DRAFT ENVIRONMENTAL IMPACT REPORT – Volume 1

Biosolids Digester Facilities Project

PLANNING DEPARTMENT
CASE NO. **2015-000644ENV**

STATE CLEARINGHOUSE NO. 2015062073

	Draft EIR Publication Date:	**May 3, 2017**
	Draft EIR Public Hearing Date:	**June 1, 2017**
	Draft EIR Public Comment Period:	**May 4, 2017 to June 19, 2017**

SAN FRANCISCO PLANNING DEPARTMENT

Written comments should be sent to:

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TO: Distribution List for the Biosolids Digester Facilities Project Draft EIR

FROM: Lisa Gibson, Acting Environmental Review Officer

SUBJECT: Request for the Final Environmental Impact Report for the Biosolids Digester Facilities Project (Planning Department File No. 2015-000644ENV)

This is the Draft of the Environmental Impact Report (EIR) for the Biosolids Digester Facilities Project. A public hearing will be held on the adequacy and accuracy of this document. After the public hearing, our office will prepare and publish a document titled "Responses to Comments," which will contain a summary of all relevant comments on this Draft EIR and our responses to those comments. It may also specify changes to this Draft EIR. Those who testify at the hearing on the Draft EIR will automatically receive a copy of the Responses to Comments document, along with notice of the date reserved for certification; others may receive a copy of the Responses to Comments and notice by request or by visiting our office. This Draft EIR together with the Responses to Comments document will be considered by the Planning Commission in an advertised public meeting and will be certified as a Final EIR if deemed adequate.

After certification, we will modify the Draft EIR as specified by the Responses to Comments document and print both documents in a single publication called the Final EIR. The Final EIR will add no new information to the combination of the two documents except to reproduce the certification resolution. It will simply provide the information in one document, rather than two. Therefore, if you receive a copy of the Responses to Comments document in addition to this copy of the Draft EIR, you will technically have a copy of the Final EIR.

We are aware that many people who receive the Draft EIR and Responses to Comments have no interest in receiving virtually the same information after the EIR has been certified. To avoid expending money and paper needlessly, we would like to send copies of the Final EIR, in Adobe Acrobat format on a CD, to private individuals only if they request them. Therefore, if you would like a copy of the Final EIR, please fill out and mail the postcard provided inside the back cover to the Environmental Planning division of the Planning Department within two weeks after certification of the EIR. Any private party not requesting a Final EIR by that time will not be mailed a copy. Public agencies on the distribution list will automatically receive a copy of the Final EIR.

Thank you for your interest in this project.

BIOSOLIDS DIGESTER FACILITIES PROJECT DRAFT ENVIRONMENTAL IMPACT REPORT
Volume 1

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May 3, 2017

City and County of San Francisco
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ACRONYMS, ABBREVIATIONS, AND GLOSSARY

Acronyms and Abbreviations

°F	degrees Fahrenheit
$\mu g/m^3$	micrograms per cubic meter
AASHTO	American Association of State Highway Transportation Officials
AAU	Academy of Art University
AB	Assembly Bill
AB 32	Assembly Bill No. 32
ABAG	Association of Bay Area Governments
ACI	American Concrete Institute
ACM	asbestos-containing material
ACW	asbestos-containing waste
ADRP	archeological data recovery plan
AISC	American Institute of Steel Construction
APE	Area of Potential Effects
APEZ	Air Pollutant Exposure Zone
AMEL	average monthly effluent limit
AMP	Archeological Monitoring Program
ANSI	American National Standards Institute
APEZ	Air Pollutant Exposure Zone
AQI	Air Quality Index
AQTR	Air Quality Technical Report
ASC	Anthropological Studies Center
ASCE	American Society of Civil Engineers
ASF	Age Sensitivity Factors
AT&SF	Atchison, Topeka and Santa Fe
ATCM	Asbestos Toxic Control Measure
ATP	archeological testing plan
AWWA	American Water Works Association

BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
BACWA	Bay Area Clean Water Agencies
BART	Bay Area Rapid Transit
Basin Plan	Water Quality Control Plan for the San Francisco Bay Basin
Bay Plan	*San Francisco Bay Plan*
Bay Trail	San Francisco Bay Trail
BCDC	San Francisco Bay Conservation and Development Commission
BDFP (or project)	Biosolids Digester Facilities Project
Better Streets Plan	*San Francisco Better Streets Plan*
BFS	Bruce Flynn Pump Station
bgs	below ground surface
Bicycle Plan	*San Francisco Bicycle Plan*
Blue Book	SFMTA's *Regulation for Working in San Francisco Streets*
BMPs	best management practices
BMS	Biosolids Management System
BNSF	Burlington Northern Santa Fe
B.P.	before present
BSSC	Building Seismic Safety Council
Btu	British thermal unit
CAA	Clean Air Act
CAC	Citizens' Advisory Committee
CA FID UST	Facility Inventory Database
CalEPA	California Environmental Protection Agency
CAL FIRE	California Department of Forestry and Fire Protection
California Register	California Register of Historical Resources
Cal/OSHA	California Division of Occupational Safety and Health
CalRecycle	California Department of Resources Recycling and Recovery
Caltrans	California Department of Transportation
CAP	Clean Air Plan
CAPCOA	California Air Pollution Control Officers Association
C-APE	CEQA Area of Potential Effects
CARB	California Air Resources Board
CARE	Community Air Risk Evaluation
CBC	California Building Code

CCAA	California Clean Air Act
CCR	California Code of Regulations
CCSF (or City)	City and County of San Francisco
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CER	Conceptual Engineering Report
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CGS	California Geological Survey
CH_4	methane
CHMIRS	California Hazardous Material Incident Reporting System
City (or CCSF)	City and County of San Francisco
CIWMA	California Integrated Waste Management Act
CMP	Congestion Management Program
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2E	carbon dioxide-equivalent
CO-CAT	Coastal and Ocean Working Group of the California Climate Action Team
CPF	Cancer Potency Factors
CRRP	Community Risk Reduction Plan
CSD	combined sewer discharge
CSO Control Policy	Combined Sewer Overflow Control Policy
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
cy	cubic yards
D/T	dilution to threshold ratio
dB	decibel
dBA	A-weighted decibel

DBI	Department of Building Inspection
DEHP	di (2-ethylhexyl) phthalate
DEM	San Francisco Department of Emergency Management
DGS NGS	Department of General Services Natural Gas Services
district	*Southeast Treatment Plan Streamline Moderne Industrial Historic District*
DOE	Department of Environment
DOGGR	Division of Oil, Gas, and Geothermal Resources
DOSH	Division of Occupational Safety and Health (also known as "Cal/OSHA")
DPF	diesel particulate filter
DPM	diesel particulate matter
DPR	California Department of Parks and Recreation
D/T	dilution to threshold ratio
DTSC	Department of Toxic Substances Control
EDD	State of California Employment Development Department
EFH	Essential Fish Habitat
EIR	environmental impact report
EMI	Emissions Inventory Data
EMU	electric multiple unit
ENSO	El Niño–Southern Oscillation
EO	Executive Order
EOC	Emergency Operations Center
EP	Environmental Planning Division of the San Francisco Planning Department
EQ	(Class A Biosolids) Exceptional Quality
ERO	Environmental Review Officer
ERP	Electricity Resource Plan
ESA	Environmental Site Assessment
ESL	Environmental Screening Level
FAA	Federal Aviation Administration
FARR	Final Archeological Resources Report
Far Western	Far Western Anthropological Research Group
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHWA	Federal Highway Administration

FIRM	Flood Insurance Rate Map
First Update	*First Update to the Climate Change Scoping Plan*
FRA	Federal Railroad Administration
FSD	Forensic Service Division
FTA	Federal Transit Administration
FWHA	Federal Highway Administration
g	gravity
GBT	gravity belt thickener
General Plan	*San Francisco General Plan*
GHG	greenhouse gas
GHGRP	Greenhouse Gas Reporting Program
GIS	geographic information system
gpd	gallons per day
gpm	gallons per minute
GSA	General Services Agency (City and County of San Francisco)
gsf	gross square feet
GSRs	General Seismic Requirements
H_2S	hydrogen sulfide
HABS	Historic American Building Survey (HABS)
HAER	Historic American Engineering Record
HAZNET	Facility and Manifest Data
HEPA	High Efficiency Particulate Air Filter
HERO	Human and Ecological Risk Office
HHRA	Human Health Risk Assessment
Highway 101	U.S. Highway 101
HIST UST	Hazardous Substance Storage Container Database
HMBP	Hazardous Materials Business Plan
hp	horsepower
HRA	health risk assessment
HRSG	Heat Recovery Steam Generator
HUD	U.S. Department of Housing and Urban Development
HVAC	heating, ventilation, and air conditioning
I-280	Interstate 280
I-80	Interstate 80
IADG	Industrial Area Design Guidelines

IBC	International Building Code
ICS	influent control structure
ICTF	Intermodal Container Transfer Facility
in/sec	inches per second
IPCC	Intergovernmental Panel on Climate Change
ISCOTT	Interdepartmental Staff Committee on Traffic and Transportation
JPB	Joint Powers Board
km	kilometer
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hours
LASH	Lighter Aboard Ships
LCC	Less than Cumulatively Considerable
L_{dn}	day-night noise level
LED	light emitting diode
LEED®	Leadership in Energy and Environmental Design
LID	low-impact development
LiDAR	Light Detection and Ranging
LOS	Level of Service
LS	Less than Significant impact
LSM	Less than Significant impact with Mitigation required
LUST	leaking underground storage tank
MD	Metropolitan Division
MDEL	maximum daily effluent limit
MEI	maximally exposed individual
MEISR	maximally exposed individual sensitive receptor
MG	million gallon
mgd	million gallons per day
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/L as N	milligrams per liter as nitrogen
mg/m^3	micrograms per cubic meter
MHHW	Mean Higher High Water
MHW	mean high water
million $MTCO_2E$	million gross metric tons of carbon dioxide-equivalent

MLD	Most Likely Descendant
MLP	maximum load point
mm/s	millimeters per second
MMBtu/hr	million British thermal units per hour
MMRP	Mitigation Monitoring and Reporting Program
$MMTCO_2E$	million metric tons of carbon dioxide-equivalent
MnO_4	manganate (VII) ion
mph	miles per hour
MPO	metropolitan planning organization
MRR	Mandatory Reporting of Greenhouse Gas Emissions
MRZ	Mineral Resource Zone
MS4	Small Municipal Separate Storm Sewer System
MSM	mobile source measure
MTBE	methyl tert-butyl ether
MTC	Metropolitan Transportation Commission
$MTCO_2E$	metric tons of carbon dioxide-equivalent
MTS	Metropolitan Transportation System
Muni	San Francisco Municipal Railway
MW	megawatt
Mw	moment magnitude
MWh	megawatt-hours
N_2O	nitrous oxide
n/a	not applicable
NAAQS	national ambient air quality standards
NAHC	Native American Heritage Commission
National Register	National Register of Historic Places
NAVD88	North American Vertical Datum of 1988
NED	National Elevation Dataset
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
ng/m^3	nanograms per cubic meter
NHPA	National Historic Preservation Act
NI	No Impact
NIOSH	National Institute for Occupational Safety and Health
NMFS	National Marine Fisheries Service

NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOP	Notice of Preparation
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPF	North Point Wet Weather Facility
NPS	National Park Service
NRC	National Research Council
NRCS	Natural Resources Conservation Service
NR-NHL	National Register-National Historic Landmark
NSMCSD	North San Mateo County Sanitation District
NSR	New Source Review
NWIC	Northwest Information Center
O&M	operations and maintenance
OCII	Office of Community Investment and Infrastructure
OCS	overhead contact system
OEHHA	California Office of Environmental Health Hazard Assessment
OES	Office of Emergency Services
OEWD	Office of Economic and Workforce Development
OHP	Office of Historic Preservation
OPR	Office of Planning and Research
OSHA	Occupational Safety and Health Administration
OSP	Oceanside Water Pollution Control Plant
PCBs	polychlorinated biphenyls
PG&E	Pacific Gas and Electric Company
Planning Department	San Francisco Planning Department
PM	particulate matter
$PM_{2.5}$	particulate matter of 2.5 microns in diameter or less
PM_{10}	particulate matter of 10 microns in diameter or less
Port	Port of San Francisco
POTWs	publicly owned treatment works
ppb	part per billion
pphm	parts per hundred million
ppm	parts per million
ppi	pixels per inch

PPV	peak particle velocity
PRC	California Public Resources Code
PRMMP	Paleontological Resources Monitoring and Mitigation Program
project	Biosolids Digester Facilities Project
QACL	Qualified Archeological Consultants List
R&R	Repair and Replacement
RCRA	Resource Conservation and Recovery Act
RCRA-LQG	Resource Conservation and Recovery Act-Large Quantity Generator
RCRA-SQG	Resource Conservation and Recovery Act-Small Quantity Generator
RFP	Request for Proposals
RGA LUST	Recovered Government Archive Leaking Under Ground Storage Tank
RMC	RMC Water and Environment
ROG	reactive organic gases
RPS	Renewables Portfolio Standard
RWQCB	Regional Water Quality Control Board
SAAQS	state ambient air quality standards
SamTrans	San Mateo County Transit District
SARA	Superfund Amendments and Reauthorization Act
SB	Senate Bill
SCADA	supervisory control and data acquisition
Scoping Plan	*Climate Change Scoping Plan*
SCT	South Container Terminal
SD3	Superdistrict 3
SDC	Seismic Design Category
SECF	Southeast Community Facility
SEI	Structural Engineering Institute
SEP	Southeast Water Pollution Control Plant (Southeast Plant)
SEP North	SEP facilities north of Jerrold Avenue
SEP South	SEP facilities south of Jerrold Avenue
SEWG	Southeast Working Group
SFBAAB	San Francisco Bay Area Air Basin
SF-CHAMP	San Francisco Chained Activity Modeling Process
SFCTA	San Francisco County Transportation Authority
SFD	San Francisco City Datum
SFDE	San Francisco Department of the Environment

SFDPH	San Francisco Department of Public Health
SFPW	San Francisco Public Works
SFFD	San Francisco Fire Department
SF Guidelines	San Francisco Transportation Impact Analysis Guidelines
SFMTA	San Francisco Municipal Transportation Agency
SFO	San Francisco International Airport
SFPD	San Francisco Police Department
SFPUC	San Francisco Public Utilities Commission
SFRPD	San Francisco Recreation and Parks Department
SFSD	San Francisco Sheriff's Department
SFSU	San Francisco State University
SHPO	State Historic Preservation Officer
SID	Strategic Incentives Division
SLR	sea level rise
SM	Significant and Unavoidable with Mitigation
SMARA	Surface Mining and Reclamation Act
SPC	Seismic Performance Class
SO_2	sulfur dioxide
SRF	State Revolving Fund
SSIP	Sewer System Improvement Program
STLC	soluble threshold limit concentration
STC	Sound Transmission Class
SU	Significant and Unavoidable
SUM	Significant and Unavoidable with Mitigation
SVOC	semi-volatile organic compound
SVP	Society of Vertebrate Paleontology
SWEEPS UST	Statewide Environmental Evaluation and Planning System Underground Storage Tank
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAAS	total annual available sunlight
TAC	toxic air contaminant
TASC	Transportation Advisory Staff Committee
TAZ	Traffic Analysis Zone
TC	Traffic Company

TCLP	toxic characteristic leaching procedure
TDM	Transportation Demand Management
THP	thermal hydrolysis process
THS	thermally hydrolyzed sludge
TIFF	Tagged Image File Format
TIM	Transportation Information Map
TMDLs	total maximum daily loads
TOG	total organic gases
tpd	tons per day
TPH	total petroleum hydrocarbons
TPZ	Tree Protection Zone
TTLC	total threshold limit concentration
UCMP	University of California Museum of Paleontology
UPRR	Union Pacific Railroad
USA North	Underground Service Alert of Northern California
USC	United States Code
USC&GS	U.S. Coast and Geodetic Survey
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	underground storage tank
UWMP	Urban Water Management Plan
VDECS	verified diesel emission control strategy (or strategies)
VFA	volatile fatty acids
VMT	vehicle miles traveled
VOC	volatile organic compound
WDRs	Waste Discharge Requirements
WEAP	Worker Environmental Awareness Program
WETA	Water Emergency Transportation Authority
WHO	World Health Organization
WSA	water supply assessment

Glossary

100-year flood	A flood event that has a 1 percent chance of occurring in any given year.
Activated carbon	Carbon that has been treated to increase the surface area available for adsorption, typically through pyrolysis (burning) or other types of oxidation.
Activated sludge	The combination of microorganisms that are maintained in suspension in wastewater undergoing secondary treatment via the activated sludge treatment process.
Activated sludge treatment process	The conventional activated sludge treatment process is a commonly used method to remove the soluble/non-settleable organic solids from primary effluent with the assistance of microorganisms. The microorganisms consume the organics and grow additional microorganisms, and then are settled out of the water after a certain amount of time. This is achieved through a two-stage process. First, primary effluent is mixed with an inventory of microorganisms ("activated sludge") in an aeration tank. Air or oxygen is supplied to the aeration tank to encourage microbial growth. Then the liquids in the aeration tank are transferred to secondary clarifiers, where the microbial solids settle by gravity and are separated from the treated water. The majority of the microbial solids collected from the secondary clarifier back to the aeration tank to seed additional microbial activity; these microbial solids are called "return activated sludge." In order to maintain the correct balance of microorganisms in the aeration tank, the remaining microbial solids from the clarifier, collectively called "waste activated sludge," are sent to the digesters.
Active fault	An earthquake fault that shows geologic evidence of movement within Holocene time (approximately the last 11,000 years).
Adsorption	Occurs when a molecule is held physically on the surface of an adsorbent material, as opposed to absorption, in which a molecule chemically reacts with the absorbing material. Adsorbed molecules can also be desorbed (i.e., removed) from the material.
AERMOD	The United States Environmental Protection Agency's preferred or recommended steady state air dispersion plume model. It is used for dispersion modeling in order to assess emissions from primary sources.
Ammonia	Ammonia is a nutrient that contains nitrogen and hydrogen. Its chemical formula is NH_3 in the un-ionized state and NH_4^+ in the ionized form. Total ammonia is the sum of both un-ionized and ionized ammonia.
Ammonia scrubbers	Ammonia scrubbers are a technology used for the control of ammonia emissions. Sulfuric acid or acidic leachate is used as a scrubbing solution to absorb the ammonia, which is collected and removed in a form of salt (e.g., ammonium sulfate).

Anaerobic digestion	Anaerobic digestion is a method of treating wastewater solids using oxygen-starved biological processes to inactivate bacteria and pathogens (disease-causing organisms), break down organic matter and produce stabilized biosolids and biogas.
A-weighted decibel (dBA)	A scale of noise measurement that approximates the range of sensitivity of the human ear to sounds of different frequencies.
B20 biodiesel	A blend of biodiesel (defined below) and petroleum diesel in which between 6 and 20 percent of the blended fuel is biodiesel.
Belt filter press	A machine that applies mechanical pressure to a chemically (polymer) conditioned solid stream to remove water from the solids. The mechanical pressure is applied by sandwiching the solids between tensioned belts that pass through a series of rollers. This process separates the solid stream into a filtrate (reject water stream) and a concentrated solid (cake).
Beneficial reuse	Treated biosolids can be beneficially reused for a variety of uses such as landfill cover, agricultural land application, soil blending, and compost. Class A biosolids have fewer restrictions on end uses.
Biodiesel	A fuel produced using a transesterification process from biological feedstock sources including fats, oils and greases. Biodiesel is chemically different from petroleum diesel and renewable diesel (defined below) because it contains oxygen atoms. Biodiesel can be used in its pure form or blended with petroleum diesel.
Biofiltration	Biofiltration is a proposed odor control technology. In biofiltration, odorous air is passed through a biologically active collection of peat, soil, or other engineered media, where microbes in the media degrade odorous chemical compounds.
Bioregion	An area defined by a combination of ecological, geographic, and social criteria and consists of a system of related, interconnected ecosystems.
Biosolids	Biosolids are the recyclable solid materials removed from the wastewater during the treatment process When treated and processed, these nutrient-rich residuals can be recycled and applied as fertilizer to improve and maintain productive soils and stimulate plant growth.
Blind-thrust faults	Low-angled subterranean faults that have no surface expression.
Cake	Industry term used to denote dewatered biosolids. Typically consistency is 16 percent to 26 percent solids and the cake has the appearance of damp soil. The term is applied equally to Class A or Class B biosolids.
CALPUFF	An advanced, non-steady-state meteorological and air quality monitoring system adopted by the United States Environmental Protection Agency as the preferred model for assessing long-range transport of pollutants in certain circumstances and on a case-by-case basis for certain near-field applications involving complex metrological conditions.

Carbon dioxide-equivalents Greenhouse gas emissions are frequently measured in carbon dioxide-equivalents due to the differential heat absorption potential of various greenhouse gases. Carbon dioxide-equivalents present a weighted average based on each gas's heat absorption (or "global warming") potential.

Chemisorption A process during which potassium permanganate media converts odorous gases into harmless microscopic particles, which remain trapped in the media.

Class A biosolids As defined by 40 CFR 503.32(a), these are biosolids in which the pathogens (including enteric viruses, pathogenic bacteria, and viable helminth ova) are reduced below detectable limits. Class A biosolids that meet the United States Environmental Protection Agency's metals pollutant limits are labeled "Exceptional Quality (EQ)" biosolids and have the fewest restrictions for land applications such as soil conditioning and fertilizer.

Class B biosolids As defined by 40 CFR 503.32(b), these are biosolids in which the pathogens are reduced to levels that are unlikely to pose a threat to public health and the environment under specific use conditions, including site and cropping restrictions.

Cogeneration Cogeneration, or combined heat and power, is the use of a heat engine to generate electricity and useful heat at the same time. At wastewater treatment facilities that have anaerobic digesters, the methane gas produced can be used to produce thermal energy (heat) and electricity (power) and reduce operational energy costs.

Combined sewer system A sewer system that collects both wastewater and stormwater in a single pipeline and conveys them to facilities for treatment and discharge.

Dechlorination The process of removing chlorine from treated wastewater that has been chlorinated for disinfection. Dechlorination is intended to protect aquatic resources.

Dewatering The process of removing excess water by mechanical means (centrifuge or belt press) from biosolids to minimize moisture content and volume.

Digester gas Gas produced by the biological breakdown of organic matter in the absence of oxygen. Digester gas is biogas produced from the anaerobic digestion or fermentation typically of wastewater solids (sludge). This type of biogas is comprised mostly of methane and carbon dioxide.

Ferric chloride Ferric chloride ($FeCl_3$) is an iron salt in an oxidized state. In wastewater treatment ferric chloride is used to control the buildup of struvite (defined below) in digesters, pipes, and other equipment. It is considered hazardous due to its corrosivity.

Filtrate The liquid separated from the gravity belt thickeners or belt filter presses during solids treatment.

Gravity belt thickeners	Thickening is the process by which solids are condensed. Thickening wastewater solids reduces the volume and improves operation. Gravity belt thickeners condense wastewater solids using gravity drainage of liquid through a filter belt.
Headworks	Collective term that refers to both screenings and grit removal (or pre-treatment) facilities that occur upstream of primary and secondary treatment.
Hibernaculum	The winter quarters of a hibernating animal.
Holocene fault	An earthquake fault that has shown geologic evidence of movement within Holocene time (approximately the last 11,000 years). Historic faults are Holocene faults that have also demonstrated fault movement within the last 200 years.
Hydric soil	Soil that is permanently or seasonally saturated by water.
Hydrogen sulfide	Hydrogen sulfide is a gas with a rotten egg odor. The gas is produced by bacteria under anaerobic conditions, such as in digesters. At high concentrations, hydrogen sulfide gas is particularly dangerous because it is only noticeable for a short time before it dulls the sense of smell. The gas is poisonous to the respiratory system, explosive, flammable, and colorless. Hydrogen sulfide contained in biogas (defined above) can cause odors, corrosiveness, and sulfur emissions when the gas is burned.
Jurisdictional features	Waters or wetlands subject to the jurisdiction of the U.S. Army Corps of Engineers, Regional Water Quality Control Board, or California Department of Fish and Wildlife pursuant to the federal Clean Water Act, Porter Cologne Water Quality Act, or California Fish and Game Code.
Leq	Time variations in noise exposure over time are typically expressed in terms of a steady-state energy level (L_{eq}) that represents the acoustical energy of a given measurement.
Light Detection and Ranging (LiDAR)	A remote sensing technology that measures distance by illuminating a target with a laser and analyzing the reflected light. LiDAR is commonly used to create high-resolution terrain models, topography data sets, and topographic maps.
Liquefaction	A phenomenon in which saturated granular sediments temporarily lose their shear strength during periods of earthquake-induced, strong ground shaking. The susceptibility of a site to liquefaction is a function of the depth, density, and water content of the granular sediments, as well as the magnitude of an earthquake. Saturated, unconsolidated silts, sands, silty sands, and gravels within 50 feet of the ground surface are most susceptible to liquefaction.
Lmax	The maximum, instantaneous noise level registered during a measurement period.

Mean Higher High Water (MHHW)	The average elevation of the higher of the day's two high tides. MHHW is calculated as the average elevation of the daily high water levels observed over a 19-year period known as the "tidal epoch."
Media	As used in this EIR, a term used to describe the material within a filter system, such as activated charcoal, sand, sponge, or cloth.
Mesophilic anaerobic digestion	A method of treating wastewater solids using biological processes to inactivate bacteria and pathogens (disease-causing organisms) and produce stabilized organic biosolids, biogas, and water. Mesophilic anaerobic digesters operate at temperatures of 95 degrees Fahrenheit (°F) to 105 °F.
Moment magnitude (Mw)	A measurement of the amount of energy produced by an earthquake. Moment magnitude is directly related to the average slip rate and fault rupture area. Because of the logarithmic basis of the scale, each whole number increase in magnitude represents a tenfold increase in the measured amplitude of an earthquake wave. As an estimate of energy, each whole number step in the magnitude scale corresponds to the release of about 31 times more energy than the amount associated with the preceding whole number value.
Outfall	A pipe structure that carries treated effluent into deep offshore locations for final disposal. Effluent from the Southeast Water Pollution Control Plant (SEP) is discharged in central San Francisco Bay via the Southeast Bay Outfall.
Pathogen	A biological agent that causes disease or illness (e.g., viruses, bacteria, and protozoa such as cryptosporidium and giardia).
Piezometer	A type of well installed to monitor groundwater levels below the ground surface.
Polymer	Generally a type of chemical made up of large molecules; in wastewater treatment, a chemical used to promote thickening in the treatment process.
Potassium permanganate	A chemical compound containing potassium and the manganite (VII) ion (MnO_4^-), a strong oxidizing agent.
Potentially active fault	An earthquake fault that shows geologic evidence of movement during the Quaternary (approximately the last 1.8 million years).
Pre-treatment	Pre-treatment of wastewater generally describes the process of removing large solids from wastewater. This is achieved by using screens to capture large debris and grit and then holding the wastewater in basins to settle the heavier non-organic solids (such as sand and gravel) from the water.
Primary sedimentation tank	Large tanks used in the primary treatment process for the settling or sedimentation of suspended solids from pre-treated wastewater.

Primary sludge	The organic solids that settle out of wastewater during the primary treatment process.
Primary treatment	Typically the first major treatment step in a wastewater treatment plant after pre-treatment. It is a physical (settling) process used to remove settleable solids. The primary clarification stage is to produce both a generally homogeneous liquid capable of being treated biologically and a sludge that can be separately treated or processed.
Quaternary fault	An earthquake fault that has demonstrated displacement within last 1.8 million years.
Renewable diesel	Renewable diesel is produced from biological feedstock sources including fats, oils and greases. Chemically, renewable diesel is indistinguishable from petroleum diesel.
Reverse fault	An earthquake fault with predominantly vertical movement in which the upper block moves upward in relation to the lower block; a thrust fault is a low-angle reverse fault.
Secondary treatment	The treatment of wastewater after primary sedimentation. Secondary treatment, also known as biological treatment, is designed to substantially remove the organic content of the sewage that is typically derived from human waste, food waste, soaps, and detergent.
Serpentine	A naturally occurring group of minerals that can be formed when ultramafic rocks are metamorphosed during uplift to the earth's surface. Serpentinite is a rock consisting of one or more serpentine minerals.
Shadow fan	A diagram that shows the maximum extent of the shadows cast by a building throughout the year, between one hour after sunrise and one hour before sunset. The preliminary shadow fan is typically based on full buildout of the zoning envelope, including complete lot coverage and maximum building height.
Siloxanes	Man-made organic compounds containing silicon, oxygen, and methyl groups that are commonly used in personal hygiene, health care, and industrial products and consequently are found in wastewater. After liquid and solids treatment, siloxanes are present in biogas. When biogas is combusted in energy recovery equipment, siloxanes are oxidized to silica (sand) that causes equipment wear. Removal of siloxanes from biogas prior to combustion extends the life of the power-generating equipment and reduces maintenance requirements.
Solids	Suspended material removed from wastewater; also used to describe the residue after each treatment stage.

Storm surge	Storm surge occurs when persistent high winds and changes in air pressure push water toward the shore. This can raise the water level near the shoreline by several feet and may persist for several days. The degree of storm surge depends on the severity of the storm as well as tidal levels at the time of the storm.
Struvite	Struvite is chemically equivalent to magnesium ammonium phosphate hexahydrate. It forms when concentrations of soluble magnesium, ammonium, and orthophosphate exceed levels that promote the formation of crystals. Ferric chloride is used upstream and downstream of digesters in order to prevent struvite from building up and clogging wastewater treatment equipment.
Switchgear	A combination of electrical disconnect switches, fuses, or circuit breakers in an electric power system.
Thermal hydrolysis process (THP)	A pre-treatment of solids used in combination with anaerobic digestion to produce Class A biosolids. The process pre-heats, hydrolyzes, and sterilizes solids. The solids are heated with steam under pressure and held for a specified time in order to destroy pathogens, and then pressure is rapidly reduced to rupture microbial cells, making the solids more biodegradable and allowing for better methane production during the subsequent anaerobic digestion process.
Ultramafic rock	A type of igneous rock (formed at high temperatures well below the surface of the earth) that is rich in iron and magnesium.
Volatile organic compounds (VOCs)	Precursor pollutants (e.g., benzene, formaldehyde, and methylene chloride) that form ground-level ozone.
Waste activated sludge	The solids generated during the conventional activated sludge treatment process. The biomass is generated after microbial activity and settlement in the secondary treatment process.
Wind rose	A figure used to display how wind speed and direction are typically distributed at a particular location. The length of each spoke is related to the frequency of time that the wind blows from each direction, while the colored segments within the spoke correspond to different wind speed ranges.

SUMMARY

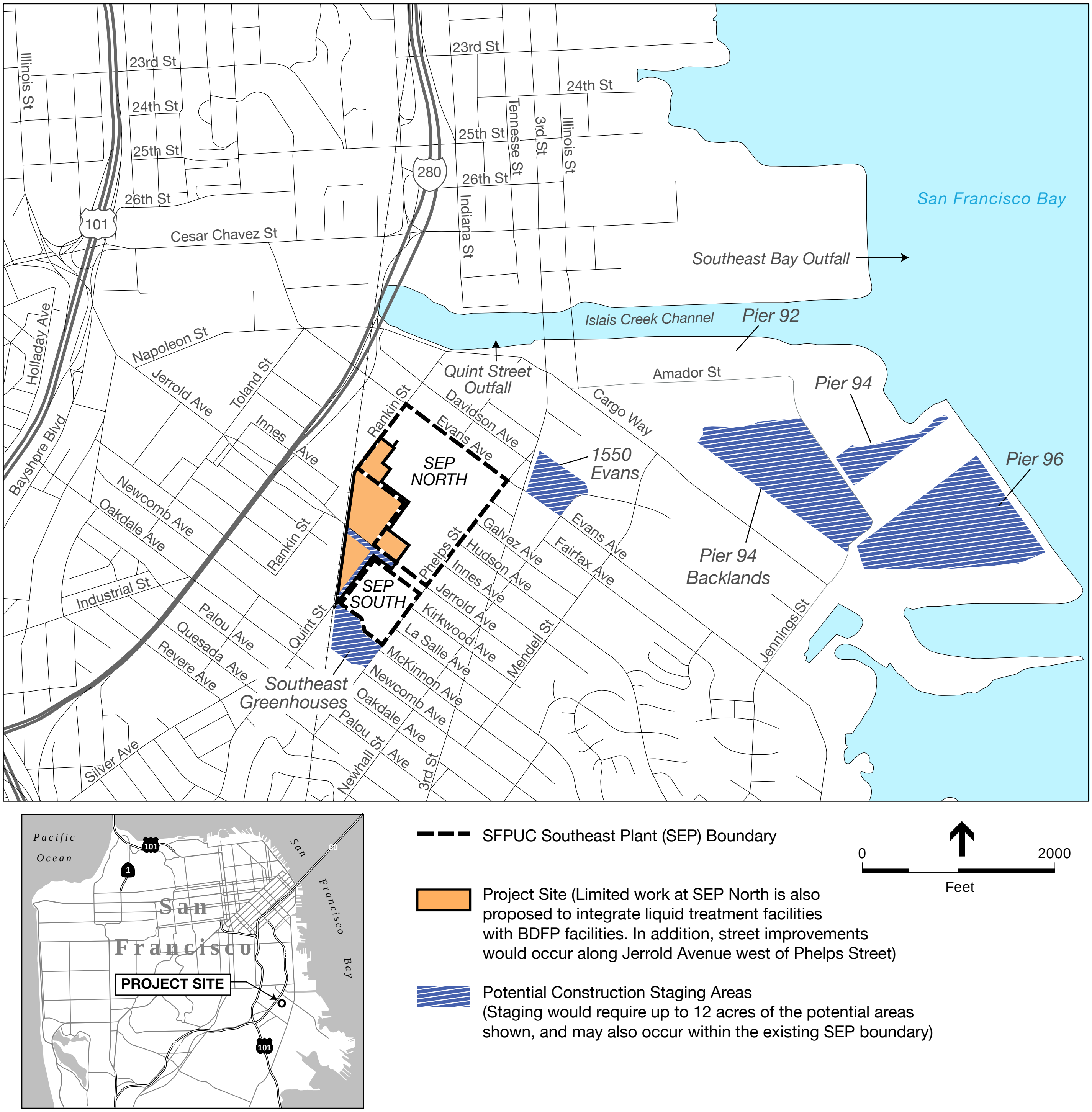
S.1 Introduction and Purpose of the Project

The San Francisco Public Utilities Commission (SFPUC) proposes to construct new solids treatment, odor control, energy recovery, and associated facilities as part of improvements to the wastewater treatment facilities at the existing Southeast Water Pollution Control Plant (Southeast Plant or SEP), located in the southeast part of San Francisco (refer to **Figure S-1**). The Biosolids Digester Facilities Project (BDFP or project) would replace the outdated existing solids treatment facilities with more reliable, efficient, and modern technologies and facilities. Biosolids are the recyclable solid materials removed from the wastewater during the wastewater treatment process and digesters are the major facility used in the solids treatment process. Many of the existing SEP solids treatment facilities are over 60 years old, require significant maintenance, and are operating well beyond their useful life. The project would replace the existing digesters with new digesters and other new facilities that produce higher-quality biosolids, capture and treat odors more effectively, and maximize digester gas[1] utilization and energy recovery for the production of heat, steam, and electrical power. In addition, the project would locate the digesters farther away from existing residences, limit project-generated odors to the SEP fence line, and make visual improvements in and around the SEP.

This environmental impact report (EIR) has been prepared by the San Francisco Planning Department (Planning Department) of the City and County of San Francisco (City or CCSF) in conformance with the California Environmental Quality Act (CEQA), the CEQA Guidelines (California Public Resources Code Section 15000 et seq., "CEQA Guidelines"), and Chapter 31 of the San Francisco Administrative Code. The Planning Department is the lead agency responsible for implementing CEQA for this project.

The Planning Department determined that the BDFP is subject to CEQA and that implementation of the BDFP could result in significant environmental impacts, and therefore, preparation of an EIR is required. The purpose of the EIR is to provide the public, responsible agencies, and decision makers with information about the project's potential physical effects on the environment, to identify mitigation measures to avoid or reduce significant impacts, and to evaluate alternatives to the project. The Planning Department published a Notice of Preparation on June 24, 2015 notifying responsible public agencies and the public about this decision to prepare an EIR on the BDFP and to initiate a scoping period to solicit input on the contents of this EIR. The Planning Department has considered all comments made by the public and agencies in preparing the EIR for this project.[2]

1 Digester gas is a byproduct of the anaerobic digestion process and comprised mostly of methane and carbon dioxide.
2 Refer to Chapter 1, Table 1-1, for a summary of scoping comments and where in the EIR those comments are addressed.



SOURCE: San Francisco Public Works 2005 GIS data; ESA+Orion, data developed in 2016 for BDFP

SFPUC Biosolids Digester Facilities

Figure S-1
Project Location

S.2 Background

The SFPUC is responsible for operating and maintaining the City’s wastewater collection, treatment, and disposal system, including the solid materials removed from the wastewater during the treatment process that is the subject of the BDFP. The SFPUC is currently implementing the Sewer System Improvement Program (SSIP), a 20-year, multi-billion-dollar citywide program to upgrade the City's aging sewer infrastructure and to ensure a reliable and seismically safe system. The SSIP sets forth overarching goals, levels of service, and strategies for upgrading the sewer infrastructure. The goals of the SSIP are to: (1) provide a compliant, reliable, and flexible system that can respond to catastrophic events; (2) integrate green and grey infrastructure to manage stormwater and minimize flooding; (3) provide benefits to impacted communities; (4) modify the system to adapt to climate change; (5) achieve economic and environmental sustainability; and (5) maintain rate payer affordability. The BDFP is the largest and most critical project in Phase 1 of the SSIP.

S.3 Project Objectives

The overall goal of the BDFP is to replace the existing aged and unreliable solids processing facilities at the SEP with new, modern, and efficient facilities to ensure the long-term sustainability of the SEP wastewater treatment system. The specific objectives of the BDFP are consistent with the SSIP goals, levels of service, and strategies. The specific BDFP objectives are as follows:

- Replace the existing solids treatment facilities at the SEP with new infrastructure with modern and more efficient treatment technologies to protect public health and safety and provide continued regulatory compliance;
- Maximize the efficiency of the current treatment process operations and maintenance, staffing resources, and the use of existing SFPUC infrastructure;
- Reliably meet treatment capacity for projected 2045 flows and loads associated with projected population growth;
- Beneficially use 100 percent of biosolids generated;
- Beneficially use 100 percent of digester gas generated;
- Build critical processes with redundant infrastructure to provide reliability and operational flexibility;
- Improve seismic reliability;
- Limit noticeable odors from BDFP facilities to the SEP property boundary;
- Provide visual improvements that promote a cohesive architectural design and identity at the BDFP site, enhance the overall aesthetics, and improve the public edges in a manner consistent with the surrounding neighborhood and the rest of the SEP;
- Design and site new facilities to accommodate or adapt to expected sea level rise over their expected life;
- Allow for timely construction of the proposed BDFP; and
- Maintain rate payer affordability.

S.4 Project Description

S.4.1 Project Location and Proposed Facilities

The BDFP would construct new solids treatment, odor control, energy recovery, and associated facilities at and adjacent to the SEP, located in the Bayview-Hunters Point district of San Francisco. The project facilities would be situated on portions of the SEP located at 750 Phelps Street and 1700 Jerrold Avenue, and two adjacent properties at 1800 Jerrold Avenue (Central Shops site) and 1801 Jerrold Avenue (Asphalt Plant site), as shown on **Figure S-2**. The project site encompasses approximately 562,000 square feet (12.9 acres).

Table S-1 summarizes key features of the BDFP and provides a comparison with the existing conditions at the SEP.

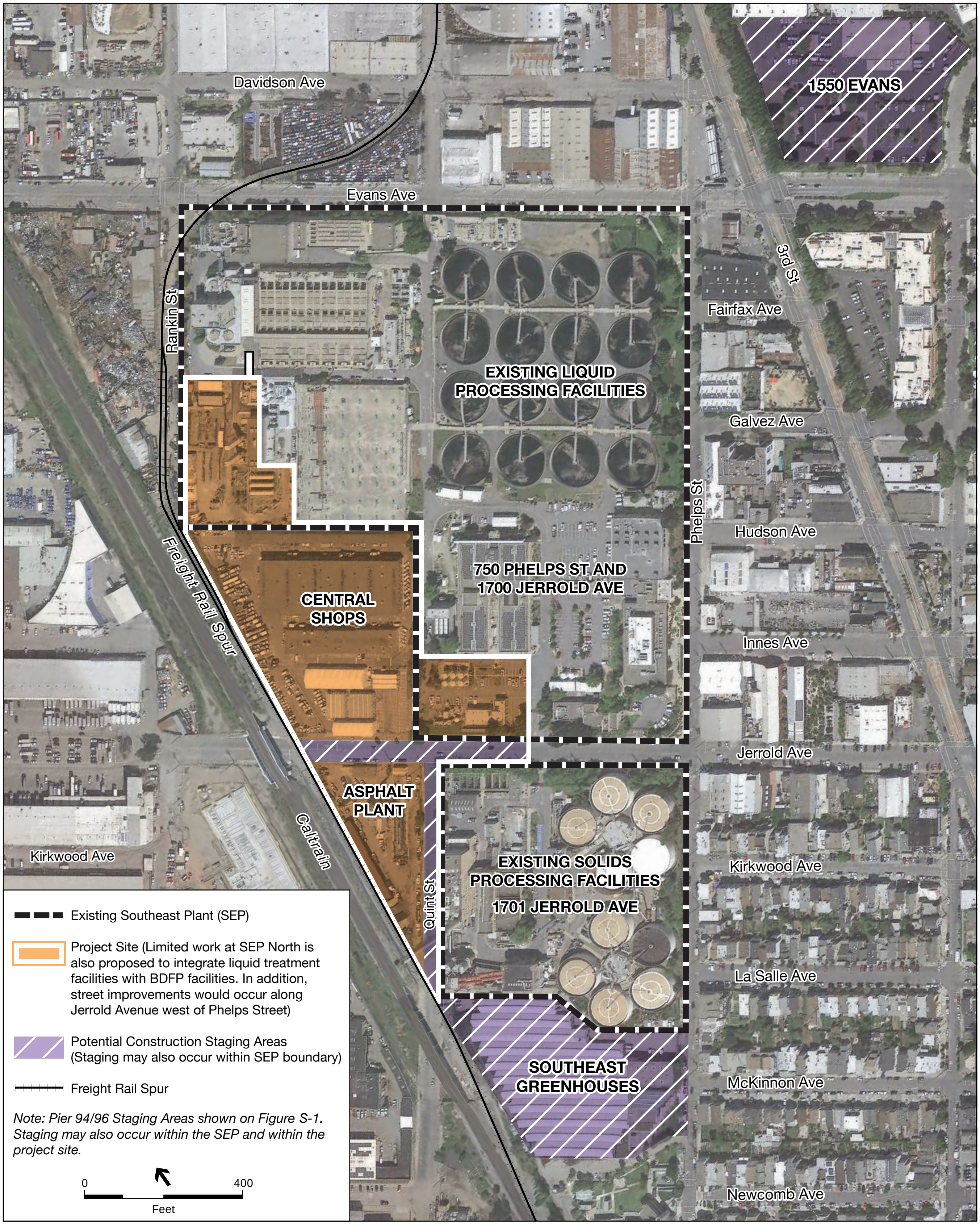
TABLE S-1
KEY FEATURES OF BIOSOLIDS DIGESTER FACILITIES PROJECT

Feature		Existing Conditions (Year 2015 unless otherwise noted)	Future Conditions with Project (Year 2045 unless otherwise noted)
SEP Property Size		2015: approximately 40 acres 2018: approximately 47 acres with anticipated expansion—1800 Jerrold Avenue (Central Shops) and 1801 Jerrold Avenue (Asphalt Plant) (acquired as separate actions)	No change from 2018
SEP Design Wastewater Flow Capacity		250 mgd (wet weather)[a] 85 mgd (dry weather design average)[a]	No change
Digester Tanks		10 digesters – 1.8 million gallons each[b] Distance to Closest Residence: <100 feet	5 digesters – 1.66 million gallons each Distance to Closest Residence: approximately 1,000 feet
Solids Treatment Process		- Thickening - Anaerobic Digestion[c] - Dewatering	- Thickening - Screening - Pre-Thermal Hydrolysis Process[d] Dewatering - Thermal Hydrolysis Process[d] - Anaerobic Digestion[c] - Biosolids Dewatering
Biosolids	Classification[e]	Class B	Class A Exceptional Quality (EQ)
	Annual Production[f]	13,000 dry tons	24,000 dry tons[g]
	Haul Trips[h]	7-10 trips/day	10-14 trips/day [g,h]
Odor Control		Does not completely contain odors from biosolids facilities to within existing SEP site boundaries	Designed to limit odors from biosolids facilities to within revised SEP site boundaries
Digester Gas[i]		Production: approximately 1.3 million cubic feet/day Flaring: routine	Production: approximately 2 million cubic feet/day Flaring: infrequent
Energy Recovery	Technology	- Internal Combustion Engine - Hot Water Boilers	- Gas Turbines - Heat Recovery Steam Generation System - Steam Boilers: Backup Only
	Electricity Generation (annual average)	Up to 2 MW	4.2-5.2 MW (2023-2045)
SEP Staffing Levels		280 staff (entire SEP including biosolids staff)	No change

NOTES: See Chapter 2, Table 2-1 for an explanation of the terms used in this table.

SEP = Southeast Water Pollution Control Plant; mgd = million gallons per day; MW = megawatts

SOURCE: SFPUC, *BDFP Conceptual Engineering Report*, March 2016; SFPUC, City and County of San Francisco Biosolids Annual Summary Report. February 19, 2016.



SOURCE: Google Maps Imagery from 2015; ESA+Orion, data developed in 2016 for BDFP

SFPUC Biosolids Digester Facilities

Figure S-2
Biosolids Digester Facilities Project Site

The key components of the BDFP include the following:

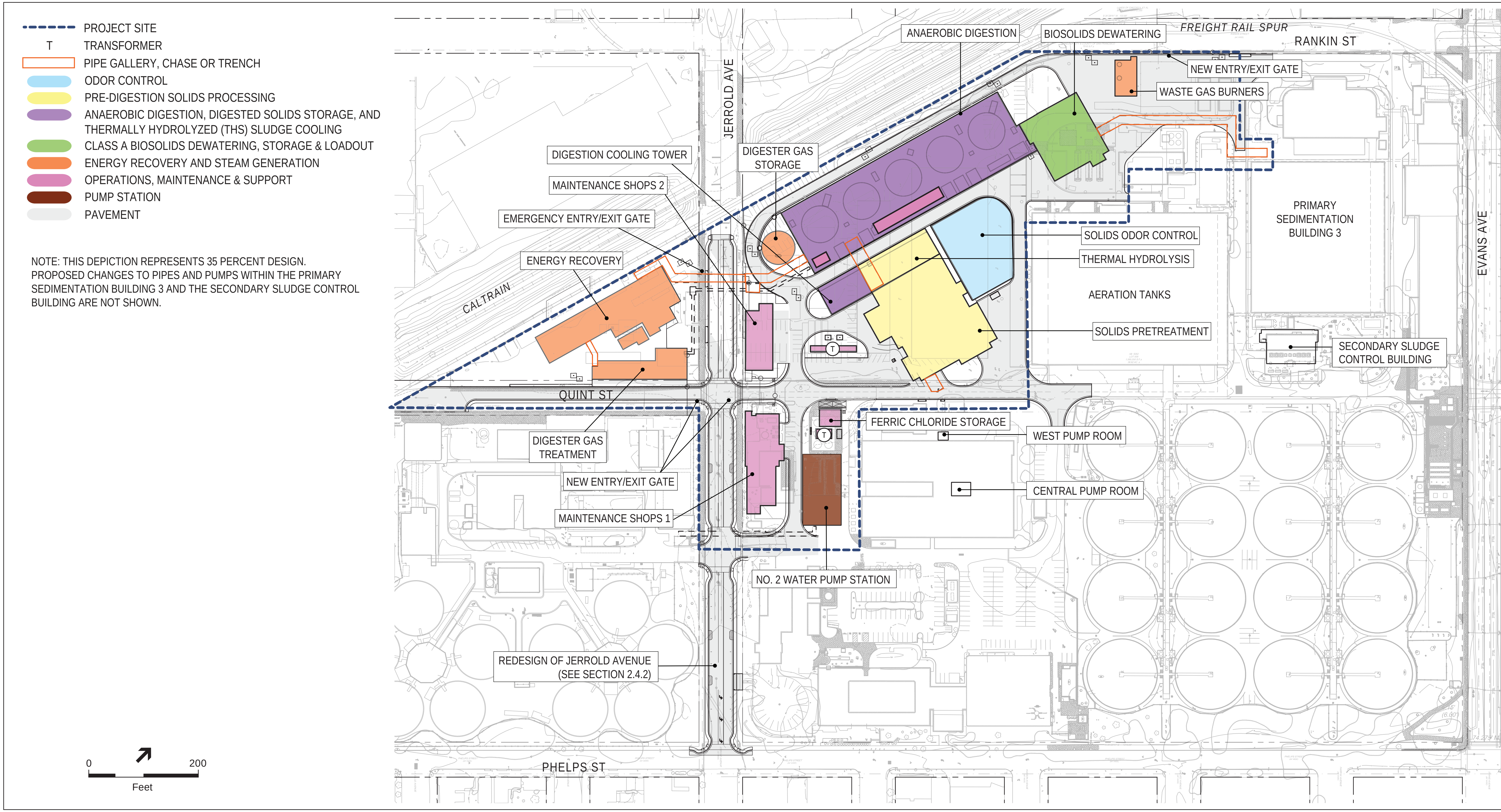
- Replacement and relocation of the solids processing treatment processes with new processes and new facilities;
- Energy recovery facilities to reuse 100 percent of the digester gas generated by the proposed solids processing facilities to produce energy for heating and power uses at the SEP;
- Odor control facilities to collect and treat odors from solids handling and energy recovery facilities;
- Water systems and pump stations;
- Support facilities such as buildings for operations and maintenance staff, and ancillary piping and electrical facilities; and
- Changes to vehicular circulation and access, landscaping, and architectural improvements.

The proposed new facilities would use a new technology to pretreat the solids upstream of the digesters; this new technology would reduce the volume of biosolids produced at the end of the treatment process, compared to the current technology used in the existing facilities. The new facilities would also upgrade the quality of the biosolids produced during the solids treatment process. The existing facilities produce Class B biosolids, which are treated but still contain detectable levels of pathogens, while the proposed facilities would produce Class A biosolids, which would have no detectable levels of pathogens, thereby expanding the options for beneficial reuse of these materials. The project would also improve odor control over existing conditions such that any odors from the proposed solids treatment process would be contained within the SEP site boundaries. In addition, the project would more than double the current energy recovery capability at the SEP, generating an estimated annual average power output ranging from 4.2 to 5.2 megawatts (MW); more than enough to power the proposed BDFP.

The BDFP would require construction of new structures on approximately 206,000 square feet of the project site and excavation in certain areas to a maximum depth of about 41 feet below grade. The height of new structures would be up to 65 feet above grade.[3] To accommodate the proposed facilities, a number of existing structures within the project site would be demolished. This includes the Central Shops buildings and existing SEP facilities within the SEP boundaries of the project site totaling about 136,000 square feet.

Figure S-3 presents the preliminary site plan showing the location and layout of the proposed facilities. **Figure S-4** presents a conceptual representation of the general massing of the proposed buildings and other structures and provides an indication of the general physical characteristics and scale of the BDFP facilities from an aerial perspective.

[3] Heights listed exclude mechanical penthouses, catwalks, and similar accessory structures that qualify for exemption from the 65-foot height limit for the project site pursuant to Section 260(b) of the San Francisco Planning Code.



SOURCE: SFPUC, SEP Biosolids Digester Facilities Project Overall Site Plan CADD files provided to ESA+Orion November 8, 2016, adapted by ESA+Orion

SFPUC Biosolids Digester Facilities

Figure S-3
Preliminary BDFP Site Plan

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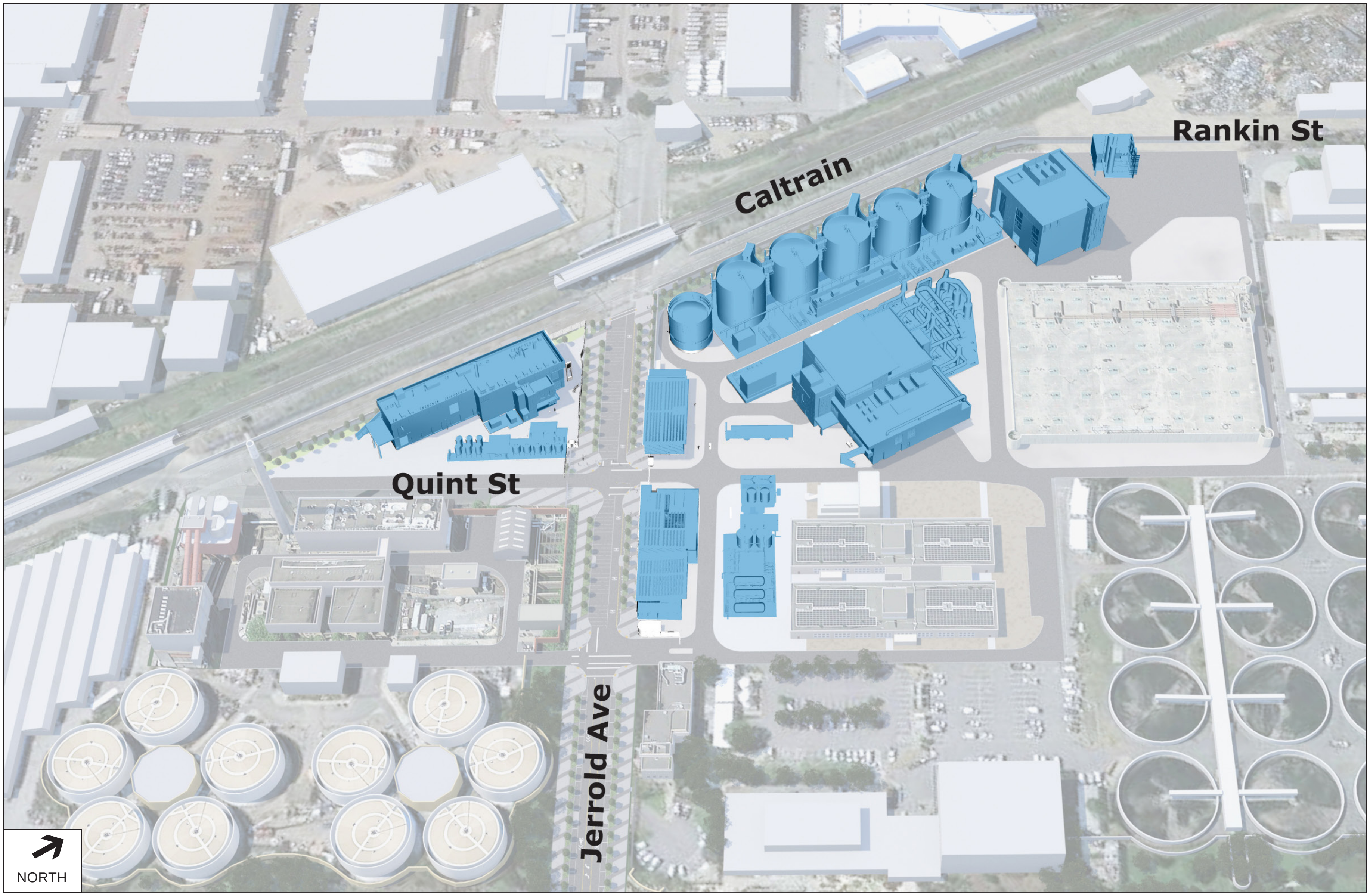

SOURCE: Brown and Caldwell, CH2M, Black & Veatch, Michael Willis Architects, SFPUC, Preliminary massing diagram provided to ESA+Orion November 8, 2016

SFPUC Biosolids Digester Facilities

Figure S-4
Preliminary Massing Diagram

S.4.2 Operations

Long-term operation of the new solids treatment and associated facilities would be integrated with the overall SEP operations. Upon completion of construction, the SFPUC would perform initial performance testing of the new biosolids digester facilities for approximately six months followed by 24 months of full facility commissioning. Testing would occur as part of this transition period, during which both old and new biosolids treatment systems would operate concurrently. As the new systems are tested, stabilized, and optimized, the BDFP would gradually increase its share of the solids treatment while the old systems are phased out. Full facility commissioning is expected to be complete in 2025.

Similar to current conditions, proposed solids treatment facilities constructed as part of the BDFP would operate as needed, 24 hours per day, seven days per week. No increase in the existing operations staff levels of about 280 people for the entire SEP is anticipated from the project.

Proposed energy recovery facilities would supply an estimated 4.2 MW energy from 1.6 million cubic feet of digester gas generated per day in 2023. As the total volume of solids to be treated by the BDFP increases over time due to anticipated population growth within the service area, the amount of digester gas generated would increase commensurately to 2 million cubic feet per day, which in turn would increase the amount of energy supplied by the turbines to approximately 5.2 MW. In the long term, the BDFP would generate more energy than needed for BDFP operations, and the excess energy would be used by other SEP facilities, decreasing the SEP's reliance on Hetch Hetchy hydropower.

S.4.3 Construction

Project construction would require five years to complete, from 2018 through 2023. During the construction period, the SFPUC would operate and maintain the existing solids treatment facilities to ensure no interruption of service and ongoing compliance with applicable regulatory permits.

Construction would require temporary use of other off-site locations for staging including construction employee parking during the five-year construction period. The BDFP would require up to 12 acres for off-site construction staging at one or more sites, in addition to areas within the project site itself. Figure S-1 shows the location of potential construction staging sites. Potential staging areas include the segments of Quint Street and Jerrold Avenue that would be closed during construction, the Southeast Greenhouses site and the 1550 Evans Avenue site if they are available for use (both owned by SFPUC), and portions of Piers 94 and 96 and the Pier 94 Backlands (administered by the Port of San Francisco and available for lease).

For most of the project construction period, construction activities at the project site would occur Monday through Friday from 7:00 a.m. to 3:30 p.m., with some activities extending to 8:00 p.m. as needed. Construction could also occur on Saturdays and Sundays when needed. Work would occur on holidays and 24 hours per day only if needed for critical facility connections. Pile driving would generally occur between 7:00 a.m. and 3:30 p.m., Monday to Friday, and at times until 8:00 p.m. consistent with the City's Noise Ordinance. During the peak of construction, a period of approximately one year, and other times during critical functions, construction would occur in two shifts per day if needed: Monday through Saturday from 7:00 a.m. to 3:30 p.m. and from 2:30 p.m. to 11:00 p.m. Nighttime work (after 8:00 p.m.) would be limited to interior facility work and outside work with minimal noise. The size of the construction work force would vary over the five-year construction period, averaging about 333 workers per day and ranging from about 133 to 550 workers per day.

The SFPUC would prepare and implement a Traffic Control Plan to minimize impacts on local street circulation during the construction period; the plan would address roadway and lane closures, signage, safety protocols, truck routes and truck controls, maintenance of pedestrian and bicycle access, and coordination with transit, hospitals, schools and emergency service providers. Due to the proposed temporary closure of Jerrold Avenue during the construction period, the Muni 23 Monterey bus route would need to be relocated.

During construction, the SFPUC would also implement a noise control plan requiring contractors to use non-impact equipment that meets the San Francisco Noise Ordinance limit of 80 dBA at 100 feet and including monitoring to confirm the noise limit is not exceeded. The SFPUC would also implement its standard construction measures, which were adopted to reduce potential environmental effects during construction and apply to all SFPUC projects.

S.5 Summary of Project Impacts and Mitigation Measures

Chapter 3 of this EIR describes the plans and policies that apply to the BDFP and identifies the potential for the BDFP to be inconsistent with those plans or policies adopted for the purpose of avoiding or mitigating environmental effects. Chapter 4 of this EIR presents the environmental impacts analyses for 18 resource areas consistent with the Planning Department Guidelines and Appendix G of the CEQA Guidelines. For each resource area, the impact analysis describes the environmental setting, identifies significance criteria used in the analysis, evaluates potential physical effects of the BDFP on both a project and cumulative basis, and provides feasible mitigation measures that would reduce the severity of significant impacts.

Table S-2 (located at the end of this chapter) summarizes all impacts identified for the proposed project in this EIR, lists the significance determination for each impact, and presents the full text of the mitigation measures identified to avoid, reduce, or otherwise lessen significant impacts.

In summary, the impact analysis determined that in 13 of the 18 resource areas, impacts would be either less than significant or no impact, generally due to the project's required compliance with applicable regulations protecting these resources, incorporation of project-specific control measures (such as traffic and noise control plans) and SFPUC standard construction measures as part of the project, and/or the limited extent that the existing resource would be affected by the project. However, in five resource areas, the EIR identified 15 significant impacts, four of which would be significant and unavoidable even with mitigation; the remaining eleven impacts would be mitigated to a less-than-significant level with implementation of identified mitigation measures.

This EIR determined that the BDFP would result in significant and unavoidable impacts in the areas of cultural resources and air quality that would remain significant and unavoidable even with implementation of feasible mitigation measures, as follows:

- Cultural Resources (impact on an identified individual historic architectural resource due to demolition of Central Shops Buildings A and B; and cumulative impact on an identified, eligible historic district, the *Southeast Plant Streamline Moderne Industrial Historic District* because implementation of the BDFP would replace the function of the existing digesters and would allow for future demolition of the digesters and other contributors to the historic district) and
- Air Quality (project construction would generate levels of nitrogen oxide emissions that would exceed significance thresholds during two of the five years of construction that would also be a cumulatively considerable contribution to regional air quality conditions).

The EIR identified significant impacts that could be mitigated to a less-than-significant level with implementation of identified mitigation measures in the following areas:

- Cultural Resources (construction effects on archeological resources and human remains),
- Noise (increase in noise levels from use of certain types of construction equipment),
- Biological resources (construction effects on roosting bats), and
- Paleontological resources (construction disturbance).

Chapter 5 evaluates the growth-inducing impacts of the BDFP and determined that the project would not have a substantial growth-inducing impact. The existing sewer system is already sized to serve the City's projected population of over 1 million residents by 2045. Together, the City's two existing wastewater treatment plants (the Southeast Plant and Oceanside Water Pollution Control Plant) currently have capacity for the projected wastewater flows expected through 2045, and the BDFP would be designed to treat the solids from these flows up to the existing capacity.[4] Project implementation would thus maintain the existing overall capacity of the SEP. The project is designed to provide solids treatment for projected wastewater flows and solids loads for the year 2045, the project's planning horizon. Over the planning period for the BDFP, the projected population growth to be served by the SEP is anticipated to increase annual average solids loads from about 187,000 pounds per day (2014) to about 280,000 pounds per day (2045).

S.6 Alternatives to the Proposed Project

Chapter 6 presents the CEQA alternatives analysis to identify potentially feasible alternatives that could avoid or substantially lessen the significant impacts identified for the project while still meeting most of the project objectives. This chapter describes the methodology used to screen and select alternatives to the project for detailed CEQA analysis, and it analyzes four alternatives in detail. For each of these four alternatives, the chapter evaluates the alternatives' impacts relative to

[4] SFPUC, 2014. *Wastewater Flow and Load Projections Technical Memorandum*. Prepared for San Francisco Public Utilities Commission Sewer System Improvement Program. Updated February 2014.

existing environmental conditions and compares the potential impacts of the alternatives with those of the proposed project. Based on this analysis, this chapter then identifies the environmentally superior alternative. The chapter also describes 19 alternative concepts that were considered but eliminated from detailed consideration in this EIR, together with the reasons why they were eliminated.

The four alternatives analyzed in this EIR and the reason they were selected are as follows:

- *Alternative A: No Project* — Would avoid all significant impacts of the project and is required by CEQA
- *Alternative B: Pier 94 Backlands* — Would avoid the project's significant impacts on the Central Shops historic architectural resource, biological resources (roosting bats), and paleontological resources
- *Alternative C: Historical Resources Relocation* — Would avoid the project's significant impact on the Central Shops historic architectural resource
- *Alternative D: SEP South/Quint Street* — Would avoid the project's significant impact on the Central Shops historic architectural resource

S.6.1 Alternative A: No Project

The No Project Alternative represents what would reasonably be expected to occur in the foreseeable future if the project were not to be approved. Under the No Project Alternative, the BDFP would not be constructed and the SFPUC would continue to operate and maintain the existing SEP solids treatment and energy recovery facilities indefinitely. The SFPUC would not demolish Central Shops Buildings A and B, an identified individual historical resource. However, because of the age and condition of the existing facilities, the SFPUC would need a more rigorous program to repair and replace facilities, requiring up to five additional permanent staff over the existing conditions. In addition, in order to maintain reliable operations, increased levels of repair and replacement of equipment and facilities would ultimately be required. This alternative would fail to meet most of the BDFP objectives.

The No Project Alternative would have the same risk of upset compared to existing conditions, but the risk of upset in the future would increase the longer the existing solids treatment facilities are in use. The risk of upset would be substantially higher than what would occur under the proposed project. The existing facilities are not built to current seismic standards, nor are they designed for future sea level rise considerations. Thus, long-term continued use of the existing solids treatment facilities under the No Project Alternative would result in an increasing risk of failure and shutdown the longer this equipment is used. A seismic event in the SEP vicinity could have severe consequences. In addition to the increased likelihood of physical damage and release during an earthquake, failure of portions of the SEP could reduce the efficacy of wastewater and solids treatment and limit the facilities available for wastewater processing. The SFPUC's ability to treat wastewater could be compromised, with implications for public health and safety as well as regulatory permit violations.

The No Project Alternative would avoid the significant and unavoidable impacts related to historical resources and construction-phase nitrogen oxide emissions identified for the proposed project. Under "normal" conditions (without breakdowns and equipment failure), the No Project Alternative would also avoid all construction and operational impacts that were identified for the project, but under possible future scenarios with breakdowns and equipment failures, there would be potential for a wide range of impacts, depending on the nature and extent of those breakdowns.

However, unlike the proposed project, the No Project Alternative would have a significant impact related to greenhouse gas emissions because it would not recapture energy from increased digester gas production (and would not improve biosolids reuse opportunities). Thus, the No Project Alternative would not be consistent with adopted policies intended to reduce statewide greenhouse gas emissions. This would also be considered a wasteful use of a local energy resource, and would be a significant impact that would not occur under the proposed project. However, there are feasible mitigation measures that could reduce these impacts to less than significant.

S.6.2 Alternative B: Pier 94 Backlands

The Pier 94 Backlands Alternative would construct the BDFP facilities on approximately 15-acres within the 27-acre Pier 94 Backlands, one of the same sites as the potential staging areas under the proposed project. Under this alternative, no construction or demolition activities would occur at the project site, and Central Shops Buildings A and B would not be demolished. This alternative was selected for evaluation because it would avoid a significant impact on a historical resource, and thus is a full preservation alternative. This alternative was also one of two sites recommended by an advisory group representing the local Bayview-Hunters Point community (the advisory group, the Southeast Digester Task Force, recommended the Central Shops site and the Pier 94 Backlands site).[5]

This alternative would also require construction and operation of multiple pipelines to convey sludge and other materials about 4,000 feet between the SEP and the Pier 94 Backlands. Under this alternative, the SFPUC would have to secure permission to use the Pier 94 Backlands site from the Port of San Francisco, and the State Lands Commission would have to make a public trust determination. The proposed facilities under this alternative would occupy a larger area than the proposed project (15 acres compared to 10 acres), and the maximum height of structures would be lower (40 feet compared to 65 feet). The distance of the digesters to the nearest residences would be greater than under the proposed project (more than 1,800 feet compared to 1,000 feet). Construction requirements at the Pier 94 Backlands site would generally be the same as those of the proposed project, but there would be additional construction required for new utilities at the site and for the pipelines construction between the Pier 94 Backlands and the SEP. Construction duration would be the same as the proposed project, but the start date for construction would be delayed by at least several years due to site acquisition and use requirements.

This alternative would meet most of the project's basic objectives, but would fail to meet those objectives related to visual improvements at the SEP, construction schedule, efficiency of existing infrastructure and resources, and rate payer affordability.

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[5] Southeast Digester Task Force for the San Francisco Public Utilities Commission, *Review of the Biosolids Digester Facility Project*, June 2, 2010.

The Pier 94 Backlands Alternative would avoid one significant and unavoidable impact on historical resources by retaining Central Shops Buildings A and B in place, but the other significant and unavoidable impacts of this alternative on historical resources and construction-phase nitrogen oxide emissions would be the same or more severe than those of the proposed project. This alternative would have additional construction noise impacts associated with pipeline construction that would not occur under the proposed project as well as increased potential for vibration impacts along the pipeline route, although these impacts could be mitigated to less than significant with similar mitigation measures to those identified for the proposed project. The Pier 94 Backlands Alternative would result in minor differences in construction-related toxic air contaminant emissions, but like the proposed project, impacts would be less than significant. Unlike the proposed project which would have significant but mitigable impacts, impacts on biological resources (roosting bats) and on paleontological resources would be less than significant at this site. All other impacts would be less than significant, assuming compliance with and implementation of all federal, state, and local regulations designed to protect the environment and implementation of SFPUC standard construction measures.

S.6.3 Alternative C: Historical Resources Relocation

The Historical Resources Relocation Alternative is a full preservation alternative that would consist of full construction and operation of the BDFP as proposed, plus the relocation and rehabilitation of Central Shops Buildings A and B to a similar industrial setting in San Francisco. The relocation, rehabilitation, and reuse of Buildings A and B would be consistent with the Secretary of the Interior's Standards and would reduce the significant and unavoidable impact on historical resources under the proposed project to a less-than-significant level. The SFPUC has identified an approximately three-acre site at Pier 90 on Amador Street east of Illinois Street and Cargo Way as a potential new location for Buildings A and B. The Pier 90 site is within a port-priority use area, and it is assumed that future uses of Buildings A and B at this site would be consistent with the existing use of the Central Shops, as well as with allowable uses within a port-priority area. Construction requirements for this alternative would be the same as those of the proposed project, with the addition of about one year at the beginning of the construction period to dismantle and transport Buildings A and B to Pier 90 plus the site preparation and construction activities required to reconstruct and rehabilitate these buildings at the new site.

This alternative would meet all the project objectives, with the exception of maintaining rate payer affordability due to the unknown costs associated with site preparations and precautions needed to dismantle, transport, and reconstruct Central Shops Buildings A and B consistent with Secretary of Interior's Standards.

Because the Historical Resources Relocation Alternative would involve full implementation of the BDFP as proposed, this alternative would have all of the same environmental impacts as those identified for the proposed project, with the exception of avoiding the significant and unavoidable impact associated with demolition of Central Shops Buildings A and B. However, the significant and unavoidable impact of this alternative on historic districts would be the same as those of the project, and the significant and unavoidable impacts associated with construction-phase nitrogen oxide emissions would be more severe than those of the proposed project because of the additional emissions resulting from relocation and rehabilitation of the Central Shops buildings. In addition, there would be impacts associated with relocation and rehabilitation of the Central Shops Buildings A and B at an off-site location, although any significant impacts could generally be mitigated to less than significant with similar mitigation measures identified for the proposed project.

S.6.4 Alternative D: SEP South/Quint Street

The SEP South/Quint Street Alternative is a full preservation alternative that would consist of construction and operation of the same processes and facilities as the proposed project, except that the project facilities would be reconfigured and located within different portions of the SEP boundaries, the Asphalt Plant site, portions of the Central Shops site, and within the right-of-way of Quint Street between Jerrold Avenue and the Caltrain right-of way. Central Shops Buildings A and B and the immediate surrounding area would be preserved, thereby avoiding the significant impact on this historical resource that would occur with its demolition under the proposed project. Under this alternative, the digesters would be located at the Asphalt Plant site, placing the digesters closer to the nearest residences (600 feet to Phelps Street and 700 feet to Oakdale Avenue) compared to the proposed project (1,000 feet). The location of the waste gas burners would also be closer to residences.

Construction of facilities within SEP South would require demolition of existing solids treatment facilities that need to operate during construction of the new facilities. Therefore, this alternative would require construction of interim facilities (e.g., gravity belt thickeners, centrifuge systems, sludge pipelines, biosolids dewatering, cake storage and loadout, etc.) at another location prior to construction, and these interim facilities would be required to operate for at least seven years, until construction is completed and the new facilities are fully commissioned. One possible site for the interim facilities is the Southeast Greenhouses site. In addition, this alternative would require permanently vacating the segment of Quint Street between Jerrold Avenue and the Caltrain right-of way for construction of both aboveground and below ground structures. This is unlike the proposed project, under which this same portion of Quint Street would be closed to the public and incorporated into the project site, but no permanent facilities would be constructed here, and relocation of underground utilities would not be required. The SEP South/Quint Street Alternative would require relocation of existing utilities under Quint Street, including a 24-inch diameter high pressure gas line. The location and extent of relocating the existing utilities has not been identified, but could require construction in locations outside of the SEP boundaries. The construction schedule for this alternative would be at least seven years, substantially longer than the five years estimated for the proposed project, and the start date of construction would be delayed by several years.

This alternative would meet most the project objectives, but would not meet the objectives related to timely construction and rate payer affordability due to the extended construction duration and delay in start date, as well as the costs associated with the substantial increase in construction requirements (building interim facilities and relocating a major gas pipeline).

The SEP South/Quint Street Alternative would result in most of the same impacts as the proposed project, plus several significant impacts that would not occur under the proposed project. Even though the Central Shops Buildings A and B would be retained in place, at least seven structures that are contributors to the eligible historic district would be demolished, a significant and unavoidable impact that would not occur under the proposed project. In addition, due to the closer proximity of sensitive receptors, health risk impacts associated with exposure to toxic air contaminants would be greater than those under the proposed project, a potentially significant impact. Increased exposure to toxic air contaminants due to closer proximity to sensitive receptors would occur during construction (due to construction equipment and trucks) as well as during operations (due to waste gas burners). The extended construction period for this alternative would extend the duration of all construction-related impacts, and specifically air pollutant emissions and noise impacts, which as stated above would occur in closer proximity to sensitive receptors, further exacerbating these impacts.

S.6.5 Environmentally Superior Alternative

Alternative C, the Historical Resources Relocation Alternative is considered to be the environmentally superior alternative among the proposed project and alternatives analyzed. With the exception of the No Project Alternative, the other alternatives would result in more severe impacts of varying degrees. Alternative C would avoid one significant and unavoidable impact of the proposed project, but would otherwise generally result in similar impacts to the project and require the same mitigation measures. However, this alternative would not meet the project objectives to the same extent as the proposed project. Due to the unknown costs to acquire a suitable relocation site for Buildings A and B and to conduct site preparations and precautions needed to dismantle, relocate, and rehabilitate Buildings A and B consistent with Secretary of Interior's Standards, it is unknown if this alternative would allow for rate payer affordability.

S.7 Areas of Known Controversy and Issues to be Resolved

On June 24, 2015, the San Francisco Planning Department issued a Notice of Preparation (NOP) to interested members of the public, organizations, and agencies to inform them of the intent to prepare an EIR on the BDFP and to provide them an opportunity to comment on the issues and provide input on the scope of the EIR. Consistent with CEQA, the Planning Department conducted a public scoping process, including a 33-day scoping period from June 24 to July 27, 2015 and a scoping meeting on July 16, 2015. No areas of scientific or technical controversy have been identified for this project. Comments received during the scoping period from community members and agencies include the following:

- Pedestrian, bicyclist and motorist safety during construction
- Transit impacts related to construction
- Overall health impacts related to truck traffic, exposure to diesel particulates and dust, and respective mitigation measures
- Construction and operations job opportunities for the community; benefits of project to the community
- Community involvement and outreach

- Use of the facility for educational and training purposes
- Conflicts with other concurrent construction projects in vicinity; potential for cumulative impacts with other projects
- Odors
- Environmental justice[6]

[6] The U.S. Environmental Protection Agency's (USEPA) Office of Environmental Justice defines environmental justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Consistent with CEQA, economic or social effects of a project are not to be treated as significant effects on the environment (CEQA Guidelines Section 15131). The EIR focuses on physical environmental effects rather than socioeconomic effects. The SFPUC is conducting a separate environmental justice analysis concurrent with the project. For more information please see the SFPUC's Land Use and Environmental Justice web page: http://sfwater.org/index.aspx?page=654

TABLE S-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Land Use, EIR Section 4.2		
Impact LU-1: The project would not physically divide an established community.	LS	No mitigation required.
Impact LU-2: The project would not conflict with land use plans and policies adopted for the purpose of avoiding or mitigating an environmental effect.	LS	No mitigation required.
Impact C-LU: The project, in combination with past, present, and probable future projects, would not physically divide an established community, nor would it conflict with applicable land use plans and policies adopted for the purpose of avoiding or mitigating an environmental effect.	LS	No mitigation required.
Aesthetics, EIR Section 4.3		
Impact AE-1: Project construction would not substantially degrade the existing visual character of the site or its surroundings or damage scenic resources.	LS	No mitigation required.
Impact AE-2: Project construction would not create a substantial new source of light or glare that could adversely affect nighttime views in the area, or could substantially impact other people or properties.	LS	No mitigation required.
Impact AE-3: Project operation would not substantially degrade the existing visual character of the site or its surroundings or damage scenic resources.	LS	No mitigation required.
Impact AE-4: Project operation would not create a substantial new source of light or glare that could adversely affect day or nighttime views in the area, or substantially impact other people or properties.	LS	No mitigation required.

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Aesthetics, EIR Section 4.3 (cont.)		
Impact C-AE-1: Implementation of the BDFP, in combination with past, present, and probable future projects in the vicinity, would not substantially degrade the existing visual character of the site or its surroundings or damage scenic resources.	LS	No mitigation required.
Impact C-AE-2: Implementation of the BDFP, in combination with past, present, and probable future projects in the vicinity, would not contribute considerably to substantial new sources of light or glare that could adversely affect nighttime views in the area, or could substantially impact other people or properties.	LS	No mitigation required.
Population and Housing, EIR Section 4.4		
Impact PH-1: Construction of the BDFP would not directly or indirectly induce substantial population growth in the area or create demand for additional housing.	LS	No mitigation required.
Impact PH-2: Operation of the BDFP would not directly or indirectly induce substantial population growth in the area or create demand for additional housing.	LS	No mitigation required.
Impact C-PH-1: The project, in combination with past, present, and probable future projects, would not directly or indirectly induce substantial population growth or create demand for additional housing.	LS	No mitigation required.

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Cultural Resources, EIR Section 4.5		
Impact CR-1: The project would cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5, including those resources listed in Article 10 or Article 11 of the San Francisco Planning Code.	SUM	**Mitigation Measure M-CR-1. Documentation of Historic Resources and Interpretive Display** Prior to demolition, the SFPUC shall retain a professional who meets the Secretary of the Interior's Professional Qualifications Standards for Architectural History to prepare written and photographic documentation of the Central Shops. The documentation effort shall be based on the National Park Service (NPS) Historic American Building Survey (HABS)/Historic American Engineering Record (HAER) Historical Report Level II Guidelines, and NPS's policy for photographic documentation as outlined in the National Register of Historic Places and National Historic Landmarks Survey Photo Policy Expansion. The written historical data for this documentation shall follow HABS/HAER standards. Efforts shall be made to locate original construction drawings or plans of the Central Shops. If located, these drawings shall be reproduced and included in the dataset. Historical information, as well as copies of building plans gathered from the prior evaluations of the SEP and Central Shops, can be reused and reformatted for this effort. Digital photography shall be used. The ink and paper combinations for printing photographs shall be in compliance with National Register-National Historic Landmark (NR-NHL) Photo Policy Expansion[1] and have a permanency rating of approximately 115 years. Digital photographs shall be taken as uncompressed, Tagged Image File Format (TIFF) files. Each image shall be 1,600 by 1,200 pixels at 330 pixels per inch (ppi) or larger in size, color format, and printed in black and white. The file name for each electronic image shall correspond with the index of photographs and photograph label. Photograph views for the dataset shall include (a) contextual views; (b) views of each side of each building and interior views, where possible; (c) oblique views of buildings; and (d) detail views of character-defining features. All views shall be referenced on a photographic key. This photographic key shall be on a map of the property and shall show the photograph number with an arrow to indicate the direction of the view. Historic photographs shall also be collected, reproduced, and included in the dataset. The SFPUC shall transmit the datasets as hardcopies on archival paper and in electronic PDF format to the History Room of the San Francisco Public Library, the San Francisco Planning Department, the archives of the San Francisco Public Utilities Commission, and to the Northwest Information Center of the California Historical Information Resource System. The SFPUC shall scope the documentation measures with San Francisco Planning Department Preservation staff. Preservation staff shall also review and approve the submitted documentation for adequacy. In addition, the SFPUC shall provide a permanent display of interpretive materials (which may include, but are not limited to, a display of photographs, a brochure, educational website or an exhibitive display) concerning the history and architectural features of the Central Shops. Development of the interpretive materials shall be supervised by an architectural historian or historian who meets the Secretary of the Interior's Professional Qualification Standards. The interpretative materials shall be placed in a prominent, public setting. A proposal describing the general parameters of the interpretive materials shall be approved by Planning Department Preservation staff prior to construction completion. The substance, media and other elements of such interpretive display shall be approved by Planning Department Preservation staff prior to completion of the project. ——— 1 National Park Service, *National Register Photo Policy Factsheet*, Updated May 15, 2013.

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Cultural Resources, EIR Section 4.5 (cont.)		
Impact CR-2: The project could cause a substantial adverse change in the significance of an archeological resource.	LSM	**Mitigation Measure M-CR-2a. Archeological Testing, Monitoring, and/or Data Recovery** Based on the results of the project Archeological Research Design and Treatment Plan[2] (ARDTP), legally-significant prehistoric archeological resources are present within the archeological C-APE. The following measures shall be undertaken to avoid any potentially significant adverse effects from the project on an historical resource under CEQA. The SFPUC shall retain the services of a qualified archeological consultant(s), based on standards developed by the City and County of San Francisco Environmental Review Officer (ERO). The archeological consultant(s) shall have demonstrated experience in geoarcheology and historical archeology. The archeological consultant shall implement archeological testing and other treatment as specified in the project ARDTP, as detailed below, which shall include archeological monitoring and data recovery as required pursuant to findings of ongoing testing and this measure. The archeological consultant's work shall be conducted in accordance with this measure and with the requirements of the project ARDTP at the direction of ERO or its designated representative and in coordination with the SFPUC. In instances of inconsistency between the requirement of the project ARDTP and of this archeological mitigation measure, the requirements of this archeological mitigation measure shall prevail. Project design changes after finalizing the ARDTP eliminated the portion of the C-APE that was identified in the ARDTP as sensitive for historical archeological resources. Testing as discussed below for historical archeological resources shall only be required if future design changes call for excavation in that location. If future project design changes further revise other parts of the C-APE, then testing shall only be required in archeologically sensitive areas that potentially would be adversely affected by project implementation. All plans and reports prepared by the consultant as specified herein shall be submitted directly to the ERO for review and comment and concurrently to the SFPUC for review and comment, and shall be considered draft reports, subject to revision until final approval by the ERO. Archeological monitoring and/or data recovery programs required by this measure could suspend construction of the affected area of the project for up to a maximum of four weeks. At the direction of the ERO, the suspension of construction can be extended beyond four weeks only if such a suspension is the only feasible means to reduce to a less-than-significant level potential effects on a significant archeological resource as defined in CEQA Guidelines Section 15064.5 (a) and (c). **Consultation with Descendant Communities**. On discovery of an archeological site[3] associated with descendant Native Americans, the Overseas Chinese, or other potentially interested descendant group, an appropriate representative[4] of the descendant group, the ERO, and the SFPUC shall be contacted. The representative of the descendant group shall be given the opportunity to monitor archeological field investigations of the site and to offer recommendations to the ERO and SFPUC regarding appropriate archeological treatment of the site, of recovered data from the site, and, if applicable, any interpretative treatment of the associated archeological site. A copy of the Final Archeological Resources Report shall be provided to the representative of the descendant group. 2 Byrd, Brian F., Philip Kaijankoski, Rebecca Allen, and Matthew Russell, Archaeological Research Design and Treatment Plan for the Biosolids Digester Facility Project, Southeast Water Pollution Control Plant, San Francisco, California. Prepared for San Francisco Public Utilities Commission, October, 2016. 3 The term "archeological site" is intended here to minimally include any archeological deposit, feature, burial, or evidence of burial. 4 An "appropriate representative" of the descendant group is here defined to mean, in the case of Native Americans, any individual listed in the current Native American Contact List for the City and County of San Francisco maintained by the California Native American Heritage Commission and in the case of the Overseas Chinese, the Chinese Historical Society of America. An appropriate representative of other descendant groups should be determined in consultation with the Department archeologist.

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Cultural Resources, EIR Section 4.5 (cont.)		
Impact CR-2 (cont.)		**Archeological Testing Program–Prehistoric Archeology.** Depending on the results of on-going prehistoric archeological testing outlined in the project ARDTP, additional testing may be required to define site boundaries of CA-SFR-171 or other prehistoric deposits at the SEP, and to assess whether redeposited and/or reworked prehistoric archeological material identified in the project ARDTP within the C-APE has sufficient integrity to contribute to the significance of known resources at SEP. At the direction of the ERO and in coordination with SFPUC, additional testing may be rolled into a subsequent data recovery program (see below). **Archeological Testing Program–Historical Archeology.** If future design changes would affect the area identified as sensitive for historical archeological resources, the archeological consultant shall implement the historical archeological testing plan outlined in the project ARDTP for potential historical archeological resources that could be adversely affected by the project. The archeological testing program shall be conducted in accordance with the approved ARDTP. The project ARDTP identifies the property types of the expected archeological resource(s) that could be adversely affected by the project, the testing method to be used, and the locations recommended for testing. The purpose of the archeological testing program will be to determine to the extent possible the presence or absence of historical archeological resources and to identify and to evaluate whether any archeological resource encountered on the site constitutes an historical resource under CEQA. If future project design changes further alter the C-APE from what is identified in the ARDTP, then the archeological consultant shall prepare and submit to the ERO for review and approval an archeological testing plan (ATP) for both prehistoric and historical archeological resources to address any area added to the C-APE to accommodate the project design changes. The archeological testing program shall be conducted in accordance with the approved ATP. The ATP shall identify the property types of the expected archeological resource(s) that potentially could be adversely affected by the project, the testing method to be used, and the locations recommended for testing. The purpose of the archeological testing program will be to determine to the extent possible the presence or absence of archeological resources and to identify and to evaluate whether any archeological resource encountered on the site constitutes an historical resource under CEQA. At the completion of the archeological testing program, as required, the archeological consultant shall submit a written report of the findings to the ERO and the SFPUC. If based on the archeological testing program the archeological consultant finds that significant archeological resources may be present, the ERO in consultation with the archeological consultant and coordination with the SFPUC shall determine if additional measures are warranted. Additional measures that may be undertaken include additional archeological testing, archeological monitoring, and/or an archeological data recovery program. No archeological data recovery shall be undertaken without the prior approval of the ERO or the Planning Department archeologist. If the ERO determines that a significant archeological resource is present and that the resource could be adversely affected by the project, at the discretion of the SFPUC either: A) The project shall be re-designed so as to avoid any adverse effect on the significant archeological resource; or B) An archeological data recovery program shall be implemented, unless the ERO determines that the archeological resource is of greater interpretive than research significance and that interpretive use of the resource is feasible.

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Cultural Resources, EIR Section 4.5 (cont.)		
Impact CR-2 (cont.)		**Archeological Monitoring Program.** Preparation of an archeological monitoring program (AMP) may be required prior to project construction depending on the results of the prehistoric and historical archeological testing programs outlined above. If the ERO in consultation with the archeological consultant determines that an archeological monitoring program shall be implemented, the archeological monitoring program shall minimally include the following provisions: • The archeological consultant, SFPUC, and ERO shall meet and consult on the scope of the AMP reasonably prior to commencement of any project-related soils disturbing activities. The ERO in consultation with the archeological consultant shall determine what project activities shall be archeologically monitored based on the results of pre-construction archeological testing currently approved and underway or planned, and archeological sensitivity assessment based on the results of that testing; • The archeological consultant shall advise all project contractors to be on the alert for evidence of the presence of the expected resource(s), of how to identify the evidence of the expected resource(s), and of the appropriate protocol in the event of discovery of a potential archeological resource; • The archeological monitor(s) shall be present on the project site according to a schedule agreed upon by the archeological consultant and the ERO or until the ERO has, in consultation with project archeological consultant, otherwise determined that project construction activities could have no effects on significant archeological deposits and monitoring can conclude; • The archeological monitor shall record and be authorized to collect soil samples and artifactual/ecofactual material as warranted for analysis; • If an intact archeological deposit is encountered, all soils-disturbing activities in the vicinity of the deposit shall cease. The archeological monitor shall be empowered to temporarily redirect demolition/excavation/construction activities and equipment until the deposit is evaluated. The archeological consultant shall immediately notify the ERO and the SFPUC of the encountered archeological deposit. The archeological consultant shall make a reasonable effort to assess the identity, integrity, and significance of the encountered archeological deposit, and present the findings of this assessment to the ERO and the SFPUC. Whether or not significant archeological resources are encountered, the archeological consultant shall submit a written report of the findings of the monitoring program to the ERO and the SFPUC. **Archeological Data Recovery Program.** An archeological data recovery program shall be implemented in accord with an archeological data recovery plan (ADRP). The ADRP shall incorporate (1) programmatic-level procedures for deeply buried prehistoric archeological deposits; (2) site-specific procedures for identified prehistoric archeological deposits; (2) and site-specific procedures for historical archeological deposits (as warranted). The archeological consultant, SFPUC, and ERO shall meet and consult on the scope of the ADRP prior to preparation of a draft ADRP. The archeological consultant shall submit a draft ADRP to the ERO and SFPUC. The ADRP shall identify how the proposed data recovery program will preserve the significant information the archeological resource is expected to contain. That is, the ADRP shall identify what scientific/historical research questions are applicable to the expected resource, what data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions. Data recovery, in general, should be limited to the portions of the historical resource that could be adversely affected by the project. Destructive data recovery methods shall not be applied to portions of the archeological resources if non-destructive methods are practical.

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Cultural Resources, EIR Section 4.5 (cont.)		
Impact CR-2 (cont.)		The scope of the ADRP shall include the following elements: • *Field Methods and Procedures*. Descriptions of proposed field strategies, procedures, and operations for the following elements: 1) Programmatic-level procedures for deeply buried prehistoric archeological deposits potentially uncovered during excavation for deep foundations (e.g., driven, drilled, or augured piles). 2) Site-specific procedures for known/identified prehistoric archeological deposits potentially affected by project excavation activities (e.g. CA-SFR-171). 3) Site-specific procedures for historical archeological deposits (as warranted) potentially affected by project excavation activities. • *Cataloguing and Laboratory Analysis*. Description of selected cataloguing system and artifact analysis procedures. • *Discard and Deaccession Policy*. Description of and rationale for field and post-field discard and deaccession policies. • *Interpretive Program*. Consideration of an on-site/off-site public interpretive program during the course of the archeological data recovery program. • *Security Measures*. Recommended security measures to protect the archeological resource from vandalism, looting, and non-intentionally damaging activities. • *Final Report*. Description of proposed report format and distribution of results. • *Curation*. Description of the procedures and recommendations for the curation of any recovered data having potential research value, identification of appropriate curation facilities, and a summary of the accession policies of the curation facilities. **Human Remains and Associated or Unassociated Funerary Objects.** The treatment of human remains and of associated or unassociated funerary objects discovered during any soils disturbing activity, in the context of an archeological deposit or in isolation, shall comply with applicable state and federal laws. This shall include immediate notification of the Coroner of the City and County of San Francisco and in the event of the Coroner's determination that the human remains are Native American remains, notification of the California State Native American Heritage Commission (NAHC) who shall appoint a Most Likely Descendant (MLD) (PRC Section 5097.98). PRC 5097.98 indicates that " The descendants shall complete their inspection and make their recommendation within 48 hours of their notification by the Native American Heritage Commission." The archeological consultant, SFPUC, ERO, and MLD shall have up to but not beyond six days of discovery to make all reasonable efforts to develop an agreement for the treatment of human remains and associated or unassociated funerary objects with appropriate dignity (CEQA Guidelines Section 15064.5[d]). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects. Nothing in existing State regulations or in this mitigation measure compels the SFPUC and the ERO to accept recommendations of an MLD. The archeological consultant shall retain possession of any Native American human remains and associated or unassociated burial objects until completion of any scientific analyses of the human remains or objects as specified in the treatment agreement if such as agreement has been made or, otherwise, as determined by the archeological consultant and the ERO.

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Cultural Resources, EIR Section 4.5 (cont.)		
Impact CR-2 (cont.)		**Final Archeological Resources Report.** The archeological consultant shall submit a Draft Final Archeological Resources Report (FARR) to the ERO and SFPUC that evaluates the historical significance of any discovered archeological resource and describes the archeological and historical research methods employed in the archeological testing/monitoring/data recovery program(s) undertaken. The FARR shall include new updated DPR forms, as applicable. Information that may put at risk any archeological resource shall be provided in a separate removable insert within the final report. Once approved by the ERO, copies of the FARR shall be distributed as follows: Northwest Information Center (NWIC) of the California Historical Resources Information System shall receive one (1) copy and the ERO shall receive a copy of the transmittal of the FARR to the NWIC. The Environmental Planning division of the Planning Department shall receive one bound, one unbound and one unlocked, searchable PDF copy on CD of the FARR along with copies of any formal site recordation forms (CA DPR 523 series) and/or documentation for nomination to the National Register of Historic Places/California Register of Historical Resources. In instances of high public interest in or the high interpretive value of the resource, the ERO may require a different final report content, format, and distribution than that presented above. **Mitigation Measure M-CR-2b. Accidental Discovery of Archeological Resources** The following mitigation measure is required to avoid any potential adverse effect from the project on accidentally discovered buried or submerged historical resources as defined in CEQA Guidelines Section 15064.5(a) and (c). The project sponsor shall distribute the Planning Department archeological resource "ALERT" sheet to the project prime contractor; to any project subcontractor (including demolition, excavation, grading, foundation, pile installation, etc. firms); or utilities firm involved in soils disturbing activities within the project site. Prior to any soils disturbing activities being undertaken each contractor is responsible for ensuring that the "ALERT" sheet is circulated to all field personnel including, machine operators, field crew, pile drivers, supervisory personnel, etc. A preconstruction training shall be provided to all construction personnel by a qualified archeologist prior to their starting work on the project. The training may be provided in person or using a video and include a handout prepared by the qualified archeologist. The video and materials shall be reviewed and approved by the ERO and the SFPUC. The purpose of the training is to enable personnel to identify archeological resources that may be encountered and to instruct them on what to do if a potential discovery occurs. Images or video of expected archeological resource types and archeological testing and data recovery methods should be included in the training. As possible, video or images should utilize archeological investigations that have occurred at the project site. The training should also include general information about the known archeological resources identified within the project site. The project sponsor shall provide the Environmental Review Officer (ERO) with a signed affidavit from the responsible parties (prime contractor, subcontractor[s], and utilities firm) to the ERO confirming that all field personnel have received copies of the Alert Sheet and have taken the preconstruction training. Should any indication of an archeological resource be encountered during any soils disturbing activity of the project, the project Head Foreman and/or project sponsor shall immediately notify the ERO and the SFPUC and shall immediately suspend any soils disturbing activities in the vicinity of the discovery until the ERO, in coordination with the SFPUC, has determined what additional measures should be undertaken.

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Cultural Resources, EIR Section 4.5 (cont.)		
Impact CR-2 (cont.)		If the ERO determines that the find may represent an archeological resource, the project sponsor shall retain the services of an archeological consultant. The archeological consultant shall advise the ERO and the SFPUC as to whether the discovery is an archeological resource, retains sufficient integrity, and is of potential scientific/historical/cultural significance. If an archeological resource is present, the archeological consultant shall identify and evaluate the archeological resource. The archeological consultant shall make a recommendation as to what action, if any, is warranted. Based on this information, the ERO may require, if warranted, specific additional measures to be implemented by the project sponsor. Measures might include: preservation in situ of the archeological resource; an archeological monitoring program; or an archeological testing program. If an archeological monitoring program or archeological testing program is required, it shall be consistent with the Environmental Planning (EP) division guidelines for such programs. The ERO may also require that the project sponsor immediately implement a site security program if the archeological resource is at risk from vandalism, looting, or other damaging actions. The project archeological consultant shall submit a Final Archeological Resources Report (FARR) to the ERO and the SFPUC that evaluates the historical significance of any discovered archeological resource and describing the archeological and historical research methods employed in the archeological monitoring/data recovery program(s) undertaken. Information that may put at risk any archeological resource shall be provided in a separate removable insert within the final report. Copies of the Draft FARR shall be sent to the ERO for review and approval and concurrently to the SFPUC for review and comment. Once approved by the ERO, copies of the FARR shall be distributed as follows: California Archaeological Site Survey Northwest Information Center (NWIC) shall receive one (1) copy and the ERO shall receive a copy of the transmittal of the FARR to the NWIC. The Environmental Planning division of the Planning Department shall receive one bound copy, one unbound copy and one unlocked, searchable PDF copy on CD three copies of the FARR along with copies of any formal site recordation forms (CA DPR 523 series) and/or documentation for nomination to the National Register of Historic Places/California Register of Historical Resources. In instances of high public interest or interpretive value, the ERO may require a different final report content, format, and distribution than that presented above.
Impact CR-3: The project could disturb human remains, including those interred outside of formal cemeteries.	LSM	**Mitigation Measure M-CR-2a. Archeological Testing, Monitoring, and/or Data Recovery** (see Impact CR-2)
Impact C-CR-1: The project, in combination with past, present, and probable future projects, would substantially contribute to cumulative adverse historic architectural resources impacts.	SUM	**Mitigation Measure M-CR-1. Documentation of Historic Resources and Interpretive Display** (see Impact CR-1)
Impact C-CR-2: The project, in combination with past, present, and probable future projects, could result in cumulative adverse impacts on archeological resources and human remains.	LSM	**Mitigation Measure M-CR-2a. Archeological Testing, Monitoring, and/or Data Recovery** (see Impact CR-2) **Mitigation Measure M-CR-2b. Accidental Discovery of Archeological Resources** (see Impact CR-2)

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Transportation and Traffic, EIR Section 4.6		
Impact TR-1: Project construction would not result in substantial interference with pedestrian, bicycle, or vehicle circulation and accessibility to adjoining areas, and would not result in potentially hazardous conditions.	LS	No mitigation required.
Impact TR-2: Project construction would not result in inadequate emergency vehicle access.	LS	No mitigation required.
Impact TR-3: Project operations and maintenance activities would not cause substantial additional vehicle miles traveled (VMT), substantially induce automobile travel, or cause or worsen traffic safety hazards.	LS	No mitigation required.
Impact C-TR-1: Construction of the project, in combination with past, present, and probable future projects, would not result in significant transportation impacts.	LS	No mitigation required.
Impact C-TR-2: Project operations and maintenance activities, in combination with past, present, and probable future projects, would not result in significant transportation impacts.	LS	No mitigation required.
Noise and Vibration, EIR Section 4.7		
Impact NO-1: Construction of the project could cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project and could expose people to or generate noise levels in excess of standards in the Noise Ordinance.	LSM	**Mitigation Measure M-NO-1a. Shielding of Concrete Saw Operations** Project contractors shall erect temporary shielding when concrete saw operations are conducted within 100 feet of a sensitive receptor. Shielding shall be sufficient to reduce noise levels to 80 dBA at a distance of 100 feet (an approximate 5 dBA reduction), consistent with the noise limit specified in Section 2907 of the Noise Ordinance. **Mitigation Measure M-NO-1b. Construction Noise Control Measures at Southeast Greenhouses Staging Area** Project contractors shall implement noise control measures at the Southeast Greenhouses staging area, such as one of the following strategies, to ensure that construction-related noise does not exceed 77 dBA at the closest residences located across Phelps Street or 70 dBA at the daycare center (including its outdoor play area) at the Southeast Community Facility (this performance standard is based on the City's ambient +10 dBA noise limit):

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Noise and Vibration, EIR Section 4.7 (cont.)		
Impact NO-1 (cont.)		• ***Restrict Use of Heavy Equipment***. Restrict operation of heavy equipment and trucks in the southern portion of the Southeast Greenhouses staging area within approximately 200 feet of the daycare center (including the outdoor play area) and residences across Phelps Street such that noise levels are maintained below this performance standard. • ***Temporary Noise Barrier***. Erect temporary noise barrier(s) along the southern and eastern boundaries of the Southeast Greenhouses staging area to shield the daycare facility and residences from noise generated by staging area activities necessary to achieve this performance standard. The SFPUC shall also post a sign on-site describing permitted construction days and hours, noise complaint procedures, and a complaint hotline number (available during construction hours).
Impact NO-2: Construction of the project would not expose structures or persons to excessive groundborne vibration levels.	LS	No mitigation required.
Impact NO-3: Operation of the project would not result in a substantial permanent increase in ambient noise levels in the project vicinity and permanently expose persons to noise levels in excess of standards in the Noise Ordinance (Article 29 of the Police Code).	LS	No mitigation required.
Impact NO-4: The project would not result in substantial permanent increases in traffic-related ambient noise levels in the project vicinity.	LS	No mitigation required.
Impact NO-5: Operation of the project would not expose any people or off-site structures to excessive groundborne vibration levels.	LS	No mitigation required.
Impact C-NO-1: Construction activities of the project combined with cumulative construction noise in the project vicinity could cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity or result in excessive groundborne vibration levels during construction.	LSM	**Mitigation Measure M-NO-1b: Construction Noise Control Measures at Southeast Greenhouses Staging Area** (see Impact NO-1)

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Noise and Vibration, EIR Section 4.7 (cont.)		
Impact C-NO-2: Operation of the project when considered with other cumulative development would not cause a substantial permanent increase in ambient noise levels or result in excessive groundborne vibration levels in the project vicinity.	LS	No mitigation required.
Air Quality, EIR Section 4.8		
Impact AQ-1: The project's construction activities would not generate fugitive dust that could violate an air quality standard or contribute substantially to an existing or projected air quality violation, but project construction would generate criteria air pollutants that would violate an air quality standard and contribute substantially to an existing or projected air quality violation, and result in a cumulatively considerable net increase in criteria air pollutants.	SUM	**Mitigation Measure M-AQ-1a. Construction Emissions Minimization** The SFPUC's contractors shall comply with the following: ***A. Engine Requirements.*** 1. All off-road equipment with larger engines (greater than or equal to 140 horsepower) shall meet United States Environmental Protection Agency (USEPA) or California Air Resources Board (CARB) Tier 4 Final off-road emission standards, while equipment with smaller engines (less than 140 horsepower) shall meet or exceed Tier 2 off-road emission standards and be equipped with diesel particulate filters (DPFs), which is equivalent to a Level 3 verified diesel emission control strategy (VDECS). 2. At least 80 percent of haul trucks (i.e., trucks used to remove or deliver backfill soil, excavated soil, and demolition debris) used must have 2010 or newer engines. 3. All diesel-powered haul trucks and off-road equipment must use renewable diesel. ***B. Waivers.*** 4. Pursuant to the Clean Construction Ordinance, the SFPUC General Manager (GM) or designee may waive the alternative source of power requirement if an alternative source of power is limited or infeasible at the project site. If the SFPUC GM grants the waiver, the contractor shall submit documentation that the equipment used for on-site power generation meets the requirements of Subsection (A)(1). 5. The SFPUC GM or designee may waive the equipment requirements of Subsection (A)(1) but only under any of the following unusual circumstances: if a particular piece of off-road equipment with Tier 4 Final standards or CARB Level 3 VDECS is technically not feasible; the equipment would not produce desired emissions reduction due to expected operating modes; installation of the equipment would create a safety hazard or impaired visibility for the operator; or there is a compelling emergency need to use off-road equipment that is not retrofitted with a CARB Level 3 VDECS. If the SFPUC GM or designee grants the waiver, the contractor shall use the next cleanest piece of off-road equipment, according to the following table:

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Air Quality, EIR Section 4.8 (cont.)		
Impact AQ-1 (cont.)		(see compliance table below)

Compliance Alternative	Engine Emission Standard
1	Tier 4 Interim
2	Tier 3
3	Tier 2

NOTES: How to use the table: If the SFPUC GM or designee determines that the equipment requirements cannot be met, then the contractor shall meet Compliance Alternative 1. If the SFPUC GM or designee determines that the contractor cannot supply off-road equipment meeting Compliance Alternative 1, then the contractor shall meet Compliance Alternative 2. If the SFPUC GM or designee determines that the contractor cannot supply off-road equipment meeting Compliance Alternative 2, then the contractor shall meet Compliance Alternative 3.

Mitigation Measure M-AQ-1b. Emission Offsets

During the five-year construction period and prior to project completion, the SFPUC, with the oversight of the Planning Department, shall implement either of the following two options or a combination of both:

1. Directly implement a specific offset program (such as replace equipment) to achieve reductions of 2.3 tons per year of ozone precursors, subject to Environmental Review Officer (ERO) approval. To qualify under this mitigation measure, the specific emissions retrofit project must result in emissions reductions within the San Francisco Bay Area Air Basin (SFBAAB) that are real, surplus, quantifiable, enforceable, and would not otherwise be achieved through compliance with existing regulatory requirements or any other legal requirement. Prior to implementation of the offset project, the SFPUC must obtain Planning Department's approval of the proposed offset project by providing documentation of the estimated amount of emissions of 2.3 tons per year of ozone precursors within the SFBAAB from the emissions reduction project(s). The project sponsor shall notify the Planning Department within six months of completion of the offset project for verification.
2. Pay a mitigation offset fee to the Bay Area Air Quality Management District's (BAAQMD) Bay Area Clean Air Foundation (Foundation) in an amount to be determined at the time of the impact. The mitigation offset fee will be no less than $18,030 per weighted ton of ozone precursors per year requiring emissions offsets plus an administrative fee of no less than 5 percent, to fund one or more emissions reduction projects within the SFBAAB. This fee will be determined by the Planning Department in consultation with the SFPUC and BAAQMD and based on the type of projects available at the time of impact. This fee is intended to fund emissions reduction projects to achieve reductions of 2.3 tons per year of ozone precursors.

For this option, the SFPUC is required to enter into a Memorandum of Understanding (MOU) with the BAAQMD's Foundation. The MOU will include details regarding the funds to be paid, administrative fee and the timing of the emissions reductions project. Acceptance of this fee by the BAAQMD shall serve as an acknowledgment and commitment by the BAAQMD to: (1) implement an emissions reduction project(s) within a time frame to be determined based on the type of project(s) selected, after receipt of the mitigation fee to achieve the emission reduction objectives specified above; and (2) provide documentation to the ERO and the SFPUC

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Air Quality, EIR Section 4.8 (cont.)		
Impact AQ-1 (cont.)		describing the amount of and the project(s) funded by the mitigation fee, including the amount of emissions of NOx reduced (tons per year) within the SFBAAB from the emissions reduction project(s). If there is any remaining unspent portion of the mitigation offset fee following implementation of the emission reduction project(s), the SFPUC shall be entitled to a refund in that amount from the BAAQMD. To qualify under this mitigation measure, the specific emissions reduction project must result in emission reductions within the SFBAAB that are real, surplus, quantifiable, enforceable, and would not otherwise be achieved through compliance with existing regulatory requirements or any other legal requirement.
Impact AQ-2: During project operations, net changes in criteria air pollutant emissions would not result in any new violations of air quality standards, contribute to an existing or projected air quality violation, or result in a cumulatively considerable net increase in criteria air pollutants.	LS	No mitigation required.
Impact AQ-3: Construction and operation of the project would generate toxic air contaminants, including diesel particulate matter, but would not expose sensitive receptors to substantial air pollutant concentrations or result in a cumulatively considerable net increase in health risks or hazards.	LS	No mitigation required.
Impact AQ-4: The project's construction-related air pollutant emissions could conflict with, or obstruct implementation of, the *2010 Clean Air Plan*.	LSM	**Mitigation Measures M-AQ-1a. Construction Emissions Minimization and M-AQ-1b. Emission Offsets** (see Impact AQ-1).
Impact AQ-5: Construction and operation of the BDFP facilities would not create objectionable odors that would affect a substantial number of people.	LS	No mitigation required.
Impact C-AQ-1a: Construction of the project, in combination with other past, present, and probable future projects, would result in a cumulatively considerable net increase in criteria air pollutants and contribute to cumulative regional air quality impacts.	SUM	**Mitigation Measures M-AQ-1a. Construction Emissions Minimization and M-AQ-1b. Emission Offsets** (see Impact AQ-1)

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Air Quality, EIR Section 4.8 (cont.)		
Impact C-AQ-1b: Operation of the project, in combination with other past, present, and probable future projects, would not result in a cumulatively considerable net increase in criteria air pollutants nor contribute to cumulative regional air quality impacts.	LS	No mitigation required.
Impact C-AQ-2: Construction and operation of the project, in combination with other past, present, and probable future projects, would generate toxic air contaminants, including diesel particulate matter, but would not expose sensitive receptors to substantial air pollutant concentrations or result in a cumulatively considerable net increase in health risks and hazards.	LS	No mitigation required.
Impact C-AQ-3: The project, in combination with past, present, and probable future projects, would not create objectionable odors that would affect a substantial number of people.	LS	No mitigation required.
Greenhouse Gas Emissions, EIR Section 4.9		
Impact C-GG-1: The project would generate greenhouse gas emissions, but not at levels that would result in a significant impact on the environment or conflict with any policy, plan, or regulation adopted for the purpose of reducing greenhouse gas emissions.	LS	No mitigation required.
Wind and Shadow, EIR Section 4.10		
Impact WS-1: The project structures would not alter wind in a manner that would substantially affect public areas.	LS	No mitigation required.
Impact WS-2: Project structures would not create new shadow in a manner that would substantially affect outdoor recreation facilities or other public areas.	LS	No mitigation required.

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Wind and Shadow, EIR Section 4.10 (cont.)		
Impact C-WS-1: The project, in combination with past, present, and probable future projects, would not substantially contribute to cumulative impacts on wind.	LS	No mitigation required.
Impact C-WS-2: The project, in combination with past, present, and probable future projects, would not substantially contribute to cumulative impacts on shadow.	LS	No mitigation required.
Recreation, EIR Section 4.11		
Impact RE-1: The project's construction and operation would not (a) increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated, (b) include recreational facilities or require the construction or expansion of recreational facilities, or (c) otherwise result in substantial degradation of existing recreational resources.	NI	No mitigation required.
Impact C-RE-1: The project, in combination with past, present, and probable future projects, would not substantially affect recreational resources.	NI	No mitigation required.
Utilities and Service Systems, EIR Section 4.12		
Impact UT-1: Project construction would not result in a determination by the wastewater treatment provider that would serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments.	LS	No mitigation required.
Impact UT-2: Project construction would not result in a substantial adverse effect related to landfill capacity.	LS	No mitigation required.

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Utilities and Service Systems, EIR Section 4.12 (cont.)		
Impact UT-3: Project construction would not result in a substantial adverse effect related to compliance with federal, state, or local statutes and regulations related to solid waste.	LS	No mitigation required.
Impact UT-4: The City's water supply provider would have sufficient water supply available to serve project operations from existing entitlements and resources, and the project would not require new or expanded water distribution or treatment facilities.	LS	No mitigation required.
Impact UT-5: Project operations would be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs.	LS	No mitigation required.
Impact UT-6: Project operations would not result in a substantial adverse effect related to compliance with federal, state, or local statutes and regulations related to solid waste.	LS	No mitigation required.
Impact C-UT-1: The project, in combination with past, present, and probable future projects, would not result in significant cumulative impacts on utilities and service systems.	LS	No mitigation required.
Public Services, EIR Section 4.13		
Impact PS-1: Construction and operation of the BDFP would not increase demand for public services to an extent that would require new or physically altered governmental facilities in order to maintain acceptable service ratios, response times, or other performance objectives for public services.	LS	No mitigation required.
Impact C-PS-1: The project, in combination with past, present, and probable future projects, would not substantially contribute to cumulative impacts related to public services.	LS	No mitigation required.

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Biological Resources, EIR Section 4.14		
Impact BI-1: Project construction could have a substantial adverse effect, either directly or through habitat modifications, on species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or United States Fish and Wildlife Service.	LSM	**Mitigation Measure M-BI-1: Protective Measures for Special Status Bats and Maternity Roosts** The San Francisco Public Utilities Commission (SFPUC) shall engage a qualified biologist to conduct a pre-construction survey of buildings and other structures to be demolished, vacant buildings within 100 feet of construction activities, trees to be removed, and trees located within 100 feet of construction activities to locate potential roosting habitat for special-status bats and active maternal colonies. The pre-construction surveys shall occur no more than two weeks in advance of initiation of building demolition or renovation activities on-site or initiation of construction. No activities that could disturb active roosts of special-status bats or maternal roosts shall proceed prior to the completed surveys. The pre-construction survey shall include at a minimum: • Identification of potential direct and indirect project-related bat- disturbing activities; and • Locations of active roosting habitat and maternal colonies. If the pre-construction survey does not identify signs of potentially active bat roosts (e.g., guano, urine staining, dead bats, etc.) then no further action is required. If the pre-construction survey identifies signs of potentially active bat roosts, the following measures shall be implemented: • Removal of structures and trees shall occur when bats are active, approximately between the periods of March 1 to April 15 and August 15 to October 15; outside of bat maternity roosting season (approximately April 15 to August 31); and outside of months of winter torpor (approximately October 15 to February 28). On structures where bats were observed during the pre-construction survey, exclusion devices (i.e., one-way doors) shall be installed prior to removal of the structures. Exclusion devices shall be left in place for a minimum of four nights prior to demolition of the structures. • If removal of structures and trees during the periods when bats are active is not feasible and active bat roosts being used for maternity or hibernation purposes are found on or in the immediate vicinity of the project site where structure demolition or renovation is planned, a no-disturbance buffer of 100 feet or less if determined adequate by a qualified biologist in coordination with the California Department of Fish and Wildlife (CDFW) based on site-specific conditions shall be established around the roost sites until they are determined to be no longer active or volant by a qualified biologist. • The qualified biologist shall be present during structure and tree disturbance if active bat roosts are present. Structures and trees with active roosts shall be removed only when no rain is occurring or is forecast to occur for three days and when daytime temperatures are at least 50 degrees Fahrenheit (˚F). • Structures or trees containing or suspected to contain active bat roosts shall be dismantled or removed under the supervision of the qualified biologist in the evening and after bats have emerged from the roost to forage. Structures shall be partially dismantled to significantly change the roost conditions, causing bats to abandon and not return to the roost. • If significant bat roosting habitat (e.g., maternity roosts or special-status non-maternity roost sites) is destroyed during structure or tree removal, artificial bat roosts shall be constructed in an undisturbed area in the project site vicinity away from human activity and at least 200 feet from project demolition/construction activities. The design and location of the artificial bat roost(s) shall be determined by a qualified bat biologist. • Bat roosts that begin during construction are presumed to be unaffected, and no buffer would be necessary.

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Biological Resources, EIR Section 4.14 (cont.)		
Impact BI-2: Project construction would not have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act through direct removal, filling, hydrological interruption, or other means.	LS	No mitigation required.
Impact BI-3: Construction activities would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	LS	No mitigation required.
Impact C-BI-1: The project, in combination with past, present, and probable future projects, could substantially contribute to cumulative impacts on biological resources.	LSM	**Mitigation Measure M-BI-1: Protective Measures for Special Status Bats and Maternity Roosts** (see Impact BI-1)
Geology, Soils, and Paleontological Resources, EIR Section 4.15		
Impact GE-1: The project would not expose people or structures to the risk of loss, injury, or death involving seismic ground shaking or seismically induced ground failure.	LS	No mitigation required.
Impact GE-2: The project would not result in substantial erosion.	LS	No mitigation required.
Impact GE-3: The project site is not located on a geologic unit or soil that is unstable, and the site would not become unstable as a result of the project.	LS	No mitigation required.
Impact GE-4: The project could directly or indirectly destroy a unique paleontological resource.	LSM	**Mitigation Measure M-GE-4: Paleontological Resources Monitoring and Mitigation Program** The SFPUC shall retain the services of a qualified paleontological consultant having expertise in California paleontology to design and implement a Paleontological Resources Monitoring and Mitigation Program (PRMMP) for construction activities that would disturb the upper layered sediments that are sensitive for paleontological resources. The PRMMP shall not require monitoring in shallower excavations that do not encounter the upper layered sediments. The PRMMP shall include a description of when and where construction monitoring would be required; emergency discovery procedures; sampling and data recovery procedures; procedure for the preparation, identification, analysis, and curation of fossil specimens and data recovered; pre-construction coordination procedures; and procedures for reporting the results of the monitoring program.

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Geology, Soils, and Paleontological Resources, EIR Section 4.15		
Impact GE-4 (cont.)		The PRMMP shall be consistent with the Society for Vertebrate Paleontology (SVP) Standard Guidelines for the mitigation of construction–related adverse impacts on paleontological resources and the requirements of the designated repository for any fossils collected. During construction, earth-moving activities shall be monitored by a qualified paleontological consultant having expertise in California paleontology in the areas where these activities have the potential to disturb the upper layered sediments. Monitoring need not be conducted for construction activities that would disturb only artificial fill material and/or young bay mud. The consultant's work shall be conducted in accordance with this measure and at the direction of the City's Environmental Review Officer (ERO) in coordination with the SFPUC. Plans and reports prepared by the consultant shall be submitted first and directly to the ERO for review and comment and concurrently to the SFPUC for review and comment, and shall be considered draft reports subject to revision until final approval by the ERO. Paleontological monitoring and/or data recovery programs required by this measure could suspend construction of the project in an appropriate buffer zone around a discovered paleontological resource or area determined in the PRMMP to be sensitive for paleontological resources for up to a maximum of four weeks. At the direction of the ERO and in coordination with the SFPUC, the suspension of construction may be extended beyond four weeks for a reasonable time required to implement appropriate measures in accordance with the PRMMP only if such a suspension is the only feasible means to reduce potential effects on a significant paleontological resource as previously defined to a less-than-significant level.
Impact C-GE-1: The project, in combination with past, present, and probable future projects, would not substantially contribute to cumulative impacts on geology or soils.	LS	No mitigation required.
Impact C-GE-2: The project, in combination with past, present, and probable future projects, could substantially contribute to cumulative impacts on paleontological resources.	LSM	**Mitigation Measure M-GE-4: Paleontological Resources Monitoring and Mitigation Program** (see Impact GE-4)
Hydrology and Water Quality, EIR Section 4.16		
Impact HY-1: Construction of the project would not violate water quality standards or waste discharge requirements or otherwise substantially degrade water quality.	LS	No mitigation required.
Impact HY-2: Construction of the project would not substantially deplete groundwater supplies or interfere with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table.	LS	No mitigation required.

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Hydrology and Water Quality, EIR Section 4.16 (cont.)		
Impact HY-3: Construction of the project would not place structures within a 100-year flood zone or expose people or structures to a significant risk of loss, injury, or death involving flooding under current conditions or future conditions resulting from sea level rise.	LS	No mitigation required.
Impact HY-4: Construction of the project would not expose people or structures to a significant risk of loss, injury, or death involving inundation by seiche or tsunami.	LS	No mitigation required.
Impact HY-5: Operation of the project would not violate water quality standards or waste discharge requirements or otherwise substantially degrade water quality.	LS	No mitigation required.
Impact HY-6: Operation of the project would not substantially deplete groundwater supplies or interfere with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table.	LS	No mitigation required.
Impact HY-7: Operation of the project would not exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.	LS	No mitigation required.
Impact HY-8: Operation of the project would not include the construction of structures that would impede flood flows within an existing 100-year flood zone or 100-year flood zones resulting from sea level rise.	LS	No mitigation required.
Impact C-HY-1: The project, in combination with past, present, and probable future projects in the site vicinity, would not result in significant adverse cumulative hydrology impacts.	LS	No mitigation required.

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Hydrology and Water Quality, EIR Section 4.16 (cont.)		
Impact C-HY-2: The project, in combination with past, present, and probable future projects in the site vicinity, would not result in significant adverse cumulative water quality impacts.	LS	No mitigation required.
Hazards and Hazardous Materials, EIR Section 4.17		
Impact HZ-1: Project construction and operation would not result in a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	LS	No mitigation required.
Impact HZ-2: Project construction and operation would not result in reasonably foreseeable conditions involving the release of hazardous building materials to the environment.	LS	No mitigation required.
Impact HZ-3: Project construction and operation would not release hazardous emissions or handle acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	LS	No mitigation required.
Impact HZ-4: The project would be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5; however, project construction and operation would not result in a significant hazard to the public or the environment under reasonably foreseeable conditions.	LS	No mitigation required.
Impact HZ-5: Project construction and operation would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	LS	No mitigation required.

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TABLE S-2 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

IMPACT	Significance Determination	Mitigation Measure
Hazards and Hazardous Materials, EIR Section 4.17 (cont.)		
Impact HZ-6: Project construction and operation would not result in a significant risk of loss, injury, or death involving fire.	LS	No mitigation required.
Impact C-HZ-1: The project, in combination with past, present, and probable future projects, would not substantially contribute to cumulative hazards or hazardous materials impacts.	LS	No mitigation required.
Mineral Resources, Energy Resources and Water Use, EIR Section 4.18		
Impact ME-1: Construction of the project would not result in the use of large amounts of fuel, water, or energy, or use these resources in a wasteful manner.	LS	No mitigation required.
Impact ME-2: Operation of the project would not result in the use of large amounts of fuel, water, or energy, or use these resources in a wasteful manner.	LS	No mitigation required.
Impact C-ME-1: The project, in combination with past, present, and probable future projects, would not encourage activities that result in the use of large amounts of fuel, water, or energy, or use such resources in a wasteful manner.	LS	No mitigation required.
Agriculture and Forest Resources, EIR Section 4.19		
Impact AG-1: The project would not involve changes in the existing environment which could result in the conversion of farmland to non-agricultural use or forest land to non-forest use.	NI	No mitigation required.
Impact C-AG-1: The project, in combination with past, present, and probable future projects, would not substantially contribute to cumulative impacts on farmland or forest land.	NI	No mitigation required.

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CHAPTER 1
Introduction

1.1 Purpose of this Environmental Impact Report

This environmental impact report (EIR) has been prepared by the San Francisco Planning Department (Planning Department) of the City and County of San Francisco (City or CCSF) in conformance with the provisions of the California Environmental Quality Act (CEQA), the CEQA Guidelines (California Public Resources Code Section 15000 et seq., "CEQA Guidelines"), and Chapter 31 of the San Francisco Administrative Code. The Planning Department, through its Environmental Planning section (EP), is the lead agency responsible for implementing CEQA for all projects sponsored by CCSF or located within San Francisco, including those sponsored by the San Francisco Public Utilities Commission (SFPUC). The lead agency is the public agency that has principal responsibility for carrying out or approving a project. CEQA requires the preparation of an EIR when a project could have significant unavoidable impacts on the physical environment. EP determined that the Biosolids Digester Facilities Project (BDFP or project), for which the SFPUC is the project sponsor, could cause significant environmental impacts that cannot be mitigated to a less than significant level, and that preparation of an EIR was therefore required.

The BDFP would construct new solids treatment, odor control, energy recovery, and associated facilities at the SFPUC's Southeast Water Pollution Control Plant (Southeast Plant or SEP) located in the Bayview-Hunters Point district of San Francisco. The project facilities would be located on portions of the SEP located at 750 Phelps Street and 1700 Jerrold Avenue, and two adjacent properties at 1800 Jerrold Avenue (Central Shops) and 1801 Jerrold Avenue (Asphalt Plant).

Pursuant to CEQA Guidelines Section 15161, this is a project-level EIR, defined as an EIR that examines the physical environmental impacts of a specific development project. The Planning Department has prepared this EIR to provide the public and the responsible and trustee agencies reviewing the project with information about the project's potential effects on the environment. This EIR describes the potential environmental impacts that could result from implementation of the BDFP, identifies mitigation measures for reducing impacts to a less-than-significant level where feasible, and evaluates alternatives to the project.

1.2 Environmental Review Process

The environmental review process for the BDFP includes multiple steps: publication of a Notice of Preparation (NOP), public scoping period, publication of a Draft EIR, public and agency review of the Draft EIR, publication of responses to public and agency comments on the Draft EIR, and certification of the Final EIR. Each of these steps involves public outreach. Additional public outreach was also conducted by the SFPUC for the BDFP, as described in Section 1.3.

1.2.1 Notice of Preparation

The SFPUC submitted an Environmental Evaluation application for the BDFP to the Planning Department on January 29, 2015, initiating the environmental review process. In accordance with Sections 15063 and 15082 of the CEQA Guidelines, on June 24, 2015, EP sent over 1,540 Notices of Preparation (NOP) of an EIR to responsible public agencies and interested parties to begin the formal CEQA scoping process for the project. The NOP informed agencies and the public about the project and the Planning Department's decision to prepare an EIR, and included a request for comments on environmental issues that should be addressed in the EIR. The Planning Department also distributed a Public Notice of the Availability of the NOP and Notice of Public Scoping Meeting to additional public agencies, interested parties, and landowners/occupants located near the project, which was posted on the Planning Department website and placed in the legal classified section of the *San Francisco Examiner* on June 24, 2015.

The Planning Department held a public scoping meeting on Thursday, July 16, 2015, at the Southeast Community Facility, 1800 Oakdale Avenue, San Francisco to receive oral comments on the scope of the EIR. The 30-day scoping period ended on July 27, 2015. **Table 1-1** presents summaries of the written and oral comments received during the public scoping period and indicates the EIR sections that address comments pertaining to the project description or the scope and content of the environmental analysis. **Appendix NOP** presents the NOP, transcripts from the scoping meeting, and written comments received during the scoping period. The Planning Department has considered all comments made by the public and agencies in preparing the EIR for the project.

1.2.2 Draft EIR

This Draft EIR has been prepared in accordance with CEQA and the CEQA Guidelines. It provides an analysis of the project-specific physical environmental impacts of construction and operation of the project, and the project's contribution to the environmental impacts of foreseeable cumulative development.

TABLE 1-1
SUMMARY OF SCOPING COMMENTS

Commenter	Summary of Comment	Coverage in the EIR
Susan Stewart, State Water Resources Control Board (SWRCB) (July 23, 2015) Letter	Identifies the SWRCB, Division of Financial Assistance, as a funding agency and state agency with jurisdiction regarding California's water resources. Discusses requirements of the Clean Water State Revolving Fund (SRF) Program. Explains that with SRF funding, the project will be subject to federal laws and requirements such as the Federal Endangered Species Act and National Historic Preservation Act.	• As indicated in Section 2.7.2 in Chapter 2, *Project Description*, the SFPUC will pursue SRF funding for the BDFP. The SFPUC will comply with SWRCB reporting requirements regarding compliance with applicable federal laws and requirements.
	Requests clarification as to the depths of excavations and an estimate of the cubic yards of soil to be removed.	• Chapter 2, *Project Description*
	Requests an estimated percent design on project design figure references.	• Figure 2-5 in Chapter 2 indicates the percent design complete
	Requests a discussion of the removal and replacement of street trees, including the types of trees that would be used for revegetation, planting schedule, and measures to protect migratory birds. In addition, requests description of protection measures for trees adjacent to the construction area.	• Chapter 2, *Project Description* • Section 4.14, Biological Resources
Patricia Maurice, California Department of Transportation (Caltrans), District 4 (July 23, 2015) Letter	Identifies guidelines and elements of a Transportation Impact Study. Encourages early collaboration with Caltrans and review of the Transportation Impact Study.	• Chapter 2, *Project Description* • Section 4.6, Transportation and Circulation • Appendix – TR
	Indicates that a Transportation Management Plan (approved by Caltrans) may be required if traffic restrictions and detours affect state highways, and references requirements for such plans.	
	Identifies permits required for movement of oversized or excessive load vehicles on state roadways.	• Section 4.6, Transportation and Circulation • Appendix – TR
	Discusses regulations for transportation of hazardous materials.	• Section 4.6, Transportation and Circulation • Section 4.17, Hazards and Hazardous Materials
	Requests that the EIR identify project mitigations, including the project's fair share contribution associated with planned improvements on Caltrans roadways.	• Section 4.6, Transportation and Circulation
Mark Klaiman, Pet Camp, 525 Phelps Street (July 22, 2015) Email	Expresses concern about the safety of pedestrians, bicyclists, and motorists on Phelps Street due to truck and other traffic associated with project construction. Identifies Phelps Street as a narrow road designated as a bike route. Requests a truck route that avoids Phelps Street.	• Chapter 2, *Project Description* • Section 4.6, Transportation and Circulation • Chapter 6, *Alternatives*
Siri Datta Khalsa, San Francisco Foliage, 1150 Phelps Street (July 16, 2015) Scoping Meeting Speaker	Expresses concern about the potential loss of the community greenhouses, including effects on jobs, internship opportunities for youth, and educational classes.	• Section 4.1, Impact Overview, and cumulative impact discussions in each topic area • The EIR focuses on physical environmental effects rather than socioeconomic effects.[a]

TABLE 1-1 (Continued)
SUMMARY OF SCOPING COMMENTS

Commenter	Summary of Comment	Coverage in the EIR
Ace Washington (July 16, 2015) Scoping Meeting Speaker	Expresses concern about community involvement.	• Refer to discussion of public outreach presented in this chapter.
Karen Pierce, Newcomb Street (July 16, 2015) Scoping Meeting Speaker	Expresses dissatisfaction with the community benefits provided by earlier SEP development and requests additional benefits from this project. Expresses concern about transit (19 Polk) during construction; complete abatement of odor, dust mitigation during construction; coordination with other construction projects in the vicinity; and height of digesters and aesthetics of the SEP.	• Chapter 2, *Project Description* • Section 4.1, Impact Overview, and cumulative impact discussions in each topic area • Section 4.3, Aesthetics • Section 4.6, Transportation and Circulation • Section 4.8, Air Quality • Community benefits are not subject to analysis under CEQA. The SFPUC is conducting a separate environmental justice analysis concurrent with the project.
Steven Tell (July 16, 2015) Scoping Meeting Speaker	Expresses concern regarding odors and environmental justice issues.	• Chapter 2, *Project Description* • Section 4.8, Air Quality • The EIR focuses on physical environmental effects rather than socioeconomic effects.[a] The SFPUC is conducting a separate environmental justice analysis concurrent with the project.[b]
Terry Anders, Anders & Anders Foundation (July 16, 2015) Scoping Meeting Speaker	Requests construction jobs for the community as an economic benefit.	• The EIR focuses on physical environmental effects rather than socioeconomic effects.[a]
David Pilpel, former SFPUC Wastewater Citizens' Advisory Committee member (WWCAC) (July 16, 2015) Scoping Meeting Speaker	Recommends the project include using compostable material from black carts or high strength waste. Requests that the EIR identify other concurrent SFPUC projects, particularly at the SEP; clearly define the area for cumulative impacts; and discuss impacts of the Central Shops relocation. Suggests consideration of the following: acquisition of Palou Phelps open space as mitigation; free compost for residents; the Cayuga diversion to shift wastewater flow from the SEP to the Oceanside Plant as mitigation; use of rail haul options for sludge load-out and other materials (inbound and outbound); and alternative locations for the project such as 1550 Evans Avenue and the Pier 94 Backlands.	• Chapter 2, *Project Description* • Section 4.1, Impact Overview, and cumulative impact discussions in each topic • Chapter 6, *Alternatives*
Tracy Zhu, SFPUC Citizens' Advisory Committee (CAC member (July 16, 2015) Scoping Meeting Speaker	Calls for the project to be a destination for positive uses, such as City College, other training programs, and businesses (Southeast Greenhouses). Expresses concerns regarding transit impacts (19 Polk) of project construction; health and public safety impacts along truck routes in the neighborhood; and culturally appropriate aesthetics.	• Chapter 2, *Project Description* • Section 4.3, Aesthetics • Section 4.6, Transportation and Circulation • Section 4.8, Air Quality

TABLE 1-1 (Continued)
SUMMARY OF SCOPING COMMENTS

Commenter	Summary of Comment	Coverage in the EIR
Andrea Tacdol (July 16, 2015) Scoping Meeting Speaker	Expresses concerns about environmental health impacts of the project; truck routes that minimize health impacts; proximity of Southeast Greenhouses staging area to community center and childcare facility; and cumulative impacts of multiple construction projects.	• Chapter 2, *Project Description* • Section 4.1, Impact Overview, and cumulative impact discussions in each topic area • Section 4.6, Transportation and Circulation • Section 4.8, Air Quality
Diego Sanchez (July 16, 2015) Scoping Meeting Speaker	Notes interest in existing digesters decommissioning and future use and additional public outreach (flyers) to nearby neighbors. Expresses concern regarding truck traffic, diesel particulates, dust, and odors.	• Refer to discussion of public outreach presented in this chapter. • Chapter 2, *Project Description* • Section 4.1, Impact Overview, and cumulative impact discussions in each topic area • Section 4.6, Transportation and Circulation • Section 4.8, Air Quality
Mindy Kenner, Anders & Anders Foundation (July 16, 2015) Scoping Meeting Speaker	Requests that the local community have priority for construction and operations jobs.	• The EIR focuses on physical environmental effects rather than socioeconomic effects.[a]

NOTES:

[a] Consistent with CEQA, economic or social effects of a project are not to be treated as significant effects on the environment (CEQA Guidelines Section 15131).

[b] For more information on the SFPUC's environmental justice analysis, please see the SFPUC's Land Use and Environmental Justice web page: http://sfwater.org/index.aspx?page=654.

The Draft EIR was published on May 3, 2017. The CEQA Guidelines and Chapter 31 of the San Francisco Administrative Code encourage public participation in the planning and environmental review processes. CCSF is providing opportunities for the public to present comments and concerns regarding the CEQA process for this project. The public has the opportunity to review the Draft EIR during a 45-day public review and comment period beginning May 4, 2017 and ending June 19, 2017, and at a public hearing before the San Francisco Planning Commission on June 1, 2017. The Draft EIR is available for public review on the Planning Department's SFPUC Negative Declarations and EIRs web page (http://sf-planning.org/sfpuc-negative-declarations-eirs). CDs and paper copies are also available at the Planning Information Center counter on the first floor of 1660 Mission Street, San Francisco.[1] Referenced materials are available for review at the Planning Department's office at 1650 Mission Street, Suite 400 (call 415-575-9035 or e-mail timothy.johnston.@sfgov.org).

[1] Paper copies are also available for review at the San Francisco Main Library and the Bayview Library branch.

Written comments may be submitted during the specified review period to:

Timothy P. Johnston, MP, Environmental Planner
Re: Biosolids Digester Facilities Project
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

Written and oral comments on the Draft EIR may be presented at a public hearing concerning the project as indicated on the cover of this EIR, sent by facsimile to 415-558-6409, or sent by electronic mail to: timothy.johnston@sfgov.org within the 45-day comment period noted above.

1.2.3 Final EIR

Following the close of the Draft EIR public review and comment period, the Planning Department will prepare and publish a document entitled "Responses to Comments," which will contain a copy of all comments received on this Draft EIR and written responses to all substantive comments. The document may also contain specific changes and revisions to the Draft EIR. This Draft EIR, together with the Responses to Comments document, will constitute the Final EIR. In an advertised public meeting, the San Francisco Planning Commission will consider whether to certify the Final EIR as adequate and in compliance with CEQA.

1.2.4 Mitigation Monitoring and Reporting Program

The SFPUC will use the information in the certified Final EIR in its deliberations on whether to approve, modify, or deny the project or aspects of the project. If the SFPUC approves the project, it will adopt CEQA findings that identify the project-related impacts and the mitigation measures or alternatives that have been adopted to reduce significant impacts. A Mitigation Monitoring and Reporting Program (MMRP) must be adopted by the SFPUC as part of the adoption of the CEQA findings. The MMRP lists the mitigation measures included in the project as identified in the Final EIR, entities responsible for carrying out the measures, timing of implementation of the measures, and associated reporting requirements. If significant and unavoidable impacts would occur even with implementation of all identified mitigation measures, the SFPUC must adopt as a condition of project approval a Statement of Overriding Considerations documenting how the benefits of project implementation outweigh its significant and unavoidable impacts on the environment.

1.3 Other Public Outreach

The SFPUC has undertaken numerous public outreach steps in addition to those taken by the Planning Department as part of the CEQA process. The SFPUC has informed multiple groups and individuals about the project in the past decade through presentations, print media, webinars, and one-on-one discussions. The ongoing community outreach process provides project updates and an opportunity for the public to provide input to the SFPUC. Presentations on the project were made to various groups at their public meetings; a description of these groups is provided below. The SFPUC has conducted approximately 50 separate public outreach efforts related to the project, beginning in 2009 and continuing through 2016.

1.3.1 San Francisco Public Utilities Commission Meetings

The San Francisco Public Utilities Commission consists of five members, nominated by the Mayor and approved by the Board of Supervisors. Its responsibility is to provide operational oversight in areas such as rates and charges for services, approval of contracts, and organizational policy. Updates on the BDFP are provided to the Commission at its public meetings.

1.3.2 SFPUC Southeast Digester Task Force

The Southeast Digester Task Force was a nine-member advisory group that was convened to review and discuss information regarding the replacement of the aging existing biosolids digester facilities at the SEP, identify areas of concern, and make recommendations to SFPUC staff. The task force members were selected to provide a fair and open review process for the community regarding the development of the BDFP and consisted of active members of the Bayview-Hunters Point community. The task force members were affiliated with local business, job training, environmental, and homeowners interests; some of whom were also members of the SFPUC Citizens' Advisory Committee (CAC), the Southeast Community Facility (SECF) Commission; and the representative of the District 10 Supervisor.

The task force met on a regular basis from February 2009 through June 2010. They reviewed and evaluated preliminary facility sites, layouts, construction costs and schedules, operation and maintenance costs, architectural themes, and potential community benefits. A final report from the Southeast Digester Task Force was delivered in June 2010 to the SFPUC and included input on site selection of the digesters, cost and facility design themes, architectural improvements, methods to minimize odor and noise in the community, and overall community integration of the project. In December 2010, the San Francisco Board of Supervisors passed a resolution supporting the recommendations in the 2010 Southeast Digester Task Force report.

1.3.3 SFPUC Southeast Working Group

With co-chairs from the SFPUC Wastewater CAC and the SECF Commission, the Southeast Working Group (SEWG) met on a regular basis from 2014 through the end of 2016 and provided a complementary public forum to inform and discuss activities stemming from the SFPUC's extensive investments in the vicinity of the SEP Similar to the 2009 Southeast Digester Task Force, the SEWG was made up of a cross-section of residents, business owners, and community group leaders based near the SEP (some of whom were members of the Digester Task Force). The SEWG met routinely to gain updates on SFPUC projects, and provide input on SFPUC projects and other activities in the vicinity of the SEP.

1.3.4 SFPUC Citizens' Advisory Committee

The CAC consists of 17 members appointed by the Board of Supervisors. The CAC provides recommendations to the SFPUC General Manager and the Board of Supervisors regarding the agency's long-term strategic, financial, and capital improvement plans. The full CAC public meeting is held monthly. The CAC is comprised of three subcommittees: water, wastewater, and power. The Wastewater CAC reviews wastewater and stormwater collection, treatment, and disposal system replacement, recycling, and other relevant plans, programs, and policies. The Wastewater CAC public meeting is held a minimum of four times a year. The SFPUC has provided regular updates on the Sewer System Improvement Program (SSIP) and BDFP to the full CAC and Wastewater CAC since 2012.

1.3.5 Southeast Community Facility Commission

The SECF Commission was established in 1987 by ordinance of the San Francisco Board of Supervisors. The members of the SECF Commission are appointed by and serve under the leadership of the Mayor. The SECF Commission public meetings are held twice monthly and the Commission reviews and provides guidance regarding the operations of the SECF and other facilities under its jurisdiction. The Commission's goal is to promote and advocate special services for the improvement of the general economic, health, safety, and welfare of residents in the southeastern sector of the city.

1.3.6 Bayview Hunters Point Citizens' Advisory Committee

The Bayview Hunters Point CAC, established by the Board of Supervisors in June 2013, provides policy advice on the appropriateness of projects and land use matters regarding the Bayview Hunters Point Redevelopment Project Area Zone 2 (inclusive of the SEP). The District 10 Supervisor, the Mayor, and the City Administrator each appoint four members. The 12-member Bayview Hunters Point CAC provides community guidance to the Board of Supervisors, City boards, commissions, and departments regarding planning and development issues in Zone 2.

1.4 Organization of the EIR

This EIR is organized as follows:

- **Chapter S, *Summary*.** This chapter summarizes the project, identifies significant environmental impacts and mitigation measures, and describes the alternatives considered in this EIR, including the environmentally superior alternative. It also identifies areas of controversy and issues to be resolved.
- **Chapter 1, *Introduction*.** This chapter describes the purpose and organization of the EIR, as well as the environmental review process and additional public outreach efforts.
- **Chapter 2, *Project Description*.** This chapter describes the project (including project background and project objectives), summarizes project components, and provides information about project construction and operation. The chapter also lists permits and approvals relevant to the construction and operation of the BDFP.

- **Chapter 3, *Plans and Policies*.** This chapter describes applicable land use plans and policies and their relevance to the project and identifies any inconsistencies with those plans.

- **Chapter 4, *Environmental Setting and Impacts*.** This chapter is subdivided into sections for each environmental resource topic. Each section describes the environmental and regulatory setting, the criteria used to determine impact significance, and the approach to the analysis for that resource topic. It then presents analyses of potential environmental impacts as well as the project-specific mitigation measures that have been developed to address significant and potentially significant impacts. Each section also includes an evaluation of cumulative impacts with respect to that resource topic. The environmental resource topics are:

    - Land Use
    - Aesthetics
    - Population and Housing
    - Cultural Resources
    - Transportation and Circulation
    - Noise and Vibration
    - Air Quality
    - Greenhouse Gas Emissions
    - Wind and Shadow
    - Recreation
    - Utilities and Service Systems
    - Public Services
    - Biological Resources
    - Geology, Soils, and Paleontological Resources
    - Hydrology and Water Quality
    - Hazards and Hazardous Materials
    - Mineral Resources, Energy Resources, and Water Use
    - Agriculture and Forest Resources

- **Chapter 5, *Other CEQA Issues*.** This chapter discusses growth-inducing effects, identifies the significant environmental effects that cannot be avoided if the project is implemented, and describes significant irreversible impacts.

- **Chapter 6, *Alternatives*.** This chapter describes the alternatives to the project and compares their impacts to those of the project. This chapter also summarizes the alternatives that were considered but eliminated from further analysis.

- **Chapter 7, *Report Preparers*.** This chapter lists the authors of this EIR.

Technical and supporting information for the EIR are included as appendices to the EIR.

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CHAPTER 2
Project Description

2.1 Project Overview

The San Francisco Public Utilities Commission (SFPUC) proposes to construct new solids treatment, odor control, energy recovery, and associated facilities as part of improvements to the wastewater treatment facilities at the existing Southeast Water Pollution Control Plant (Southeast Plant or SEP) in San Francisco. The proposed project, the Biosolids Digester Facilities Project (BDFP or project), would replace the outdated existing solids treatment facilities with more reliable, efficient, and modern technologies and facilities. Biosolids are the recyclable solid materials removed from wastewater during the treatment process, and digesters are the major facility used in the solid treatment process. Many of the existing SEP solids treatment facilities are over 60 years old, require significant maintenance, and are operating well beyond their useful life. The project would replace the existing digesters with new digesters and other new facilities that produce higher-quality biosolids, capture and treat odors more effectively, and maximize digester gas[1] utilization and energy recovery for the production of heat, steam, and electrical power. In addition, the project intends to locate the digesters farther from existing residences, limit project-generated odors to the SEP fence line, and make visual improvements in and around the SEP. The SFPUC anticipates that project construction would require five years to complete, from 2018 through 2023, followed by a transition period to conduct performance testing and facility commissioning, with full operation commencing in 2025.

2.1.1 Project Location and Site Description

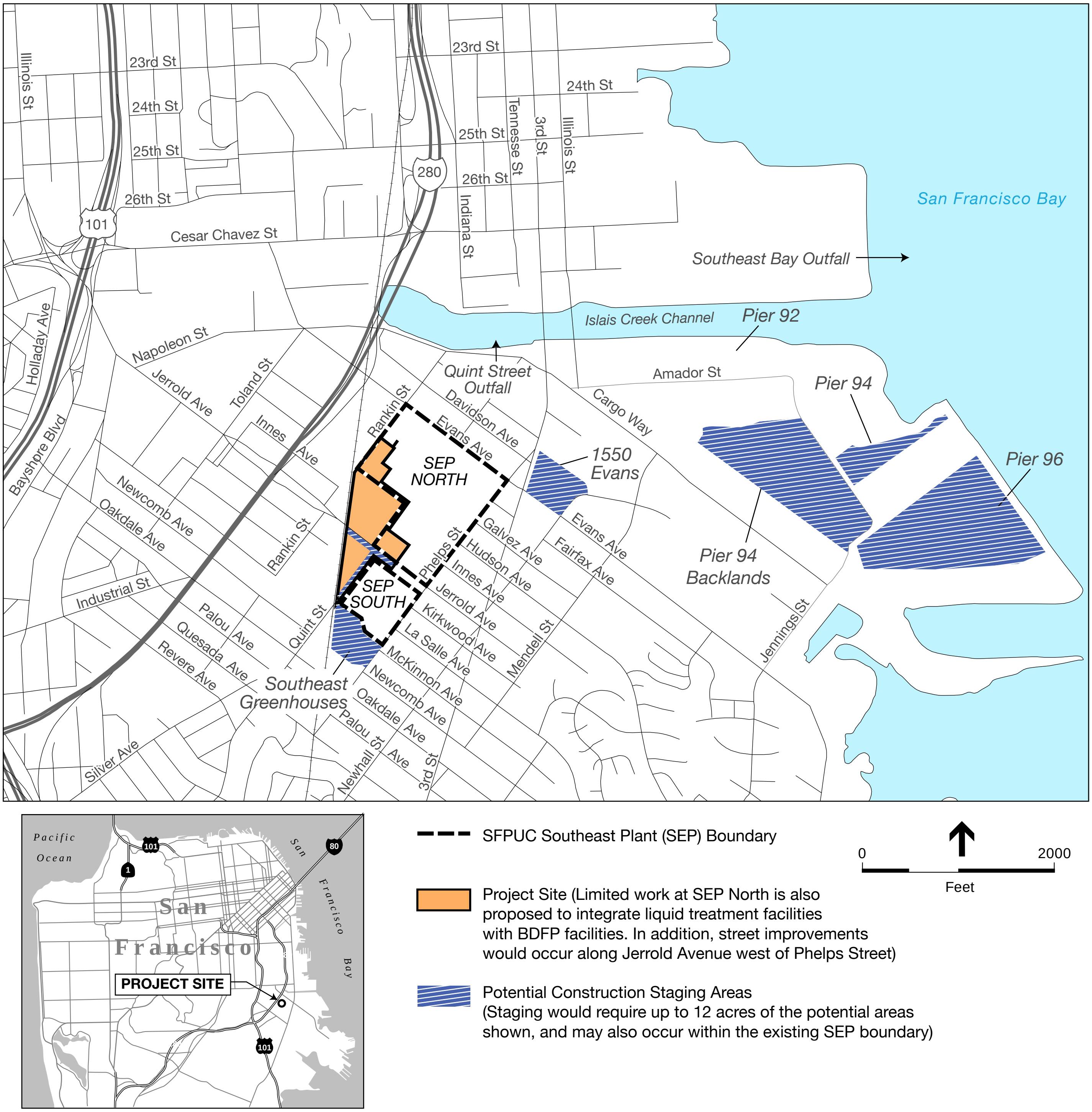
2.1.1.1 Project Site

As shown on **Figure 2-1** and **Figure 2-2**, the project site is located in the southeast part of San Francisco, bordered by a freight rail spur[2] and the Caltrain right-of-way on the west, Rankin Street on the northwest, and the existing SEP on the northeast, east, and southeast. The project site is bisected by Jerrold Avenue and includes the segment of Quint Street between Jerrold Avenue and the Caltrain right-of-way. The project site includes areas located within the west side of the existing SEP property boundaries at 750 Phelps Street and 1700 Jerrold Avenue (Block and Lot 5262/009). The project site also includes two properties (shown on Figure 2-2) adjacent to the SEP: (1) a site located at 1800 Jerrold Avenue and known as the Central Shops site (Block and Lot 5262/009), and (2) the decommissioned Asphalt Plant site (Block and Lot 5281/001) located at 1801 Jerrold Avenue. The project site, including the construction staging areas along Jerrold Avenue and Quint Street, encompasses approximately 562,000 square feet (about 12.9 acres). The project also includes improvements to Jerrold Avenue between the rail spur and Phelps Street.

The project would require demolition or relocation of several currently utilized facilities at the project site within the SEP boundaries, including office trailers, a service building, pump stations, and an electrical substation (see Section 2.6.4, below, for more details). These structures range in size from 800 to 3,800 square feet.

1 Digester gas is a byproduct of the anaerobic digestion process and comprised mostly of methane and carbon dioxide.

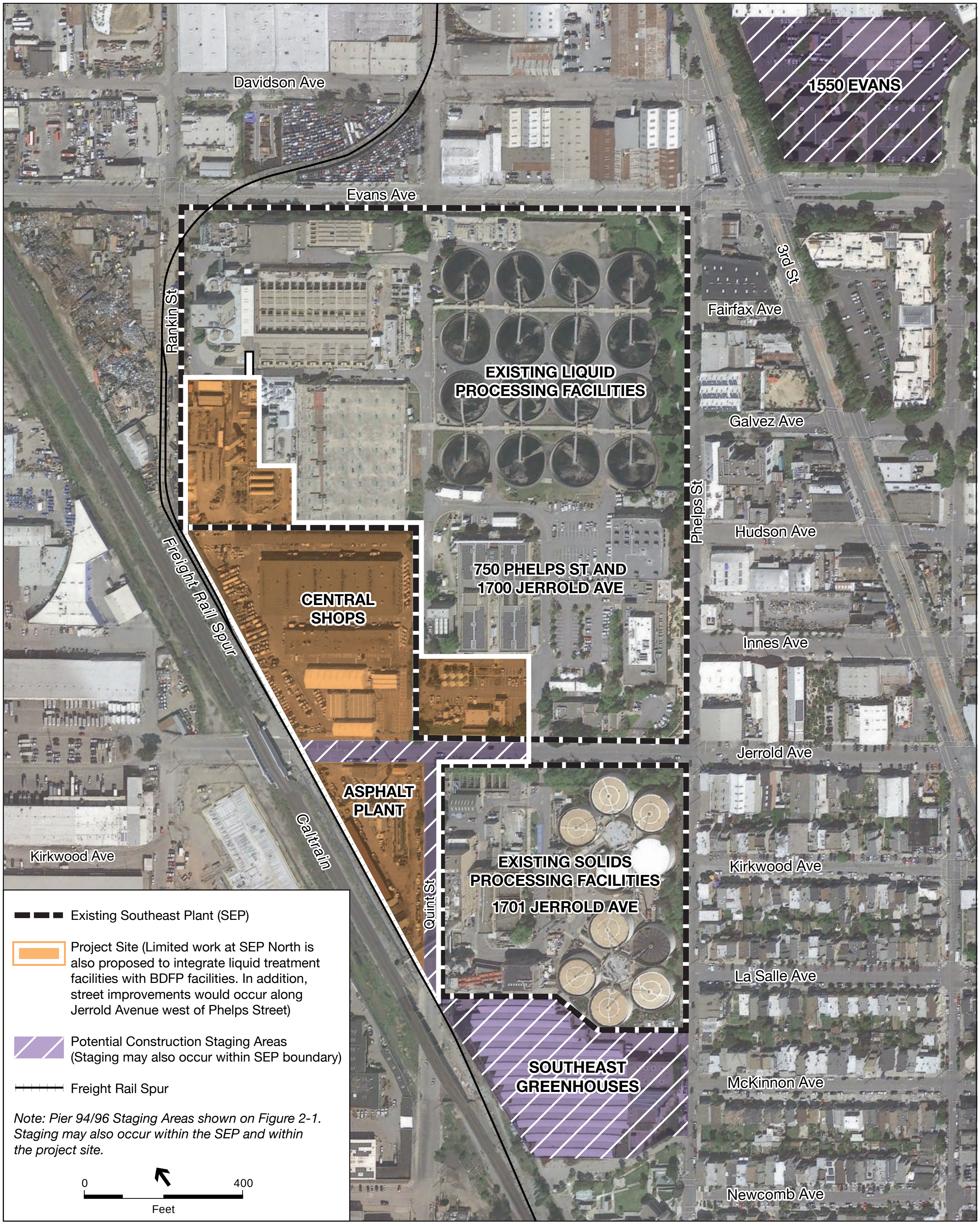
2 The rail spur is part of what is referred to as the Quint Street Lead. The Quint Street Lead is jointly owned by the Union Pacific Railroad Company and Burlington Northern Railway Company. The rail spur connects the Port of San Francisco cargo terminals and rail yard to the main rail line.



SOURCE: San Francisco Public Works 2005 GIS data; ESA+Orion, data developed in 2016 for BDFP

SFPUC Biosolids Digester Facilities

Figure 2-1
Project Location



SOURCE: Google Maps Imagery from 2015; ESA+Orion, data developed in 2016 for BDFP

SFPUC Biosolids Digester Facilities

Figure 2-2
Biosolids Digester Facilities Project Site

The Central Shops site is located adjacent to the SEP and is operated by the CCSF General Services Agency providing vehicle and equipment maintenance services for multiple City agencies through the Fleet Management Department. There are three main buildings on the Central Shops site ranging in size from about 13,000 to 50,000 square feet, numerous smaller structures, and parking and storage areas. As part of an action separate from the project, the General Services Agency is currently in the process of relocating the Central Shops operations, and the Central Shops site is expected to be transferred to the SFPUC in 2018 to support the wastewater treatment plant.[3] The BDFP proposes to use this site, and would demolish the existing structures, construct BDFP facilities, and change the use of the Central Shops site to wastewater facilities.

The Asphalt Plant is also part of the project site and is located adjacent to the SEP. The Asphalt Plant, which was historically operated by San Francisco Public Works (SFPW), was built in 1954 and was decommissioned in December 2009.[4] Decommissioned facilities that currently occupy the site include a three-story steel asphalt mixing, heating, and sorting facility and related ancillary facilities. The site is currently used as a vehicle dispatch center and parking area for City vehicles. The Asphalt Plant site was transferred to the SFPUC as a separate action in December 2016,[5] and as part of that separate action the SFPUC will demolish the aboveground structures and close the adjacent dead-end block of Quint Street between the Caltrain tracks and Jerrold Avenue (discussed in Section 2.4.2, below).[6] This site is proposed for use under the BDFP; the project would demolish below-grade features, construct BDFP facilities, and change the use of the Asphalt Plant site to wastewater facilities.

2.1.1.2 Construction Staging Sites

In addition to the project site described above, the project would require temporary use of other off-site locations for staging and construction employee parking during the five-year construction period. The BDFP would require up to 12 acres for construction staging at one or more sites in addition to the project site itself. Potential construction staging sites are shown on Figure 2-1 and include portions of Piers 94, 96, and the Pier 94 Backlands (administered by the Port of San Francisco and available for lease; collectively called the Piers 94 and 96 staging areas), and segments of Quint Street (to be permanently closed as part of another project) and Jerrold Avenue (to be closed during construction). Two additional sites under the jurisdiction of the SFPUC, the Southeast Greenhouses site (currently used as greenhouses) and the 1550 Evans Avenue site (currently used for parking and storage), could also be used for construction staging if they become available; the SFPUC would decide whether to use these properties prior to the start of BDFP construction (in 2018).

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[3] The City is in the process of transferring jurisdiction of the Central Shops property to the SFPUC. In October, 2015, the Planning Department found the property transfer exempt from CEQA (San Francisco Planning Department, CEQA Categorical Exemption for Central Shops Relocation and Land Transfer Project. Case Number 2015-004781ENV, October 28, 2015). The Board of Supervisors adopted a resolution establishing the initial terms and conditions of the jurisdictional transfer in February 2016 (City and County of San Francisco, Ordinance No 8-16).

[4] Santana, Benjamin, San Francisco Public Works, personal communication with Karen Frye, SFPUC, December 1, 2015.

[5] City and County of San Francisco, Resolution No. 516-16, Jurisdictional Transfer and Exchange of City Property – San Francisco Public Utilities Commission – Public Works – 160 Napoleon Street – 1801 Jerrold Avenue and a Portion of 160 Napoleon Street, approved December 16, 2016.

[6] Closure of the Quint Street block would be accommodated through a Street Vacation, where the street is permanently closed and transferred to the SFPUC. Utility easements would be provided, but no public access would be allowed.

Locations within and closest to the SEP are preferred staging locations, but since availability of some of these potential staging areas is uncertain, the full area needed could be accommodated at the Piers 94 and 96 staging area. For the purposes of California Environmental Quality Act (CEQA) environmental review, this environmental impact report (EIR) analyzes all potential construction staging areas.

Refer to Section 2.6.2, below, for more information regarding the current land uses and proposed temporary uses of the construction staging areas.

2.1.2 Project Characteristics

The project would include construction of new digesters, an odor control facility, and an energy recovery facility. **Table 2-1** summarizes and compares the proposed facilities with the existing conditions at the SEP. The proposed new facilities would use a new technology to pre-treat the solids upstream of the digesters, which would reduce the volume of biosolids produced at the end of the treatment process compared to the existing processes. The new facilities would also upgrade the quality of the biosolids produced from Class B to Class A biosolids.[7] Although Class B biosolids are treated, they may still contain detectable levels of pathogens. Under the project, the Class A biosolids would have no detectable levels of pathogens, thereby expanding the options for beneficial reuse of these materials. The project also intends to improve odor control such that odors from the proposed solids treatment process would be contained within the SEP site boundaries. In addition, the project would more than double the current energy recovery capability at the SEP, generating an estimated annual average power output ranging from 4.2 to 5.2 megawatts (MW).

The project is designed to provide solids treatment for projected wastewater flows and solids loads for the year 2045 (the project's planning horizon). Over the planning period for the BDFP, the projected population growth is anticipated to increase annual average solids loads from about 187,000 pounds per day (2014) to about 280,000 pounds per day (2045).

The BDFP would include:

- Construction of new structures on approximately 206,000 square feet of the project site. The height of new structures would be up to 65 feet above grade; some structures would extend 35 feet below grade.
- Demolition of about 136,000 square feet of building area to accommodate proposed facilities. Buildings to be demolished would include structures at the project site (the Central Shops buildings and currently used SEP facilities within the SEP boundaries of the project site) and at a potential staging site. In addition, underground structures would be removed at the Asphalt Plant site.

7 The Standards for the Use or Disposal of Sewage Sludge (Title 40 of the Code of Federal Regulations, Part 503) and related guidance documents establish rules for biosolids application to land and categorize treated sewage sludge with respect to pathogens as either Class A or Class B.

TABLE 2-1
KEY FEATURES OF BIOSOLIDS DIGESTER FACILITIES PROJECT

Feature		Existing Conditions (Year 2015 unless otherwise noted)	Future Conditions with Project (Year 2045 unless otherwise noted)
SEP Property Size		2015: approximately 40 acres 2018: approximately 47 acres with anticipated expansion—1800 Jerrold Avenue (Central Shops) and 1801 Jerrold Avenue (Asphalt Plant) (acquired as separate actions)	No change from 2018
SEP Design Wastewater Flow Capacity		250 mgd (wet weather)[a] 85 mgd (dry weather design average)[a]	No change
Digester Tanks		10 digesters – 1.8 million gallons each[b] Distance to Closest Residence: <100 feet	5 digesters – 1.66 million gallons each Distance to Closest Residence: approximately 1,000 feet
Solids Treatment Process		- Thickening - Anaerobic Digestion[c] - Dewatering	- Thickening - Screening - Pre-Thermal Hydrolysis Process[d] Dewatering - Thermal Hydrolysis Process[d] - Anaerobic Digestion[c] - Biosolids Dewatering
Biosolids	Classification[e]	Class B	Class A Exceptional Quality (EQ)
	Annual Production[f]	13,000 dry tons	24,000 dry tons[g]
	Haul Trips[h]	7-10 trips/day	10-14 trips/day [g, h]
Odor Control		Does not completely contain odors from biosolids facilities to within existing SEP site boundaries	Designed to limit odors from biosolids facilities to within revised SEP site boundaries
Digester Gas[i]		Production: approximately 1.3 million cubic feet/day Flaring: routine	Production: approximately 2 million cubic feet/day Flaring: infrequent
Energy Recovery	Technology	- Internal Combustion Engine - Hot Water Boilers	- Gas Turbines - Heat Recovery Steam Generation System - Steam Boilers: Backup Only
	Electricity Generation (annual average)	Up to 2 MW	4.2-5.2 MW (2023-2045)
SEP Staffing Levels		280 staff (entire SEP including biosolids staff)	No change

NOTES:

SEP = Southeast Water Pollution Control Plant; mgd = million gallons per day; MW = megawatts

a Flows are often expressed as dry weather and wet weather since the SEP treats both wastewater and stormwater (rainfall).
b The SEP has 10 digester tanks; seven are primary digesters, two are secondary/storage digesters, and one has been converted to a digester gas storage facility.
c Anaerobic digestion is a method of treating wastewater solids using oxygen-starved biological processes to inactivate pathogens (disease-causing organisms) and produce stabilized organic biosolids and digester gas.
d The *thermal hydrolysis process* (THP) is a pre-treatment of solids used in combination with anaerobic digestion to produce Class A biosolids. THP pre-heats, hydrolyzes, and sterilizes solids. The solids are heated with steam under pressure and held for a specified time in order to destroy pathogens, and then pressure is rapidly reduced to rupture microbial cells, making the solids more biodegradable and allowing for better methane production during the subsequent anaerobic digestion process.
e The Standards for the Use or Disposal of Sewage Sludge (Title 40 of the Code of Federal Regulations, Part 503) and related guidance documents establish rules for biosolids application to land and categorize treated sewage sludge with respect to pathogens as either Class A or Class B. Class A biosolids contain no detectable levels of pathogens and do not attract vectors such as flies, mosquitoes, and other potential disease-carrying organisms. According to the United States Environmental Protection Agency (USEPA) Guide to Part 503 Rule, Class A biosolids that meet the USEPA's metals pollutant limits are labeled "Exceptional Quality (EQ)" biosolids and have the fewest restrictions for land applications such as soil conditioning and fertilizer. Class B biosolids are treated but still contain detectible levels of pathogens.
f The annual production of biosolids is based on the amount of solids removed from the wastewater liquid treatment processes. The projected increase is due to population growth (with or without the project).
g Note that in 2045 *without implementation of the BDFP*, the amount of biosolids generated and the number of haul trips would be greater (27,700 dry tons and 14 to 18 trips per day, respectively) because the proposed BDFP solids treatment processes would reduce the quantity of biosolids generated (and associated truck trips required for off-hauling) compared to existing solids treatment processes.
h A range of biosolids hauling truck trips is provided to reflect the potential for truck trips to occur five to seven days per week. Assumes a truck capacity of 23 tons.
i Digester gas is a byproduct of the anaerobic digestion process and comprised mostly of methane and carbon dioxide.

SOURCE: SFPUC, *BDFP Conceptual Engineering Report*, March 2016; SFPUC, City and County of San Francisco Biosolids Annual Summary Report. February 19, 2016.

Section 2.4, below, describes project components in detail. Refer to Section 2.6.4, below, for more information regarding the uses, sizes, and locations of existing structures proposed to be demolished.

Construction of the BDFP is proposed to start in 2018 and would require about five years to complete. Project construction would require temporary use of one or more off-site staging areas as well as temporary closure of portions of local roadways and temporary relocation of the Muni 23 Monterey bus route. Section 2.6, below, describes project construction activities in detail.

Following construction of the proposed facilities, there would be transition period during which performance testing and full facility commissioning would occur. Initially, both old and new biosolids treatment systems would operate concurrently. Following this period, the existing digesters and many of the other solids handling facilities located south of Jerrold Avenue (shown on Figure 2-2) would be decommissioned. Demolition of these facilities and future uses of the area south of Jerrold Avenue would be determined during the planning of a future phase of the Sewer System Improvement Program (SSIP) and are not part of the project. However, since demolition of these facilities is reasonably foreseeable, the environmental consequences of demolition of the existing digesters and solids handling facilities are considered as a cumulative project in the analyses of cumulative impacts provided in Chapter 4, *Environmental Setting and Impacts*. Section 2.5, below, describes project operations in detail.

2.2 Project Background

2.2.1 City Sewer System Overview

The SFPUC operates and maintains the City's combined sewer system, which collects and treats the majority[8] of San Francisco's wastewater and stormwater at three SFPUC treatment facilities: the SEP, the Oceanside Water Pollution Control Plant (OSP), and the North Point Wet Weather Facility (NPF). Flows from the west side of the city in the Westside drainage basin are conveyed to and treated year-round at the OSP. Flow on the east side of the city in the Bayside drainage basin are conveyed to and treated at the SEP[9] and NPF, although the NPF only operates during wet weather. The system is called a "combined system" because it collects and conveys both wastewater and stormwater in the same network of pipes. Combined system flows are often expressed in terms of dry weather and wet weather flows, since rainfall during wet weather can substantially increase flows over dry weather periods.

The City's major treatment facilities were constructed over several decades as part of major capital improvement programs. The NPF was built in 1951, the SEP in 1952, and the OSP in 1993. The SEP was enlarged and upgraded to secondary treatment in 1982, and again expanded to treat peak wet weather flows in 1996.

[8] Flows from the Presidio and Treasure Island, both within San Francisco, have their own treatment systems and are not treated at one of the three treatment plants described above.

[9] The SEP also treats flows from limited areas of Daly City and Brisbane.

Wastewater treatment processes at the SEP and OSP include the following two general categories:

- Liquid treatment processes and discharge of treated water through outfalls; and
- Solids treatment processes and hauling of treated biosolids to off-site locations for reuse.

2.2.2 Southeast Water Pollution Control Plant

2.2.2.1 Location

The SEP is located at 750 Phelps Street and currently occupies approximately 40 acres bounded by Evans Avenue to the northeast, Quint and Rankin Streets to the northwest, Phelps Street to the southeast, and the Caltrain railroad tracks, a freight rail spur, and City-owned properties to the west (refer to Figures 2-1 and 2-2). Jerrold Avenue bisects the SEP, dividing it into SEP North (i.e., facilities north of Jerrold Avenue) and SEP South (facilities south of Jerrold Avenue). Facilities on SEP North are currently associated with processing the liquids portion of the wastewater. Facilities on SEP South are currently associated with processing the solids portion of the wastewater and include the existing digesters, solids loadout, and energy recovery facilities. **Figure 2-3** shows the layout of existing facilities at the SEP.

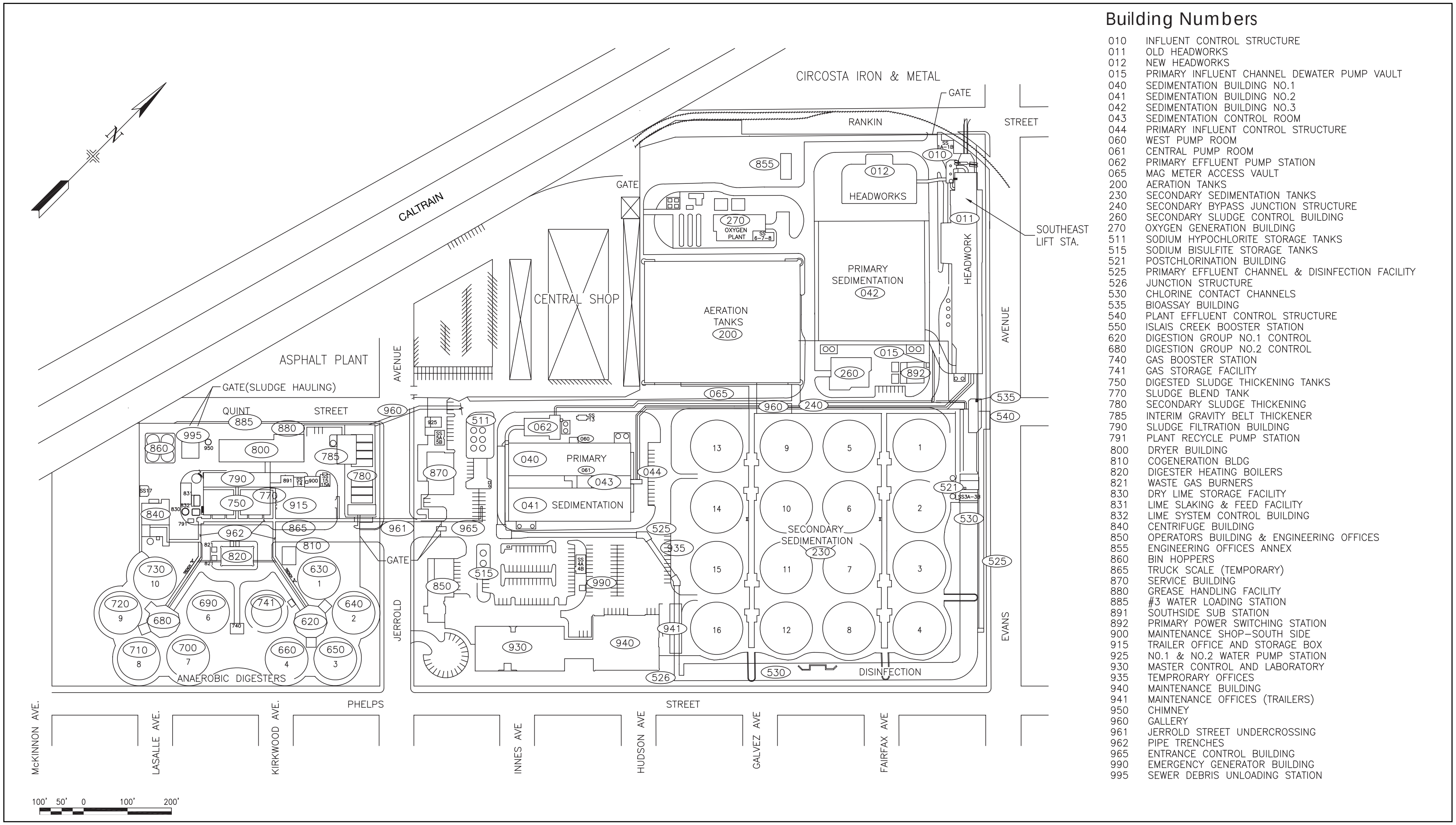
The SEP is located within San Francisco's Bayview-Hunters Point community (Supervisor District 10) and is surrounded by a mix of residential, commercial, and light- and heavy-industrial uses. Residential and commercial uses are located across Phelps Street from the SEP; the nearest residence is located less than 100 feet from the existing SEP digesters (the circular tanks shown in the lower left-hand portion of Figure 2-3 adjacent to the Southeast Greenhouses and south of Jerrold Avenue). As shown on Figure 2-2, the Central Shops and Asphalt Plant sites are between the SEP and Caltrain railroad tracks on either side of Jerrold Avenue, and the Southeast Greenhouses are adjacent to the southwestern boundary of the SEP.

2.2.2.2 Operating Characteristics

Originally built in 1952 with major upgrades in 1982 and 1996, the SEP is the City's largest wastewater treatment facility, treating approximately 80 percent of San Francisco's sewage and stormwater flows. The SEP operates seven days a week, 24 hours a day and treats wastewater from the Bayside drainage area (generally the east side of the city) as well as flows from a limited area of Daly City and Brisbane (representing about 2.5 percent of the total flow currently treated at the SEP). The existing wastewater treatment operation at the SEP consists of a number of processes, depicted on **Figure 2-4,** that separate and treat liquid and solids in the wastewater in compliance with regulatory requirements.

The liquid treatment processes consist of:

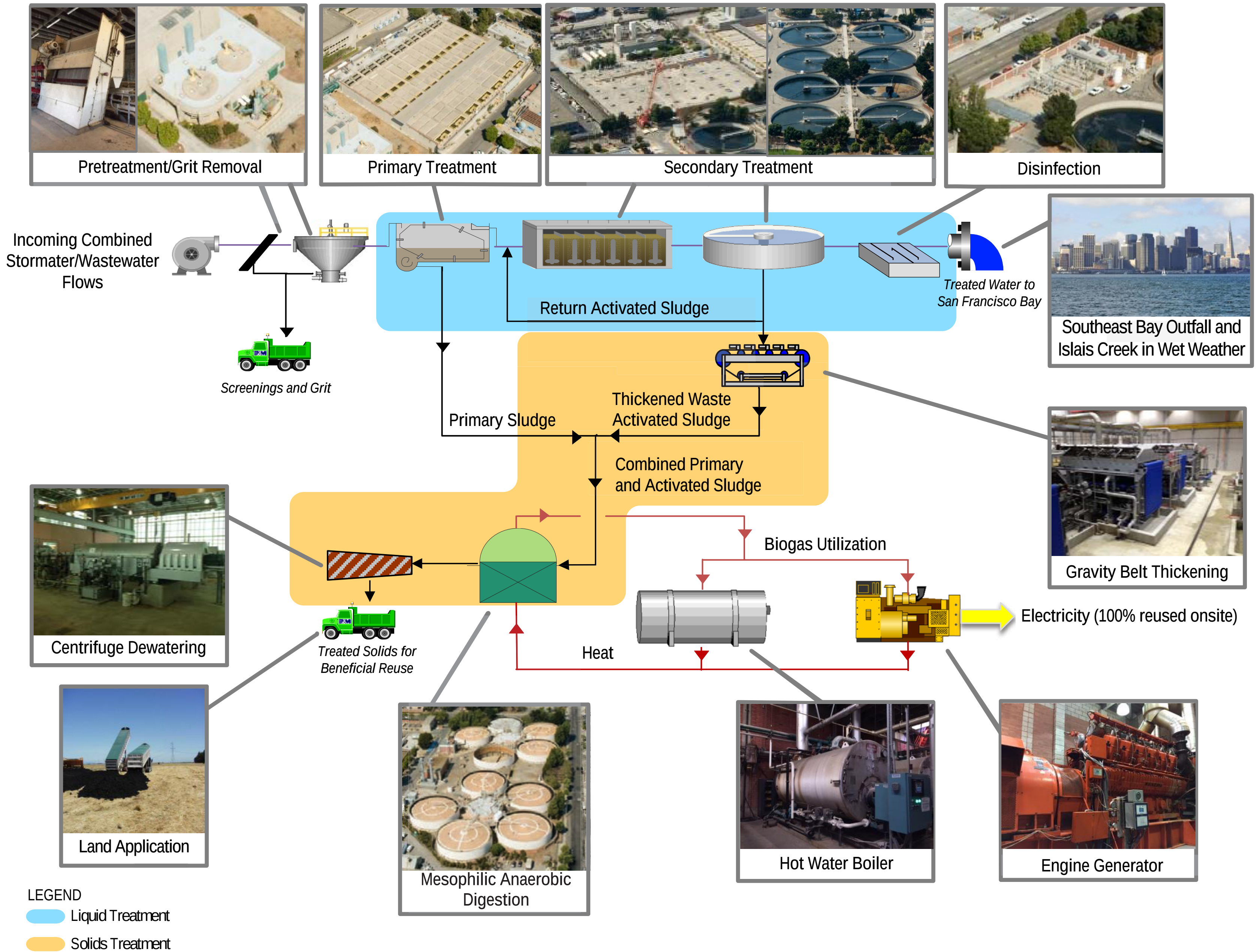
- *Pre-treatment:* screening and grit removal;
- *Primary treatment:* settling of large solids and skimming of oil and grease;
- *Secondary treatment:* biological treatment and settling; and
- *Disinfection:* adding chemicals for pathogen removal.



SOURCE: SFPUC, Wastewater Enterprise Bayside System Operations Plan Summary, October 2013, adapted by ESA+Orion

SFPUC Biosolids Digester Facilities

Figure 2-3
Existing SEP Facilities



SOURCE: SFPUC, Wastewater Enterprise Bayside System Operations Plan Summary, October 2013, adapted by ESA+Orion

SFPUC Biosolids Digester Facilities

Figure 2-4

Process Flow Diagram for Existing SEP

The solids treatment process consists of:

- *Gravity belt thickening:* condensing solids using gravity drainage to remove water;
- *Mesophilic anaerobic digestion*[10]*:* stabilizing biosolids to reduce solids and pathogens; and
- *Centrifuge dewatering:* removing excess water by mechanical means.

As part of the solids treatment process, digester gas is generated by the anaerobic digestion process and is used on-site to produce heat and power through the energy recovery process. Odor control units are operated for both liquids and solids treatment processes.

A summary of existing SEP operations follows. While the project would not alter existing SEP liquid treatment and discharge, a general description of these processes is provided below for informational purposes.[11]

Liquid Treatment and Disposal

The SEP is designed to treat up to 85 million gallons per day (mgd) of average dry weather wastewater flows and up to 250 mgd of wet weather combined wastewater and stormwater flows. During wet weather, the existing SEP facilities provide full secondary treatment (a higher level of treatment than primary treatment) for up to 150 mgd and primary treatment for an additional 100 mgd of combined wastewater and stormwater flow. The pre-treatment process consists of mechanical removal of trash, debris, and grit (sand and gravel) using screens and settling tanks. Trucks haul the material removed during this process off-site for landfill disposal. The pre-treated wastewater continues to the primary sedimentation tanks where solids sink to the bottom and grease and oils that float to the top are removed by rotating skimmers. Then, in secondary treatment, primary treated wastewater is mixed with bacterial biomass (activated sludge) and high-purity oxygen in the aeration tanks to break down organic matter. The biomass is then separated from treated wastewater in the secondary sedimentation tanks using gravity settling. Next, the treated wastewater is disinfected with sodium hypochlorite and then dechlorinated[12] with sodium bisulfite. The treated wastewater is subsequently discharged into the Bay during all weather conditions and into Islais Creek during wet weather.

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[10] Mesophilic anaerobic digestion is a method of treating wastewater solids using biological processes to inactivate pathogens (disease-causing organisms) and produce stabilized organic biosolids, digester gas, and water. Mesophilic anaerobic digesters operate at temperatures of 95 degrees Fahrenheit (°F) to 105 °F.

[11] Chapter 4, Section 4.1.3, Approach to Cumulative Analysis and Cumulative Projects, presents descriptions of other projects that would modify liquid treatment systems at the SEP.

[12] Dechlorination, the process of removing chlorine from treated wastewater that has been chlorinated for disinfection, is intended to protect aquatic resources.

Under National Pollutant Discharge Elimination System (NPDES) Permit[13] No. CA0037664, the SFPUC is authorized to discharge up to 110 mgd of mixed primary and secondary treated effluent into San Francisco Bay through the Southeast Bay Outfall (also called the Pier 80 deepwater outfall), and during wet weather up to 140 mgd of secondary effluent through the Quint Street Outfall to Islais Creek (see **Table 2-2**). Peak daily wet weather flows to the SEP for years 2012 to 2014 were 250 mgd and are projected to remain at 250 mgd in 2045. Average dry weather flows to the SEP for years 2012 to 2014 ranged from 58 to 61 mgd and are projected to increase to 69 mgd by 2045 due to population growth.[14,15]

TABLE 2-2
SOUTHEAST WATER POLLUTION CONTROL PLANT DISCHARGE AMOUNTS AND LOCATIONS

Scenario	Discharge Description	Design Capacity (million gallons per day)	Discharge Location
Dry Weather	Secondary treated and disinfected wastewater	Average: 85 Peak: 110	Pier 80 Deepwater Outfall to San Francisco Bay
Wet Weather	Mix of primary and secondary treated combined wastewater and stormwater, all disinfected	Peak: 110	Pier 80 Deepwater Outfall to San Francisco Bay
	Secondary treated and disinfected combined wastewater and stormwater	Peak: 140	Quint Street Outfall to Islais Creek
	Total Wet Weather Discharge	*Peak: 250*	

SOURCE: San Francisco Bay Regional Water Quality Control Board Order No. R2-2013-0029, NPDES No. CA0037664, adopted August 2013.

Solids Treatment and Disposal

The existing solids treatment process consists of solids thickening to reduce the liquids content, anaerobic digestion of the thickened solids, and biosolids dewatering to produce a drier material; the treated biosolids are then hauled off-site. Waste activated sludge (biomass generated after microbial activity and settlement in the secondary treatment process) is thickened using gravity belt thickeners, combined with primary sludge (solids from the primary treatment process), and sent to

13 The NPDES program is a federal program that has been delegated to the State of California for implementation through the State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCBs). NPDES permits regulate point sources (e.g., wastewater treatment plants) that discharge to waters of the United States. Waste discharge requirements for the SEP are covered under Order No. R2-2013-0029 (NPDES No. CA0037664). NPDES permits are updated approximately every five years, and the upcoming renewal of the SEP's NPDES permit is anticipated in late 2018. The BDFP would not require an update of the NPDES permit at this time; rather, SEP changes associated with the BDFP would be addressed in the subsequent NPDES permit renewal cycle.

14 SFPUC, *Wastewater Flow and Load Projections Technical Memorandum*, prepared for San Francisco Public Utilities Commission Sewer System Improvement Program, updated February 2014.

15 SFPUC, personal communication from Sue Chau to Karen Lancelle et al. regarding RFI and Action Item responses, September 9, 2015.

the anaerobic digesters. The anaerobic digestion process produces stabilized biosolids and digester gas (also referred to as biogas). The SEP currently has ten digester tanks: seven primary digesters, two secondary (storage) digesters, and one that has been converted to a digester gas storage facility.

The existing solids treatment process produces Class B biosolids, which contain detectable levels of pathogens. To protect public health, regulations for the land application of Class B biosolids include buffer requirements and restrictions on public access and crop harvesting. Class B biosolids produced at the SEP are suitable for beneficial reuse; they are trucked out for land application (i.e., added to soil to fertilize crops and other vegetation, or to condition soil with organic matter), used as alternative daily cover at landfills, or composted. In 2015, for example, biosolids were trucked to the following locations:

- Sonoma County and Solano County during the dry season (May to October) for land application;
- Sacramento County during the wet season for land application;
- Potrero Hills Landfill (Suisun City) and Altamont Landfill (Livermore) during the wet season for use as alternative daily cover; and
- A composting facility near Dos Palos in Merced County.

In 2015, the SEP produced about 13,000 dry tons (the weight of solids excluding the weight of the water) of Class B biosolids. With anticipated population growth, by 2045 the SFPUC estimates this number would increase to approximately 27,700 dry tons of Class B biosolids if operation of the existing SEP biosolids treatment process or similar technologies were to continue. With implementation of the proposed technology under the BDFP, the quantity of biosolids produced in 2045 would be reduced to about 24,000 dry tons, and the quality would be upgraded to Class A biosolids (refer to description of proposed solids handling under the BDFP in Section 2.4.1, below).

Odor Control

The SEP currently implements odor control measures for both liquid and solids treatment processes at locations with high potential for odors. These measures generally involve treating odorous air through adsorption units that chemically and physically remove and disperse odors. These include units at the Influent Control Structure, existing Headworks facilities, and Secondary Sludge Control Building in the liquid treatment processes; and at the gravity belt thickeners, Centrifuge Building, and cake loadout in the solids treatment processes. In addition, the SFPUC regularly implements best operating practices and good housekeeping, which also serve to reduce odor generation throughout the SEP.

The existing odor control units do not cover all of the process facilities with odor emission potential and are not capable of completely containing odors within the SEP fence line. For more information on existing odor control, refer to Chapter 4, Section 4.8, Air Quality.

Energy Recovery

The SEP currently operates energy recovery facilities that use the digester gas generated by the existing digesters. These facilities produce about 1.3 million cubic feet of digester gas per day and generate about 2 MW of energy, providing about one third of the SEP's energy needs through electricity and heating. The digester gas provides fuel for boilers and a cogeneration facility on-site. An internal combustion engine at the cogeneration facility converts the digester gas to electricity and heat. Existing SEP operations include routine flaring of excess digester gas that cannot be converted to energy, either because the existing equipment cannot process all of the digester gas produced or due to periodic maintenance outages of the energy recovery facilities.

2.2.3 Sewer System Improvement Program

The SFPUC is currently implementing the SSIP, a 20-year, multi-billion-dollar citywide program to upgrade the City's aging sewer infrastructure and to ensure a reliable and seismically safe system. The SSIP provides a phased approach for future sewer system improvements. In 2012, the SFPUC authorized staff to proceed with the planning and development of Phase 1 projects, with final project approvals subject to completion of environmental review.[16] In 2016, the SFPUC endorsed the updated SSIP 2016 Goals, Levels of Service (LOS), and Program and Phase 1 Strategies, including the revised overall SSIP cost of $6.976 billion for proposed capital improvements (see **Table 2-3**). The Commission further endorsed the revised baseline scope, schedule, and budget for Phase 1 SSIP projects totaling $2.91 billion. The BDFP is the largest and most critical project in Phase 1 of the SSIP. Other Phase 1 SSIP projects include replacing the SEP Headworks and providing associated improved odor control, adding redundancy to wastewater conveyance capacity via the Central Bayside System Improvement Project (funded in Phase 1 through the design phase only), upgrading the OSP and NPF, and installing green infrastructure (such as stormwater infiltration areas along streets and creek daylighting) in eight locations around San Francisco. Additional projects include improved odor control associated with the liquid treatment processes at the SEP (i.e., SEP Primary/Secondary Clarifier Upgrades Project).[17] The SFPUC has not yet authorized planning and development of projects included in Phase 2 or Phase 3 of the SSIP; examples of SSIP Phase 2 and Phase 3 projects that may be authorized for funding in the future include construction of the Central Bayside System Improvement Project, SEP Southside Renovation (demolition of the existing anaerobic digesters and subsequent redevelopment of SEP South), and additional citywide green infrastructure.

[16] SFPUC Resolution No. 12-0156 applicable to the SSIP "directs staff to return to the Commission after key project milestones have been met, and ultimately for project review and approval, following environmental review of proposed projects…."

[17] SFPUC, SSIP Phase 1 Program Executive Summary, April-June 2015.

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Table 2-3
Sewer System Improvement Program (SSIP)
Goals, Levels of Service (LOS), Program and Phase 1 Strategies (Endorsed March 22, 2016)

Wastewater Enterprise Goals	Wastewater Enterprise Levels of Service	Sewer System Improvement Program Strategies ($6.9B)	Phase 1 Strategies ($2.9B)
1. Provide a Compliant, Reliable, Resilient, and Flexible System that can Respond to Catastrophic Events			
	1.1. Full compliance with State and Federal regulatory requirements applicable to the treatment and disposal of sewage and stormwater.	a. Reduce the annual long-term average of Combined Sewer Discharge (CSD) occurrences within the Central drainage basin (Channel and Islais Creek urban watersheds) by 2 (from 12 to 10), consistent with the NPDES permit.	Complete Planning and Environmental Review of the Central Bayside System Improvement Project, for Channel Force Main redundancy, to achieve a maximum long-term average of 10 CSD occurrences, consistent with the NPDES permit.
		b. Comply with Liquid and Biosolids wastewater treatment plant permit requirements.	Construct Liquid and Biosolids projects at SEP, OSP, and NPF for permit compliance (SEP: Headworks, Disinfection, Primary and Secondary Clarification, Oxygen Generation Plant, Biosolids, and Existing Digesters; OSP: Digester Gas Upgrades, Westside Pump Station; NPF: Outfall Rehabilitation, North Shore Pump Station). Rehabilitate, or replace, critical sewers based on condition assessment and prioritization within the budgeted amount.
		c. Improve combined sewer discharge (CSD) structures to increase floatables control, consistent with the NPDES permit.	Rehabilitate CSD structures (Beach St., Sansome St., Fifth St., Sixth St.-North, and Division St.) to increase floatables control, consistent with the NPDES permit.
	1.2. Critical functions are built with redundant infrastructure.	a. Construct redundancy of Channel, North Shore, and Westside Force Mains.	Complete Planning and Environmental Review of Central Bayside System Improvement Project, for Channel Force Main redundancy. Rehabilitate the remaining section of North Shore Force Main near The Embarcadero and Jackson Street.
		b. Ensure electrical redundancy to treatment facilities.	Provide redundant electrical feeds to SEP, OSP, and NPF.
		c. Rehabilitate and add redundant pumps, as necessary, at major pump stations.	Upgrade Westside, Bruce Flynn, and North Shore Pump Stations with the ability to pump peak flow with the largest pump out of service, and rehabilitate other pump stations (Griffith, Mariposa, and Hudson), as identified by condition assessment.
	1.3. Dry weather primary treatment, with disinfection, must be on-line within 72 hours of a major earthquake.	a. Design critical and new treatment facilities to withstand the following seismic events: Magnitude 7.8 earthquake on the San Andreas fault; and, Magnitude 7.1 earthquake on the Hayward fault.	Design new facilities at SEP (Headworks, Biosolids, Disinfection, Oxygen Generation Plant, Power Switchgear Building) to withstand 7.8 earthquake on the San Andreas fault and 7.1 earthquake on the Hayward fault.
			Provide seismic retrofits to SEP Building 042, to provide primary treatment of dry weather flows.
2. Integrate Green and Grey Infrastructure to Manage Stormwater and Minimize Flooding			
	2.1. Control and manage flows from a storm of a three hour duration that delivers 1.3 inches of rain (Level of Service storm).	a. Maximize protection of the City during the Level of Service storm.	Assess flood risk citywide and prioritize infrastructure needs. Implement projects in neighborhoods including: Kansas/Marin Streets, Cayuga Ave./ Rousseau St., Wawona St./15th Ave., Victoria St./Urbano Dr., Joost Ave./Foerster St., and 17th St. /Folsom St. (Planning and Design only). Implement additional measures to reduce flood risk beyond the capacity of the collection system.
		b. Develop projects using an urban watershed approach which employs the Triple Bottom Line.	Complete the Urban Watershed Assessment plan. Apply Triple Bottom Line to applicable projects during the Alternatives Analysis phase.
		c. Identify, evaluate, and develop projects to reduce combined sewer discharge (CSD) occurrences on public beaches.	Complete Urban Watershed Assessment plan.
		d. Develop Design Standards for Green Infrastructure that are informed by the performance of the Early Implementation Projects (EIPs).	Construct EIPs and monitor performance.
3. Provide Benefits to Impacted Communities			
	3.1. Limit plant odors to within the treatment facility's fence lines.	a. Construct effective odor control systems at SEP, OSP, and NPF.	Design and construct the new Headworks and Biosolids facilities at SEP to meet 5 dilutions/threshold (D/T) odor criteria at the fence line.
		b. Use operational controls and infrastructure modifications to minimize odors from the Collection System (sewers).	Develop a Collection System Odor Model to identify potential areas of significant odor. Implement Cargo Way Flushing Line and repair of Westside Flushing Line to minimize odors.
	3.2. All projects will adhere to the Environmental Justice and Community Benefits policies.	c. Incorporate visual improvements into projects at the treatment plants and pump stations, where feasible and appropriate.	Incorporate visual and architectural improvements in the design and construction of the new Headworks and Biosolids projects at SEP.
		d. Provide community benefits including job creation, workforce development, contracting opportunities, and greening.	Provide green infrastructure contractor training and coordinate all jobs through the Contractors Assistance Center.
		e. Work with other City and County agencies on capital projects they have initiated to protect the value and function of wastewater facilities, maximize economic development, and minimize construction impacts and costs.	Coordinate and implement interdepartmental sewer projects (Central Subway, Van Ness BRT, Better Market Street, Geary BRT Phase 1 & 2, Masonic Ave, and Mission Bay Loop).
		f. Engage residents in locating green infrastructure where multiple benefits can be optimized using the Triple Bottom Line.	Utilize Triple Bottom Line and public process in development of EIPs.
4. Modify the System to Adapt to Climate Change			
	4.1. New infrastructure must accommodate expected sea level rise within the service life of the asset (i.e., 6 inches by 2030, 11 inches by 2050, 36 inches by 2100) and be consistent with the City's Guidance for Incorporating Sea Level Rise into Capital Planning.	a. Site new facilities to accommodate, or adapt to, expected sea level rise over the life of the asset.	Build new infrastructure at SEP (Headworks, Biosolids, Disinfection, Oxygen Generation Plant, Power Switchgear Building) and Mariposa Pump Station to accommodate expected sea level rise in 2100.
	4.2. Existing infrastructure that is impacted by sea level rise, within the service life of the asset, will be modified based on sea level rise projections.	b. Develop and implement an adaptation plan for existing infrastructure to address expected sea level rise within the service life of the asset.	Modify existing Bayside CSD structures that experience seawater intrusion. The following CSD structures are considered: Jackson St., Pierce St., Mariposa St., Beach St., Fifth St., Sixth St.-North., Division St., Howard St., Islais Creek-North, Marin St., Selby St., and Yosemite Ave.
5. Achieve Economic and Environmental Sustainability			
	5.1. Beneficial use of 100% of Biosolids.	a. Upgrade biosolids to treatment Class "A".	Upgrade SEP biosolids to treatment Class "A" which, contain no detectible levels of pathogens, and can be applied without restriction on food crops. Size the new Biosolids Digester Facilities to meet solids loading projections for the year 2045.
	5.2. Beneficialuse of 100% of methane generated by treatment facilities, during normal operation.	b. Provide cogeneration, or other beneficial methane use options, at SEP and OSP.	Construct cogeneration facilities at SEP and OSP for a total output of 5MW.
	5.3. Use non-potable water sources to meet WWE facilities non-potable water demands.	c. Incorporate conservation measures, recycled water, and other non-potable reuse facilities into projects, where feasible and appropriate.	In order to maximize use of non-potable water, upgrade the treated effluent pump system at SEP and incorporate its use into designs, where applicable. Accommodate space for recycled water treatment facilities at SEP and OSP.
6. Maintain Ratepayer Affordability			
	6.1. Combined sewer and water bill will be less than 2.5% of average household income for a single family residence.	a. Plan and phase projects to ensure affordability and predictability for ratepayers.	Plan and phase projects to ensure affordability and predictability for ratepayers.
			Identify and apply for Federal and State loans and grants to reduce the financial burden on ratepayers.

SEP: Southeast Treatment Plant; OSP: Oceanside Treatment Plant; NPF: North Point Wet Weather Facility; NPDES: National Pollutant Discharge Elimination System (US EPA)

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2.3 Project Objectives

The overall goal of the BDFP is to replace the existing aged and unreliable solids processing facilities at the SEP with new, modern, and efficient facilities to ensure the long-term sustainability of the SEP wastewater treatment system. The specific objectives of the BDFP are consistent with the SSIP goals, levels of service, and strategies shown in Table 2-3. The specific BDFP objectives are as follows:

- Replace the existing solids treatment facilities at the SEP with new infrastructure with modern and more efficient treatment technologies to protect public health and safety and provide continued regulatory compliance;
- Maximize the efficiency of the current treatment process operations and maintenance, staffing resources, and the use of existing SFPUC infrastructure;
- Reliably meet treatment capacity for projected 2045 flows and loads associated with projected population growth;
- Beneficially use 100 percent of biosolids generated;
- Beneficially use 100 percent of digester gas generated;
- Build critical processes with redundant infrastructure to provide reliability and operational flexibility;
- Improve seismic reliability;
- Limit noticeable odors from BDFP facilities to the SEP property boundary;
- Provide visual improvements that promote a cohesive architectural design and identity at the BDFP site, enhance the overall aesthetics, and improve the public edges in a manner consistent with the surrounding neighborhood and the rest of the SEP;
- Design and site new facilities to accommodate or adapt to expected sea level rise over their expected life;
- Allow for timely construction of the proposed BDFP; and
- Maintain rate payer affordability.

2.4 Project Components

Table 2-4 lists the approximate size and height of proposed buildings and structures, and **Figure 2-5** is a preliminary site plan showing the location of the proposed facilities. **Figure 2-6** presents a conceptual representation of the general massing of the proposed buildings and other structures and provides an indication of the general physical characteristics and scale of the BDFP facilities. The BDFP is currently in the design phase; consequently, certain aspects of the project (e.g., architectural finishes, etc.) are subject to revision and refinement. **Figure 2-7** shows the sequence of the unit processes comprising the proposed BDFP solids treatment system and provides context for the functions of the project components. **Figure 2-8** shows a representative cross-section of select facilities, showing the depth of underground facilities as well as the height of proposed structures. The SFPUC would incorporate the relevant descriptions of project components and construction contained in this EIR into contract specifications for the BDFP.

TABLE 2-4
PROPOSED BIOSOLIDS DIGESTER FACILITIES

Purpose	Facility	Type of Structure	Equipment Type and Number in 2045[a]	Building/Pad Characteristics (size, dimensions approximate)[b]			
				Size (square feet)	Floors, Total Floor Area (square feet)	Length x Width (feet)	Maximum Height (feet)[c]
Sludge Pumping	Primary Sludge Pumping	Within existing Primary Sedimentation Building	3 primary sludge pumps; 2 grit pumps; piping upgrades	-	-	-	-
	Waste Activated Sludge Pumping	Within existing Secondary Sludge Control Building	Existing pumps with piping upgrades	-	-	-	-
Pre-Digestion Solids Processing	Solids Pretreatment, including polymer systems	Building (3 stories aboveground, basement)	4 (3+1) gravity belt thickeners; 5 (4+1) inline, enclosed screens; 6 (4+2) dewatering centrifuges; 3 (2+1) cake storage bins; 3 (2+1) dry polymer super sack systems	34,200	4 floors 96,900 (vegetated roof area not included)	190 x 180	65
	Thermal Hydrolysis Process (THP)	Aboveground tanks, equipment	3 (3+0)+1) THP treatment trains	9,300	n/a	165 x 56	25
Anaerobic Digestion, Digested Solids Storage, and Thermally Hydrolyzed Sludge (THS) Cooling	Anaerobic Digesters (includes Cooling Heat Exchangers)	Tanks extending above and below ground with upper and lower basements and machine and electrical rooms	5 (3 primary, 1 primary/ backup secondary, 1 secondary) 1.66-million-gallon digesters up to 70 feet in diameter each, 10 (8+2) carbon-steel concentric tube cooling heat exchangers, 1.64 million British thermal units per hour (MMBtu/hr) cooling heat exchangers[d]	57,600	3 floors 142,000	448 x 121	65
	Digestion Cooling Tower	Equipment on concrete pad	3 (2+1) cells within the cooling tower; 2 (1+1) cooling water recirculation pumps	3,500	n/a	63 x 56	25
Class A Biosolids Dewatering, Storage, and Loadout	Biosolids Dewatering	Building (3 stories aboveground, basement)	4 (3+1) belt filter presses; 2 (2+0) belt filter press cake crossover conveyors; 4 (3+1) cake transfer conveyors; 4 (3+1) cake storage bins; 2 (1+1) dry polymer super sack systems	13,300	4 floors 39,000[b]	120 x 111	65

TABLE 2-4 (Continued)
PROPOSED BIOSOLIDS DIGESTER FACILITIES

Purpose	Facility	Type of Structure	Equipment Type and Number (duty) in 2045 [a]	Building/Pad Characteristics (size, dimensions approximate)[b]			
				Size (square feet)	Floors, Total Floor Area (square feet)	Length x Width (feet)	Maximum Height (feet)[c]
Energy Recovery and Steam Generation	Energy Recovery (for more detail, see Table 2-5)	One building with heating, ventilation, and air conditioning (HVAC) on roof. Energy recovery equipment and a standby diesel generator are located indoors.	Turbines (1 turbine and 1 future standby turbine) for heat and electricity generation, compressors, duct burner, Heat Recovery Steam Generator (HRSG); boiler feedwater treatment, backup steam boilers, exhaust stack; microturbines; medium pressure compressors; and standby power generator.	21,000 (Building)	2 floors, 39,000	265 x 105	57 (building) 75 (stack)
	Digester Gas Treatment	Outdoor equipment on concrete pads	Various equipment for digester gas conditioning. See Table 2-5.	7,300	n/a	174 x 57	22
	Digester Gas Storage	Aboveground tank	1 tank 50 feet in diameter with 60-foot-diameter outer screen	2,900	n/a	Circular	60
	Transformers	Outdoor equipment on concrete pad	Electrical transformers (2 units)	1,200	n/a	2 @ 22 x 28	
	Waste Gas Burners (Flares)	Outdoor equipment on concrete pad	Low nitrogen oxide enclosed waste gas burners (2 units)	2,000	n/a	47 x 54	40-50
Odor Control	Solids Odor Control	Underground biofilter, aboveground adsorption vessels (tanks), mechanical room, fan room and restroom on concrete pad	4 biofilter cells; 4 adsorption vessels; 3 (2+1) ammonia scrubbers/humidifiers; 3 (2+1) odor control fans; 2 (1+1) truck bay exhaust fans; 10-feet-diameter dispersion cones (stacks).	17,500	n/a	158 x 111	25 (vessels) 40 (stack)

TABLE 2-4 (Continued)
PROPOSED BIOSOLIDS DIGESTER FACILITIES

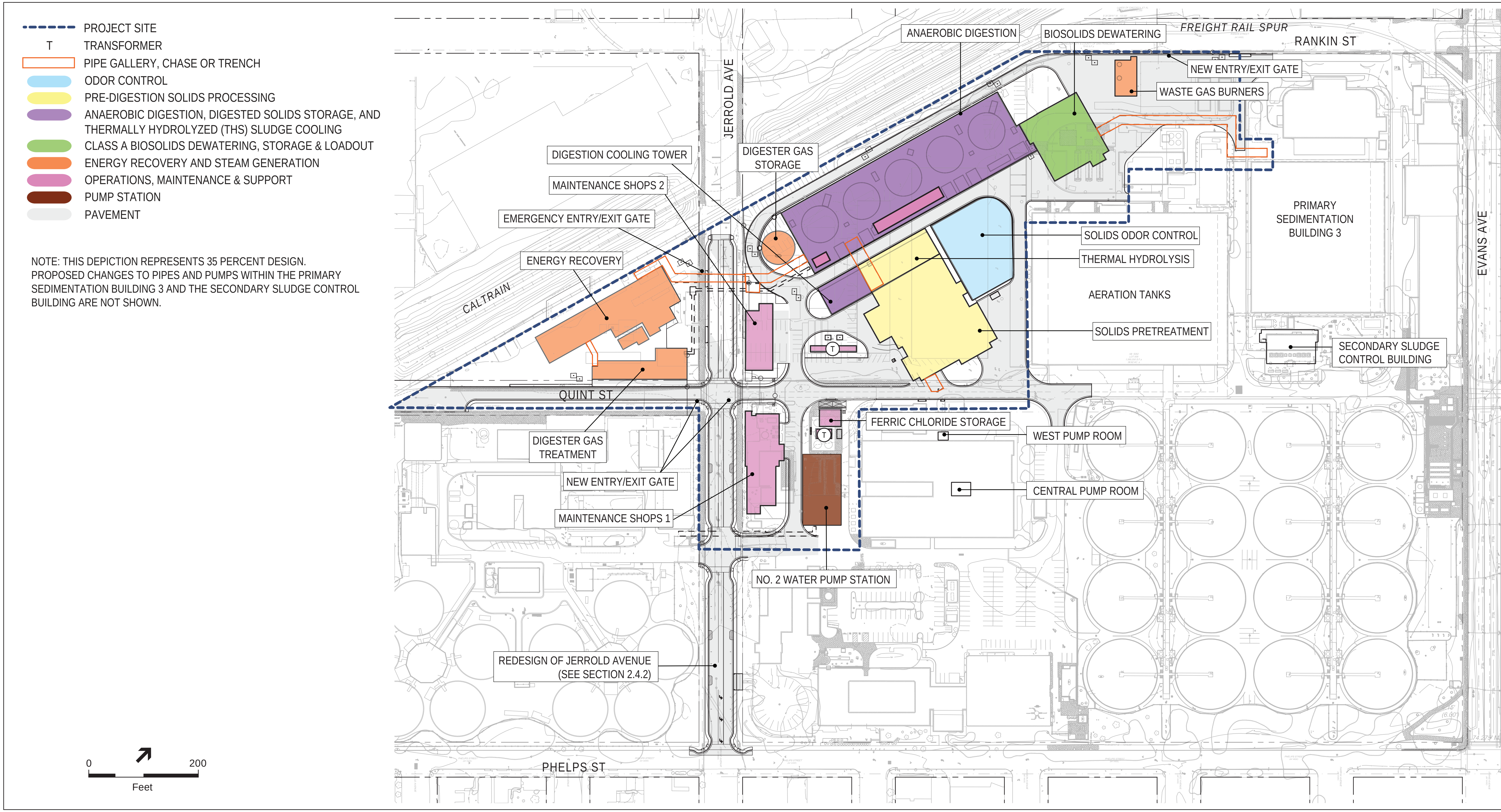
Purpose	Facility	Type of Structure	Equipment Type and Number (duty) in 2045 [a]	Building/Pad Characteristics (size, dimensions approximate)[b]			
				Size (square feet)	Floors, Total Floor Area (square feet)	Length x Width (feet)	Maximum Height (feet)[c]
Water Systems and Pump Stations[e]	No. 1 Water (Potable Water)	Underground piping	Piping	n/a	n/a	n/a	n/a
	No. 2 Water Pump Station (Chlorinated and filtered effluent)	Filters, ultraviolet (UV) disinfection, pumps, tanks, electrical room and related equipment on concrete pad, underground piping		10,400	n/a	135 x 65	20
	Pumped Plant Recycled Pump Station	Within Solids Pretreatment Facility (see above)	Two (1+1) 45-horsepower pumps in each of two wet wells	see Solids Pretreatment Facility, above			
Operations, Maintenance, and Support	Maintenance Shops 1	Building (2 stories aboveground)		12,600	2 floors 19,600	180 x 70	30
	Maintenance Shops 2	Building (1 story aboveground)		5,500[d]	1 floor 5,500	110 x 50	15
	Digester Electrical Room	Building (1 story aboveground)		Included in Digesters pad total	1 floor 2,590	139 x 21	16
	Digester Machine Room	Building (1 story aboveground)		Included in Digesters pad total	1 floor 400	29 x 17	21
	Ferric Chloride Storage Tanks	Tanks with secondary containment	2 15,500-gallon storage tanks	1,300	n/a	40 x 31	24
	Transformers (8 units)	Equipment on concrete pads		6,200	n/a	varies	10

NOTES:

n/a = not applicable; THP = thermal hydrolysis process; THS = thermally hydrolyzed sludge

[a] Many of these unit processes would have standby units. Standby units are operated only when a duty unit is taken out of service. The first number in parentheses represents the number of duty units, which would operate regularly, and the second number represents the number of standby units. (Duty units + Standby units)
[b] Building square footage may not match building dimensions due to rounding. Total square footage for some buildings is less than building length multiplied by building width due to the shape of the building. In some cases, the basement may be smaller than aboveground stories.
[c] Heights listed exclude mechanical penthouses, catwalks, and similar accessory structures that qualify for exemption from the 65-foot height limit for the project site pursuant to Section 260(b) of the San Francisco Planning Code.
[d] MMBtu represents a standard unit of measurement of heat energy, the British thermal unit (Btu). MMBtu represents a million Btus.
[e] For more details on pump stations, see Table 2-7.

SOURCE: SFPUC, *BDFP Conceptual Engineering Report*, March 2016; SFPUC, SEP Biosolids Digester Facilities Project Overall Site Plan CADD files provided to ESA+Orion, November 8, 2016.



SOURCE: SFPUC, SEP Biosolids Digester Facilities Project Overall Site Plan CADD files provided to ESA+Orion November 8, 2016, adapted by ESA+Orion

SFPUC Biosolids Digester Facilities

Figure 2-5
Preliminary BDFP Site Plan

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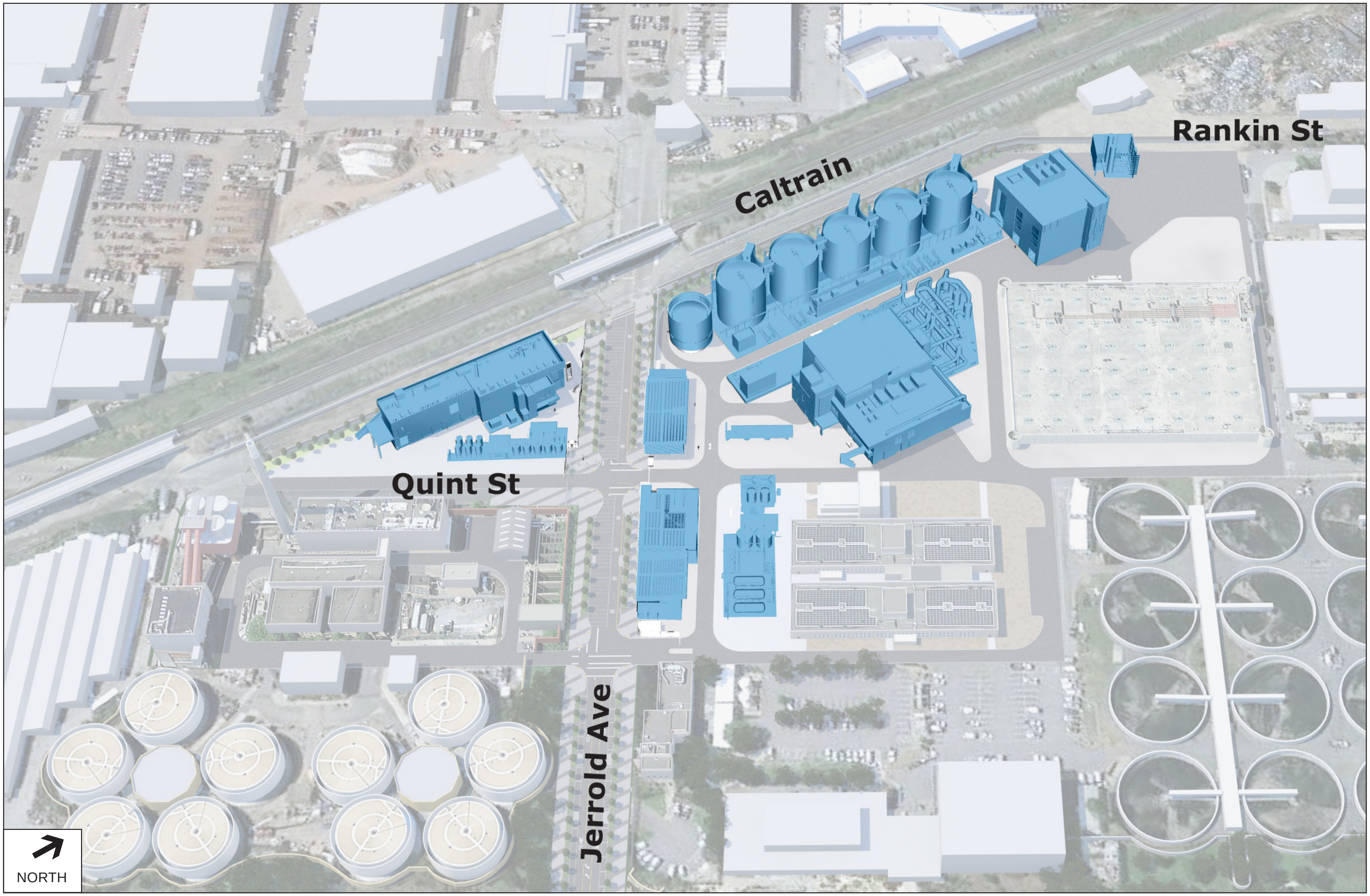

SOURCE: Michael Willis Architects, Data developed in 2016 for BDFP

Figure 2-6
Preliminary Massing Diagram

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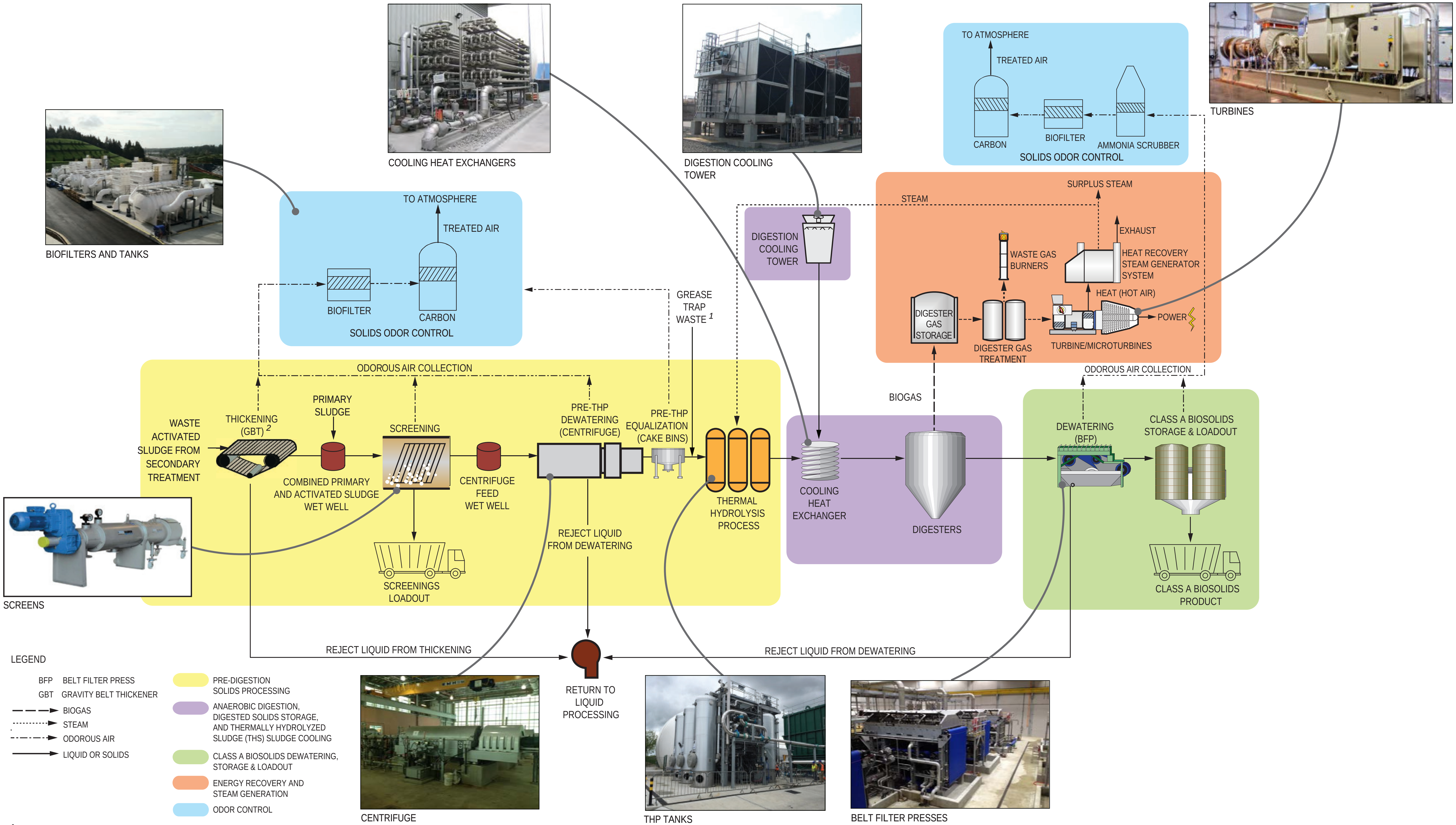

[1] If grease and grease trap waste are available in the future, then it would be combined with the dewatered solids and fed into the THP process.

[2] Equipment appearance would be similar to that shown in Figure 2-4 .

SOURCE: SFPUC, BDFP Conceptual Engineering Report, March 2016., adapted by ESA+Orion

NOTE: This figure simplifies proposed processes for illustrative purposes. Aspects of proposed operations that are not shown in the process flow diagram include non-potable water and polymer (added at many points in the solids treatment process) and back-up systems associated with energy recovery facility operations (e.g., boilers, natural gas supply from Pacific Gas & Electric).

Figure 2-7
Proposed Solids Process Flow Diagram for BDFP

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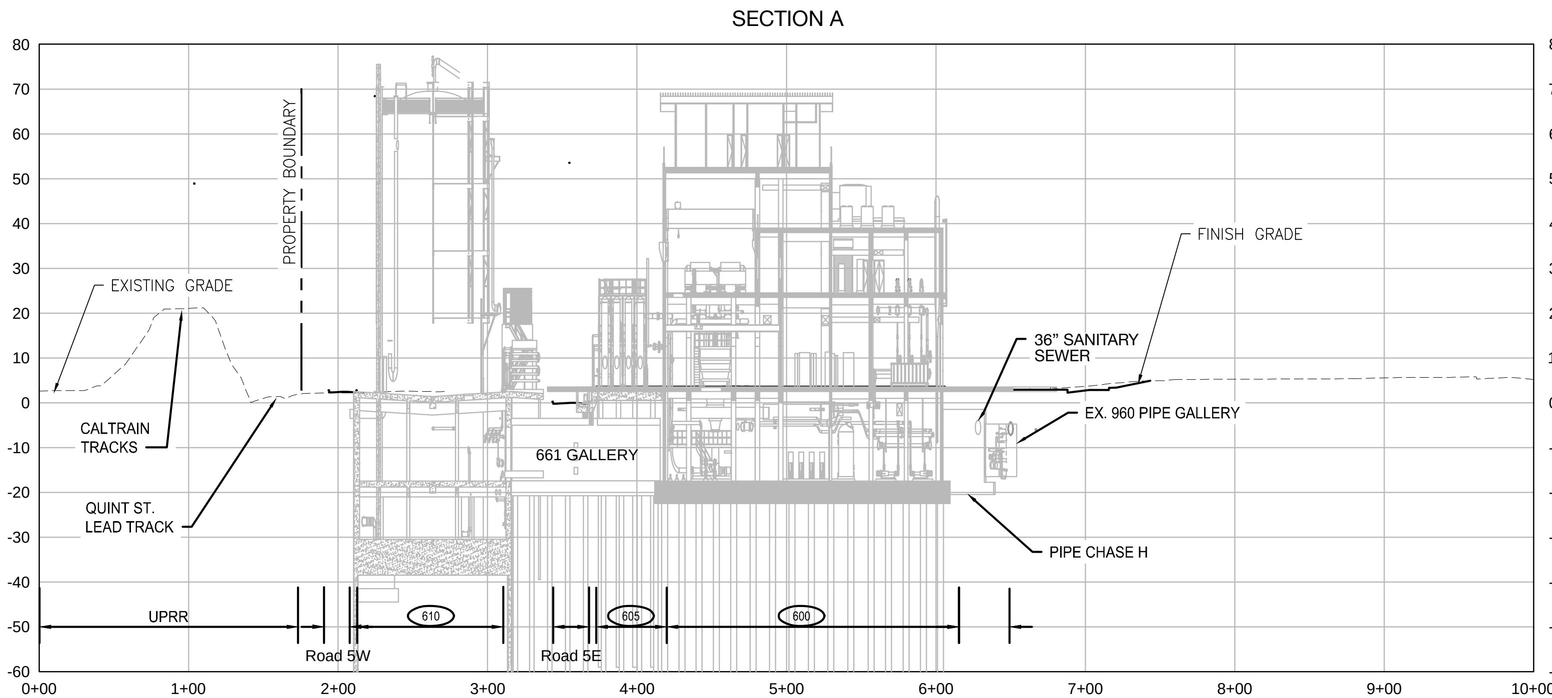
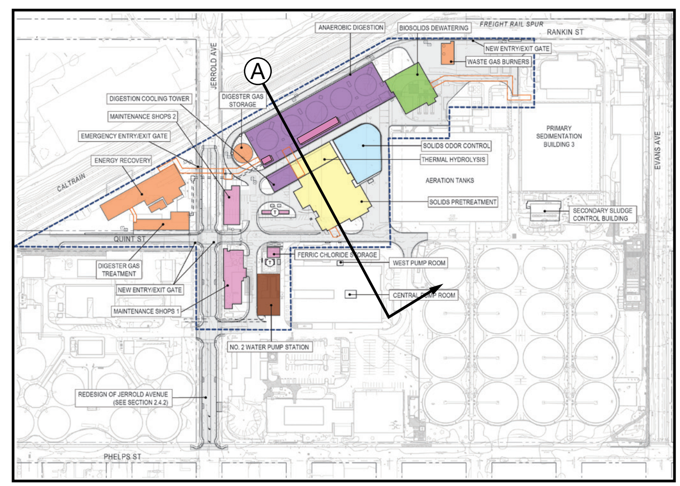


Anaerobic Digestion

Thermal Hydrolysis

Solids Pretreatment



Cross section is vertically exaggerated.

EX - Existing

UPRR - Union Pacific Railroad

SOURCE: SFPUC, Underground profile of anaerobic digesters, January 10, 2017; adapted by ESA+Orion

Figure 2-8
Cross-Section of Anaerobic Digesters, Thermal Hydrolysis Process, and Solids Pretreatment Facilities

2.4.1 Project Facilities and Processes

This section describes the proposed facilities, processes, and other project features by the following categories, as listed in Table 2-4:

- Primary Sludge and Waste Activated Sludge Pumping
- Pre-Digestion Solids Processing, including Solids Pretreatment and Thermal Hydrolysis Process (THP)
- Anaerobic Digestion, Digested Solids Storage, and Thermally Hydrolyzed Sludge (THS) Cooling
- Class A Biosolids Dewatering, Storage, and Loadout
- Energy Recovery and Steam Generation
- Odor Control
- Water Systems and Pump Stations
- Operations, Maintenance, and Support

2.4.1.1 Primary Sludge and Waste Activated Sludge Pumping

Similar to the existing solids pre-treatment process, under the BDFP, wastewater solids from the SEP liquid treatment processes—including primary sludge and waste activated sludge—would be pumped to the Solids Pretreatment Facility for processing. Primary sludge would be pumped from the existing primary sedimentation tanks to the proposed Solids Pretreatment Facility using the existing primary sludge pumps (in Primary Sedimentation Building 3 shown on Figure 2-5) to handle flows for 2033 conditions, and using new pumps for 2045 conditions. (These pumps would be added in the future when needed to meet loads or reliability criteria.) New underground piping (approximately 8-inch-diameter) would be installed in the existing piping galleries between the existing pump gallery and the proposed Solids Pretreatment Facility. Primary sludge would also pumped from the existing West Pump Room and Central Pump Room (shown on Figure 2-5) for 2045 conditions using existing piping. Waste activated sludge would also be conveyed to the proposed Solids Pretreatment Facility using the existing waste activated sludge pumps (located in the Secondary Sludge Control Building); some piping modifications would be required.

2.4.1.2 Pre-Digestion Solids Processing

As shown in the yellow rectangle on Figure 2-7, in the solids pre-treatment process solids would be thickened, screened, dewatered, and treated using a thermal hydrolysis process (THP).

Solids Pretreatment Facility

Many of the pre-digestion processes would occur within the Solids Pretreatment Facility (shown in yellow-shaded areas on Figure 2-5). The approximately 34,200-square-foot building would extend about 20 feet below grade and 65 feet (three stories) above grade. The building would house the gravity belt thickeners, screens, pre-THP dewatering centrifuges, Pumped Plant Recycled Pump

Station (returns process water for further treatment), and support systems, including a polymer[18] system and central control room. The polymer system would include dry polymer super sack systems (one dedicated polymer feed system for each process and one swing backup), batching/aging tanks, polymer tank, and polymer feed pumps.

Thermal Hydrolysis Process Facility

The proposed THP facility would consist of a series of rectangular THP "skids" on an approximately 9,300-square-foot concrete pad adjacent to the Solids Pretreatment Facility, as shown on Figure 2-5. Figure 2-7 includes a photograph of THP tanks. Each skid would contain four enclosed tanks (approximately 6 feet in diameter and 25 feet tall) on one side and two larger, enclosed tanks (approximately 8 feet in diameter and 25 feet tall) on the other side, with maintenance platforms, piping, and valves. The enclosed tanks would be made of welded steel and designed in accordance with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code.[19] The proposed design includes pressure relief devices to prevent over-pressurization and tank rupture. THP is a solids pre-treatment process that combines high temperature and high pressure followed by rapid decompression, making the solids more biodegradable and allowing for higher methane production during the subsequent anaerobic digestion process.

2.4.1.3 Anaerobic Digestion, Digested Solids Storage, and Thermally Hydrolyzed Sludge (THS) Cooling

As shown in the purple-shaded area on Figure 2-7, following THP, thermally hydrolyzed sludge (THS) would be cooled and then pumped into the new digesters for biological treatment and digester gas recovery. Digested solids could also be stored in one of the digester tanks.

Anaerobic Digesters

The project would construct five 1.66-million-gallon anaerobic digesters in a linear arrangement on an approximately 57,600-square-foot concrete pad near the Port of San Francisco's freight rail spur and parallel to the Caltrain right-of-way (see purple-shaded area on Figure 2-5). Each digester would be up to 70 feet in external diameter and extend 65 feet above grade and 35 feet below grade (for a total height of 100 feet). Below-grade structures would include two basement floors of equipment and piping, as shown on Figure 2-8. The shape of the digesters would be cylindrical, tapering to a cone underground at the bottom (see Figure 2-8). Although a final decision on the surface finish for the digesters has not been made, cladding alternatives currently being considered include stainless steel mesh and translucent channel glass. The selected material, whether metallic, glass, or other, would be textured, brushed, frosted, or otherwise treated to diffuse light and reflectivity. The size and configuration of the proposed digesters would accommodate the projected year 2045 solids loads. Under normal conditions, of the five digesters, three would be used as primary digesters, one would be a primary/backup digester, and one would be used as a secondary digester or storage tank.

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18 A polymer is a type of chemical made up of large molecules, and the polymer used in this system promotes thickening in the treatment process.

19 Section VIII, Division 1 of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code.

Anaerobic digestion is a method of treating wastewater solids using biological processes to inactivate pathogens and produce stabilized biosolids and digester gas. This treatment process would occur in new digester tanks by the same bacterial processes currently in use at the SEP (refer to Section 2.2.2), although use of the THP would make the anaerobic digestion process more efficient. Similar to existing conditions, the digester gas produced would be conveyed to on-site energy recovery facilities to produce steam and electricity (see Section 2.4.1.5, below).

Heat Exchangers and Digestion Cooling Tower

Each digester would be equipped with two cooling heat exchangers, small structures with concentric cooling pipe loops. Each pair of cooling heat exchangers would be located on a concrete pad adjacent to a digester. Figure 2-7 includes a photograph of a typical cooling heat exchanger. Water from the cooling tower would be used in the cooling loops of the heat exchangers.[20]

The digestion cooling tower would be installed on a concrete pad between the THP facilities and Maintenance Shops 2. This location provides sufficient surrounding space to ensure an adequate supply of fresh ambient air for cooling. As shown in Table 2-4, the digestion cooling tower would be about 60 feet by 60 feet and 25 feet high. Cold water would be pumped from the cooling tower to the heat exchangers, and warmed cooling water would be sent back to the cooling tower. The cooling tower would also provide cooling water for the digester gas treatment process. Depending on weather conditions (e.g., humidity), the cooling tower may generate a plume of (condensed) water mist.

2.4.1.4 Class A Biosolids Dewatering, Storage, and Loadout

As shown in the green-shaded area on Figure 2-7, the post-digestion process would involve dewatering, storage, and loadout of Class A biosolids, as described below.

The Biosolids Dewatering Facility would occupy an approximately 39,000-square-foot building adjacent to Rankin Street, shown in the green-shaded area on Figure 2-5. As indicated in Table 2-4, this three-story building with a basement would extend approximately 65 feet above grade and 21 feet below grade. The facility would contain belt filter presses and belt conveyors to remove water from the Class A biosolids; cake storage bins to store the biosolids; support facilities (e.g., storage room, mechanical room, polymer storage); and two truck bays on the ground floor to facilitate loadout of the Class A biosolids. Each truck bay would be sized to fully enclose the solids truck and trailer. The reject liquid stream from the dewatering process would be returned to the existing liquids treatment processes in the SEP; this return flow system could be reconfigured in the future if necessary to allow the filtrate to be conveyed to a potential future separate sidestream treatment facility.

[20] The Eastside Recycled Water Project (described in Table 4.1-1 in Chapter 4, Section 4.1, Overview) could provide an alternative (non-potable) water source for the heat exchangers if available in the future. Potable water would still be used as a backup water source.

2.4.1.5 Energy Recovery and Steam Generation

Similar to the existing process, digester gas generated by the digesters would be used to produce heat and power. The proposed energy recovery facilities include digester gas storage, digester gas treatment, gas turbines and microturbines, heat recovery and steam generating equipment, and waste gas burners. Turbine exhaust would flow through an exhaust stack. A standby power generator would be located in the Energy Recovery Building. **Table 2-5** presents summary descriptions of the energy recovery facilities. Figure 2-5 shows the location of proposed digester gas storage, treatment, and energy recovery facilities, primarily located south of Jerrold Avenue at the location of the former Asphalt Plant.

Digester Gas Production and Power Generation

Compared to the existing energy recovery facilities, the proposed energy recovery facilities would produce more heat and power (since they could process greater volumes of digester gas) and would not require routine flaring of digester gas. The BDFP would generate about 1.6 million cubic feet of digester gas per day (2023 annual average projection) and up to 2 million cubic feet per day in 2045, compared to the 1.3 million cubic feet per day currently generated (2014). The proposed energy recovery facilities would use this digester gas to generate 4.2 MW of electricity in 2023, with generation increasing to 5.2 MW in 2045. While energy production (4.2 MW) would not quite be sufficient to meet all project energy demands in 2023 (4.4 MW), it is anticipated that the project would meet all of the energy demand for the BDFP facilities starting in years 2026 to 2030. Until then, electricity needs for solids processing would be supplemented by SFPUC Hetch Hetchy hydropower conveyed via the Pacific Gas and Electric Company (PG&E) distribution system. Once energy production from the new energy recovery facilities exceeds energy demand of the BDFP facilities, excess energy would be used for other SEP facilities.

Digester Gas Storage

An aboveground 60-foot-tall, 50-foot-diameter (60-foot-diameter with outer screen) digester gas storage tank would be located on the north side of Jerrold Avenue, adjacent to the freight rail spur, in line with the proposed digester tanks (refer to orange-shaded circle on Figure 2-5). The tank would provide digester gas storage to accommodate process fluctuations (e.g., changes in digester gas production, steam and heating demand, and equipment failure) and serve as a buffer against pressure surges between the digesters and the digester gas treatment system. The storage can also reduce the need for operating waste gas burners to relieve excess pressure.

Digester Gas Treatment

The proposed digester gas treatment would be similar to that of the existing system. Digester gas treatment equipment (e.g., tanks, blowers[21]) would be installed on a set of concrete pads with an approximate total footprint of approximately 7,300 square feet, near the energy recovery facilities along Quint Street (refer to orange-shaded area on Figure 2-5). The digester gas would be conditioned

[21] Blowers are fans that deliver compressed air at a relatively constant pressure and are used in wastewater treatment for aeration and agitation of wastewater.

TABLE 2-5
PROPOSED ENERGY RECOVERY FACILITY COMPONENTS

Component[a]		Description	Operating Frequency
Digester Gas Storage Tank		Concrete tank, 50 feet in diameter with 60-foot-diameter outer screen, 60 feet high	Continuous
Digester Gas Treatment	Hydrogen sulfide (H_2S) removal	Five tanks, 10 feet in diameter, 12 feet tall, with iron sponge media and blowers	Continuous
	Pressure boosting and moisture removal	Three blowers, 2 glycol chillers, and 2 heat exchangers	
	Volatile organic compounds, siloxanes removal	Six vessels, 9 feet in diameter, 12 feet tall, with activated carbon or silica media	
Waste Gas Burners (flares) (2 units)		40-50 feet tall, 9 feet diameter	Infrequent (backup/standby use only, routine testing)
Compressor for gas turbines (2 units, including 1 future standby unit)		Located within 57-foot-tall Energy Recovery Building, up to 21,000 square feet	Continuous
Compressors for microturbines (Future: 2 units)			Units would come online beginning in 2031 and would operate continuously by 2045
4.6-megawatt (MW) turbine generator (2 units, including 1 future standby unit), with 19.3 million British thermal units per hour (MMBtu/hr)[b] duct burner			Continuous
0.2-MW microturbine generators (future: 4 units)			Units would come online beginning in 2031 and would operate continuously by 2045
Heat Recovery Steam Generators (HRSGs) (1 unit)			Continuous
Boiler feedwater treatment; hotwell/deaerator; boiler feedwater pumps; steam dump condenser			Continuous
Backup Steam Boilers (2 units), 21.0 MMBtu/hr[b]			Infrequent (backup, routine testing)
Standby Power Generator, 1.5 MW (1 unit) Diesel storage tank: 1,000-gallon aboveground, fire-guard protected rectangular tank.		Located within Energy Recovery Building	Infrequent (backup, routine testing)

NOTES:
[a] Many of these unit processes would have standby units. Standby units are operated only when a duty unit is taken out of service.
[b] MMBtu represents a standard unit of measurement of heat energy, the British thermal unit (Btu). MMBtu represents a million Btus.

SOURCE: SFPUC, *BDFP Conceptual Engineering Report*, March 2016.

(treated) to remove hydrogen sulfide,[22] moisture, and siloxanes[23] to protect the downstream energy recovery equipment from corrosion and scaling (buildup of hard mineral coating) and to reduce sulfur oxides emissions. Hydrogen sulfide removal would be accomplished via adsorption to an iron sponge media contained in multiple vessels. Siloxane removal would be accomplished via adsorption to granular activated carbon or alternative media. Spent media (used material) would be trucked to an appropriate landfill for disposal.

Heat and Power Generation Equipment and Processes

The heat and power generation equipment would be located south of Jerrold Avenue; all major equipment would be located within the approximately 21,000-square-foot, 60-foot-tall Energy Recovery Building (see orange-shaded area on Figure 2-5). The SFPUC would select and specify equipment that meets the Best Available Control Technology emission standards of the Bay Area Air Quality Management District. The proposed energy recovery facilities would replace the existing facilities and would include the following (refer also to Table 2-5):

- ***Turbines, Microturbines***. The project would include one turbine capable of generating heat and power and a future second turbine. Based on the projected solids loads, one 4.6-MW turbine could use all of the digester gas produced at the SEP until about 2031. (The second turbine, which would serve as a standby unit, would be installed in the future.) At that time, 0.2-MW microturbines would be brought online as warranted to use all of the digester gas generated. The turbine would be vented by a 48-inch-diameter exhaust stack that would extend 75 feet above ground surface.

- ***Heat Recovery Steam Generator System, Back-up Steam Boilers***. Steam for the THP system would be generated by recovering heat from the gas turbine's hot exhaust gases using a Heat Recovery Steam Generator (HRSG) system. The HRSG would include a supplementary duct burner where digester gas could be fired to supplement steam production if needed. Steam boilers, located within the same area, would be provided as a backup to the turbines. No. 1 water (potable water) used for the boilers would be pre-treated to remove hardness,[24] oxygen, and carbon dioxide, and chemically conditioned[25] for corrosion control and to increase the efficiency of the process. Recycled water with low total dissolved solids, if available, also could be used for this purpose.

- ***Standby Generator***. The 1.5-MW diesel standby power generator would be used to meet the standby power needs of the proposed facilities and critical power needs during startup conditions. The main point of power distribution for the new facilities would be provided via the combined heat and power switchgear[26] to control, protect, and isolate the electrical equipment.

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[22] Hydrogen sulfide contained in digester gas can cause odors, corrosiveness, and sulfur emissions when the gas is burned.

[23] Siloxanes are man-made organic compounds containing silicon, oxygen, and methyl groups that are commonly used in personal hygiene, health care, and industrial products, and consequently are found in wastewater. Removal of siloxanes from digester gas prior to combustion extends the life of the power-generating equipment and reduces maintenance requirements.

[24] Hardness is defined as the mineral (e.g., calcium and magnesium) content of water. Hard water is water that has a high mineral content.

[25] The boiler chemical feed system includes alkalinity addition, chemicals for oxygen removal and corrosion control, and polymer addition.

[26] A switchgear is the combination of electrical disconnect switches, fuses, or circuit breakers in an electric power system.

Waste Gas Burners (Flares)

Two enclosed combustion waste gas burners would be located at the northern end of the project site near the Biosolids Dewatering Facility (refer to Figure 2-5). The waste gas burners would be approximately 9 feet in diameter and 40 to 50 feet tall. Following installation of the future standby turbine, the waste gas burners are anticipated to be operated infrequently, as a backup to the gas turbine and other gas utilization equipment. In case of a spike in digester gas production or an event that impedes normal operation of gas utilization equipment, the digester gas would be sent to the waste gas burners and combusted. The waste gas burners would be tested routinely (up to 50 hours per year) to ensure their reliable operation. Prior to the installation of the future standby turbine, the waste gas burners would be operated up to 300 hours per year when the duty turbine is not in operation due to maintenance.

2.4.1.6 Odor Control

The project would construct a centralized odor control system. As shown on Figure 2-7, odorous air would be collected and treated from the pre-digestion processes (i.e., thickening, screening, pre-THP dewatering, and cake bins) and post-digestion process (i.e., biosolids dewatering, storage, and loadout). The blue-shaded area on Figure 2-5 depicts the location of the proposed Solids Odor Control Facility. Consistent with the SSIP level of service goals adopted by the SFPUC, the BDFP odor control system would be designed with the goal of treating and containing odors from the BDFP to within the SEP property boundary.

The proposed Solids Odor Control Facility, containing four biofilters, four adsorption vessels (similar to tanks), and ancillary mechanical facilities, would be located on a concrete pad approximately 160 feet by 110 feet in size. The odor control structure would extend up to about 25 feet above grade, with a 12-inch-diameter stack extending to a height of 40 feet above grade. The biofilters would be located below ground, and the adsorption vessels[27] would be located above ground. Mechanical, odor control fan, and electrical equipment would be situated above ground. An inset photograph ("Biofilters and Tanks") on Figure 2-7 depicts a typical odor control unit similar to the unit proposed for the BDFP. Odorous air emanating from the pre-digestion unit processes (gravity belt thickening, screening, pre-THP dewatering, and pre-THP cake storage bin) and from unit processes following the digesters (biosolids dewatering and Class A biosolids storage and loadout) would be collected and treated in this facility. Proposed odor control technologies include biofiltration[28] followed by a polishing stage, if needed. In addition, ammonia removal is proposed for solids odor control and would include a 5-foot-diameter ammonia scrubber tank and related equipment. The biofilter would use an engineered media and the polishing stage would use a combination of virgin carbon and potassium permanganate[29] blend. No. 2 water or No. 3 water (defined below in the next section) would be added to the biofilter media to maintain moisture and achieve efficient odor removal. Ammonia

[27] The adsorption vessels contain a mixture of carbon and potassium permanganate.

[28] In biofiltration, odorous air is passed through a biologically active collection of peat, soil, or other engineered media, where microbes in the media degrade odorous chemical compounds.

[29] Permanganate is a chemical compound containing the manganate (VII) ion (MnO_4^-), a strong oxidizing agent.

removal would be accomplished by an ammonia scrubber[30] operating at low pH. Sulfuric acid dosing would be provided as a backup for pH control.

2.4.1.7 Water Systems and Pump Stations

The SEP currently uses three water systems: No. 1 water (potable water), No. 2 water (chlorinated and filtered secondary effluent [non-potable]), and No. 3 water (chlorinated secondary effluent [non-potable]). Many of the proposed BDFP unit processes would require use of process water and wash water. The BDFP includes the expansion of these water systems for use in the biosolids treatment processes; for example, No. 2 water or No. 3 water may be used during solids pre-treatment processes for washing and wetting/blending polymer. A description of these water systems follows. **Table 2-6** summarizes existing and future (2045) biosolids facilities potable and non-potable water usage, and **Table 2-7** lists characteristics of the proposed pump stations.

TABLE 2-6
EXISTING AND FUTURE (2045) POTABLE AND
NON-POTABLE WATER DEMAND FOR SOLIDS PROCESSING

	Average Demand, Gallons per Day		
	Potable	Non-Potable	
	No. 1 Water	No. 2 Water	No. 3 Water
Existing Biosolids Facilities (2015)	43,200	172,800	1,108,800
Proposed Biosolids Digester Facilities Project (BDFP) Facilities (2045)	205,300	2,304,000	216,000
Net Increase	162,100	2,131,200	-892,800

SOURCE: SFPUC, Water Supply Assessment for the Biosolids Digester Facilities Project, 2017.

TABLE 2-7
CHARACTERISTICS OF PROPOSED PUMP STATIONS

Pumping Facility	Number of Pumps / Capacity (gallons per minute [gpm])	Horsepower (hp)
No. 2 Water Pump Station	Four (three duty) / 1,000 gpm each (3,000 gpm total)	75 hp
Pumped Plant Recycled Pump Station (within Solids Pretreatment Facility)	Two (one duty) / 2,400 gpm in each of two wet wells	45 hp

SOURCE: SFPUC, *BDFP Conceptual Engineering Report*, March 2016.

30 Ammonia scrubbers are a technology used for the control of ammonia emissions. Sulfuric acid or acidic leachate is used as the scrubbing solution to absorb the ammonia, which is collected and removed in a form of salt (e.g., ammonium sulfate).

No. 1 Water

The cooling tower for digestion, energy recovery facilities, fire suppression, and heating, ventilation, and air conditioning (HVAC) systems in various buildings would use water from the SEP's existing No. 1 water (potable) system. Maintenance Shops 1 and 2 would also require potable water service connections for employee use. Subsurface piping (up to 10 inches in diameter) would be installed to connect these facilities to the SEP's existing No. 1 water system. In compliance with San Francisco's Reclaimed Water Use Ordinance, the SFPUC would dual-plumb all BDFP facility bathrooms for recycled water, and irrigation would be single-piped with a crossover/air gap connection such that recycled water could be used if and when available. Piping would be installed in existing and proposed utility tunnels where available. Potable water connections would also be installed to supplement use of No. 2 water, if needed.

No. 2 Water

As part of the BDFP, the SFPUC would expand the existing No. 2 water system to include a new treatment and pump station located northeast of the Maintenance Shops 1 building (refer to brown-shaded area on Figure 2-5). The No. 2 water pump station would include pumps, filters, UV disinfection, water storage tanks, booster pumps, air compressors, an electrical building, and related equipment on a concrete pad about 135 feet long and 65 feet wide; equipment would extend up to 20 feet above grade. Underground piping (up to 16 inches in diameter) would be installed between the new pump station and the unit processes (e.g., Solids Pretreatment Facility, cooling heat exchangers, Biosolids Dewatering Facility; see Figure 2-5). The project would use No. 2 water for dilution water, polymer wetting and wash water, and gas compressor water. The No. 2 water system would also provide fire protection water for the existing SEP system.

No. 3 Water

The BDFP would tie into the existing No. 3 water system that is planned to be upgraded as part of a separate project by the SFPUC prior to construction of the BDFP (refer to the description of the Building 521 Replacement/522 Disinfection Upgrade Project in Chapter 4, Section 4.1, Overview). Underground piping (up to 12 inches in diameter) would be installed within existing pipe galleries between the No. 3 water system along the north side of the SEP and the proposed Solids Odor Control Facility. The project would use No. 3 water for polymer wetting and dilution. No. 3 water would also be used for the boiler feed water system.

Pumped Plant Recycled Pump Station

The Pumped Plant Recycled Pump Station would be located within the Solids Pretreatment Facility, as described under *Solids Pretreatment Facility* in Section 2.4.1.2.

2.4.1.8 Operations, Maintenance, and Support

As shown in the rose-colored shaded areas on Figure 2-5, the project would include two new buildings, called Maintenance Shops 1 and Maintenance Shops 2, along the north side of Jerrold Avenue to support operations and maintenance activities, including the maintenance of treatment equipment. The proposed buildings would include equipment repair areas, parts storage, and staff facilities. As described in Table 2-4, Maintenance Shops 1 would be two stories with a total floor area of 19,600 feet; the building would be approximately 180 feet long, 70 feet wide, and 30 feet high. The single-story Maintenance Shops 2 would have a total floor area of about 5,500 square feet; the building would be 110 feet long, 50 feet wide, and 15 feet high. Solar photovoltaic panels would be installed on the maintenance shop roofs consistent with San Francisco's Better Roof Ordinance. Additional support facilities would include the digester machine room (about 400 square feet and 21 feet high), digester electrical room (about 2,590 square feet and 16 feet high), chemical storage (discussed below in Section 2.5.6), and transformers.

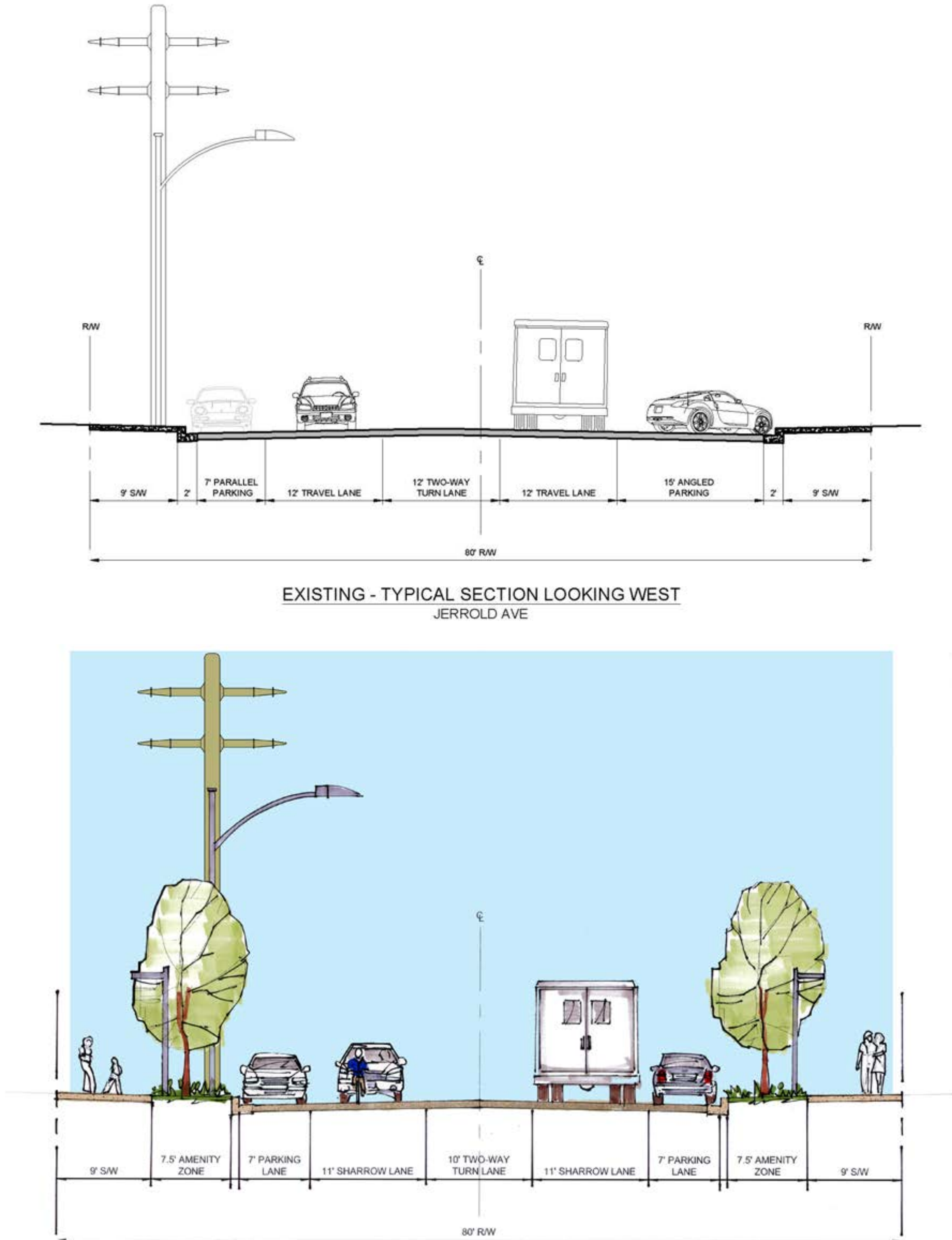
2.4.2 Other Project Features

2.4.2.1 Long-Term Changes to Local Roadway Network, Vehicular Access, and On-Site Circulation

During project construction, Jerrold Avenue between the SEP entrance west of Phelps Street and the Caltrain tracks would be temporarily closed to through public traffic (for further detail refer to Section 2.6, below). Following construction, this segment of Jerrold Avenue would be redesigned as part of the BDFP and reopened. Proposed long-term improvements to Jerrold Avenue would occur in accordance with San Francisco Better Streets Plan guidelines and could include traffic calming measures, curb extensions (road narrowing), sidewalk improvements, lighting, street trees, and safer pedestrian and worker crossings. As currently envisioned, the redesign would provide a wider landscaped buffer zone with street trees between the parking lane and the sidewalk. To accommodate this green buffer zone, the SFPUC would reduce the width of the existing middle two-way turn lane and the two travel lanes, and replace angled parking with parallel parking on the north side of the street. **Figure 2-9** depicts a typical section of the proposed Jerrold Avenue improvements. Changes would maintain minimum widths for travel lanes and undergo review by the San Francisco Municipal Transportation Agency (SFMTA), and changes to the sidewalk would be in accordance with SFPW requirements.

The project would also include a new entrance at Rankin Street to facilitate the movement of truck traffic to and from the proposed facilities. Two entrances (as well as emergency access gates) on either side of Jerrold Avenue and one entrance on Quint Street are also proposed (see Figure 2-5). The project would include redesign of on-site vehicular circulation within the SEP boundaries to accommodate the new entrances, exits, and facility layout.

In October 2015, Quint Street between Oakdale Avenue and the Caltrain tracks was permanently closed to through traffic as part of Caltrain's Quint Street Bridge Replacement project. This closure resulted in a dead-end segment of Quint Street adjacent to the project site between the Caltrain tracks and Jerrold Avenue. As described in Section 2.1.1, the Asphalt Plant site was acquired by the SFPUC and ownership of this segment of Quint Street also will be transferred from SFPW to the SFPUC under actions separate from the BDFP. Quint Street between the Caltrain tracks and Jerrold Avenue is proposed to be closed to public traffic during both construction and subsequent long-term operation of the BDFP, and the project would include a new gated entrance to Quint Street from Jerrold



KEY
S/W - Sidewalk
R/W - Right of Way

A sharrow lane is a travel lane with a marking placed to indicate where cyclists should ride. The marking helps assist cyclists with lateral positioning in a shared lane.

PROPOSED TYPICAL SECTION LOOKING WEST
JERROLD AVE

SOURCE: SFPUC, BDFP Conceptual Engineering Report, March 2016

SFPUC Biosolids Digester Facilities

Figure 2-9
Jerrold Avenue Improvements

Avenue. Refer to Chapter 4, Section 4.6, Transportation and Circulation, for further discussion of changes to the roadway network around the SEP that are associated with other projects.[31]

2.4.2.2 Utilities and Ancillary Systems

Pipe Galleries, Chases, and Trenches

The project includes installation of numerous utilities such as piping for liquids, digester gas, steam, and electrical conduits. A new pipe gallery (shown on Figure 2-5) would be constructed to accommodate utility connections and routine staff access between the Solids Pretreatment Facility and the anaerobic digesters. The internal dimensions of this pipe gallery are approximately 23 feet wide by 13 feet high, with a tunnel floor (base) approximately 21 feet below ground surface (bgs). The project also includes construction of pipe chases (also shown on Figure 2-5), which are covered trenches designed to carry multiple pipes; these would not be designed to accommodate routine staff access. The pipe chases would connect BDFP facilities to each other (including a pipe chase beneath Jerrold Avenue) and to liquids processing facilities. Internal dimensions of the pipe chases vary and would be as large as approximately 18 feet wide by up to 14 feet high, with floors approximately 8 to 30 feet bgs. Dimensions of excavations for pipe trenches and pipe chases would vary depending upon the shoring system used, other nearby subsurface facilities, and required over-excavation. Final sizing for the pipe gallery, pipe chases, and pipe trenches would be determined during detailed project design.

Project Features to Address Sea Level Rise

Flood-Proofing for Expected Sea Level Rise

In accordance with the SFPUC's Climate Change Guidance for SSIP Projects,[32] all proposed facilities that could be affected by future flooding due to expected sea level rise of 36 inches by 2100 (i.e., proposed structures in the northernmost portion of the project site, such as the Biosolids Dewatering Facility) would be designed to be flood-proof to a minimum elevation of 2.5 feet San Francisco City Datum (SFD) (12.85 feet North American Vertical Datum of 1988 [NAVD88][33]), which is 1 foot above the *projected* 100-year flood level by 2100 (i.e., 100-year storm surge in combination with 36 inches of sea level rise). Specific flood-proofing features for each structure would be evaluated during the detailed design phase and would be consistent with the CCSF floodplain management requirements.[34] Accordingly, flood-proofing may involve precluding wall penetrations (such as doorways and vents) below 2.5 feet SFD (13.82 feet NAVD88); elevating the floor or base of each structure (including equipment pads) above 2.5 feet SFD; using flood-resistant materials and utility equipment; and designing or locating electrical, heating, ventilation, plumbing, and air conditioning equipment to prevent water from entering or accumulating within the components. In addition, all

[31] Roadway changes include those that would occur as part of the Quint-Jerrold Connector Road, described in Table 4.1-1 of Chapter 4, Section 4.1, Overview.
[32] SFPUC, Climate Change Guidance for SSIP Projects memo, March 23, 2015.
[33] San Francisco City Datum (SFD) establishes the City's zero point for surveying purposes at approximately 8.6 feet above the mean sea level established by 1929 U.S. Geological Survey datum, and approximately 11.35 feet above the North American Vertical Datum of 1988 (NAVD88).
[34] San Francisco Administrative Code, Chapter 2A, Article XX, *Floodplain Management Programs*.

proposed structures would be anchored to prevent flotation, collapse, or lateral movement in the event of flooding. See Chapter 4, Section 4.16, Hydrology and Water Quality, for further discussion of future sea level rise.

Adaptive Features for Worst-Case Sea Level Rise, Storm Surge Events

In addition, consistent with the SSIP Climate Change Guidance, the project would include adaptive features to prevent flood damage in the event of the worst-case scenario of 66 inches of sea level rise in combination with a 100-year storm surge, which could result in flood water elevations of up to 4 feet SFD (15.35 feet NAVD88) by 2100. For example, a curb could be constructed to prevent the incursion of flood waters. The SFPUC would determine the specific adaptive features to be included based on the observed level of sea level rise.

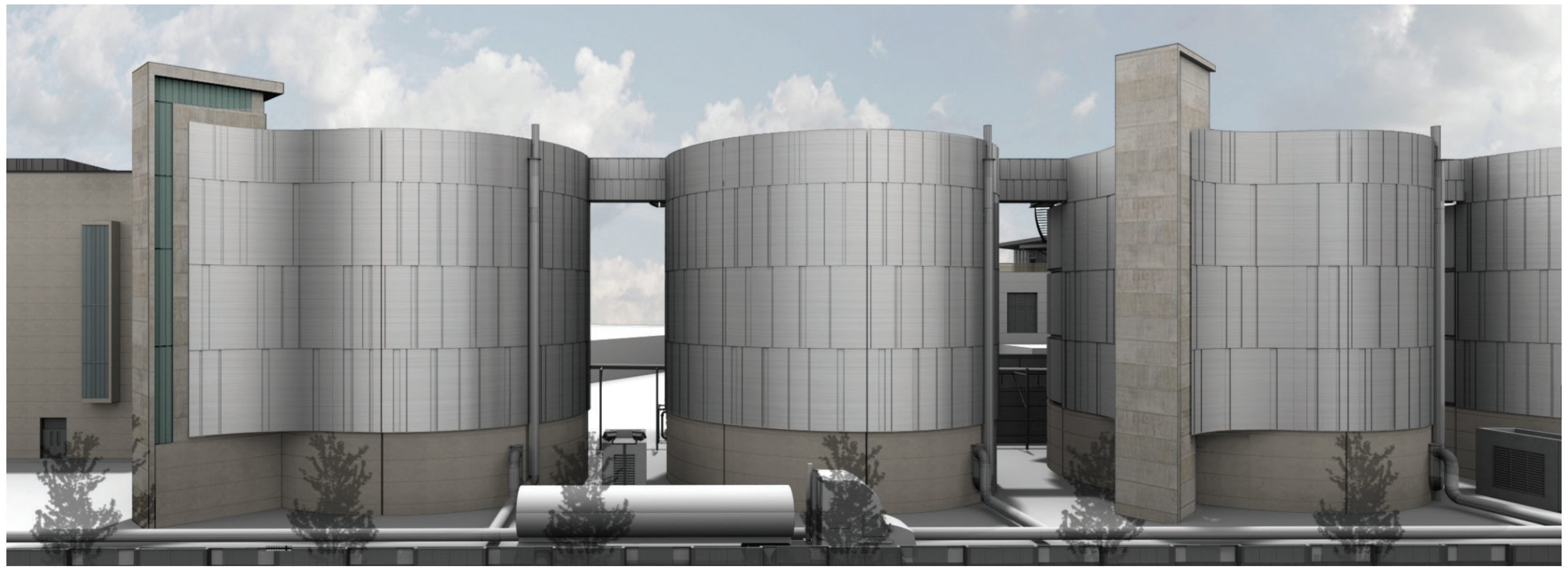
Ancillary Facilities

The project would include ancillary facilities such as security controls, energy management systems, fire protection and alarm systems, compressed air, and plant communications. These systems would require coordination with other City departments (e.g., the San Francisco Fire Department) to be compatible with existing systems where required.

The project would require connection to existing and proposed utilities, including natural gas, electricity, communications (including fiber optic cable), water, and sanitary sewer lines. The project site is currently developed and contains stormwater collection facilities that route existing stormwater runoff to plant influent or primary clarifiers for treatment. Future runoff from the roadways and new structures would be routed to the existing stormwater collection facilities at the site or future landscaped areas designed for stormwater infiltration. The existing SEP potable water distribution system would be extended to serve the BDFP facilities. Natural gas service would also be extended so that it could be used as a secondary fuel for turbines and other backup equipment.

2.4.2.3 Architecture and Landscaping

Architecture and landscaping for the BDFP would be designed consistent with the San Francisco Planning Code, the San Francisco Stormwater Management Ordinance, the San Francisco Better Roof Ordinance, the San Francisco Arts Commission Civic Design Review process and Public Art Program, and the San Francisco Better Streets Plan. **Figure 2-10** illustrates the preliminary architectural concepts that may be applied to several buildings. The project would also include the planting of trees and other landscaping, as well as fencing and street improvements (e.g., planted bulb-outs and intersection curb extensions). **Figure 2-11** depicts proposed locations for landscaping, which would be installed during the last year of construction. Landscaping would be provided along the freight rail spur and Caltrain tracks, as well as on both sides of Jerrold Avenue. Plants would include native or native-adapted species that are non-invasive, low water, low leaf litter, and low maintenance, and that have non-invasive root systems.



ANAEROBIC DIGESTION

ENERGY RECOVERY FACILITY

JERROLD AVENUE LOOKING WEST

SOLIDS PRETREATMENT FACILITY

NOTE: This figure presents concepts only; all aspects shown are subject to change.

SOURCE: SFPUC, Revised renderings, provided to ESA+Orion on November 8, 2016

Figure 2-10
Architectural Design Concepts

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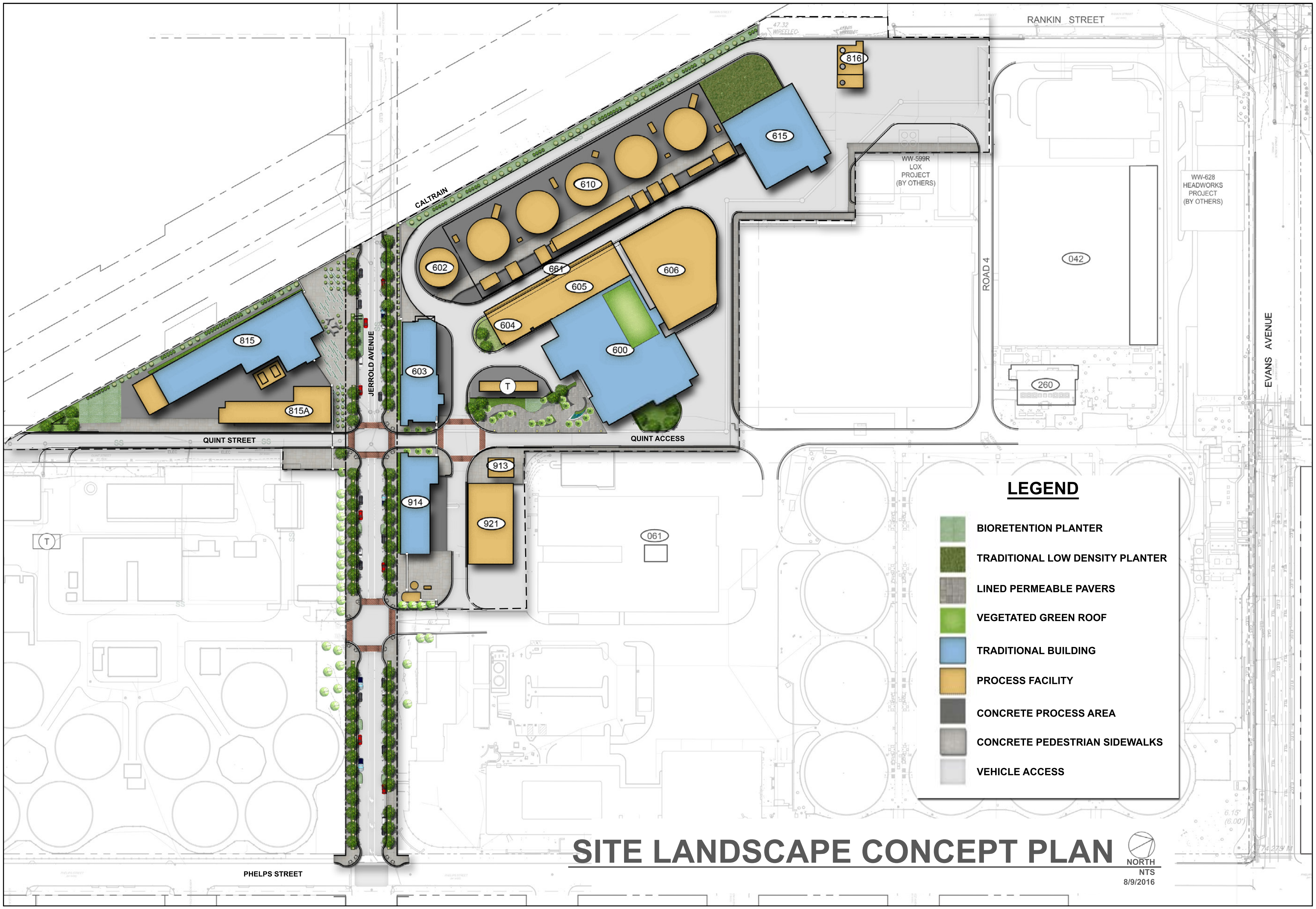


SOURCE: Brown and Caldwell, CH2M, Black & Veatch, Michael Willis Architects,
Data developed in 2016 for BDFP

SFPUC Biosolids Digester Facilities
Figure 2-11
Landscaping Improvements

Low-impact development features to reduce stormwater runoff could include street tree plantings, flow-through planters, permeable paving for sidewalks, and green roofs (a roof that is partially covered by landscaping). The Solids Pretreatment Facility would include a green roof to provide stormwater management benefits. Refer to Section 2.6, below, for information regarding trees to be removed during construction.

Project facilities would meet applicable energy and water efficiency requirements associated with the Green Building Requirements for City Buildings (San Francisco Environment Code, Chapter 7).

2.4.2.4 Decommissioning of Existing Digesters

Following the successful operational performance testing of the new digester facilities (refer to Section 2.5.1, below), the existing digester tanks and solids handling facilities would be decommissioned. Decommissioning would involve emptying, cleaning, and disconnecting the facilities from flows and power. After decommissioning, the original facilities would no longer be operational. Demolition of the existing digesters and reuse of these areas in the future are not part of the project and would be determined as part of Phase 2 of the SSIP (when authorized). However, as demolition of these facilities is reasonably foreseeable, demolition of the existing digesters is considered a cumulative project in the analyses of cumulative impacts in Chapter 4, *Environmental Setting and Impacts.*

2.5 Project Operations

2.5.1 Performance Testing and Full Facility Commissioning

Long-term operation of the new solids treatment and associated facilities would be integrated with the overall SEP operations. Following construction, there would be a transition period during which the SFPUC would conduct initial performance testing (or "start-up") of the new facilities followed by full facility commissioning. During the transition period, components of both existing and proposed biosolids treatment systems would operate concurrently.[35] As the new systems are tested, stabilized, and optimized, the BDFP would gradually increase its share of the solids treatment while the old systems are phased out. During initial performance testing, all BDFP facilities and equipment would be commissioned and tested, and sufficient units would be run to handle the flows and loads. It is expected to take six months to conduct performance testing and bring online all the equipment and facilities including THP and digestion, and up to 24 months of commissioning to optimize the new solids treatment system. Full facility commissioning is expected to be complete in 2025 (see Table 2-10 in Section 2.6, below).

[35] As described in Chapter 4, Section 4.8, Air Quality, the analysis of air pollutant emissions conservatively assumed that the entire transition period could occur over the shortest possible time frame and that the proposed facilities could become fully operational as early as 2023 to avoid understating emissions with daily thresholds.

Regarding Energy Recovery Facility operations, turbines and other equipment using digester gas fuel require a minimum flow of digester gas to start operation, which may not immediately be available. As described in Section 2.4.1.5, steam generated by recovery of heat from the turbines would be used to support the THP. The backup steam boiler would primarily operate on natural gas during startup to produce steam for the THP. Any digester gas produced would be used to fuel the backup steam boilers, and excess would be safely combusted via waste gas burners. Once the turbine minimum digester gas flow is achieved, the turbines would start operation (preceded by digester gas treatment). Natural gas or propane gas would also be provided as a starting fuel for the gas turbines. During startup, the waste gas burners would be used as needed for short periods (e.g., testing of equipment) or long periods (e.g., due to poor gas quality, equipment not ready or not working properly). Use of the waste gas burners during startup would occur during the first several months (i.e., approximately six months). After that initial period and during routine operations, the waste gas burners are expected to be used only during emergency situations or in response to an abnormal operational event.

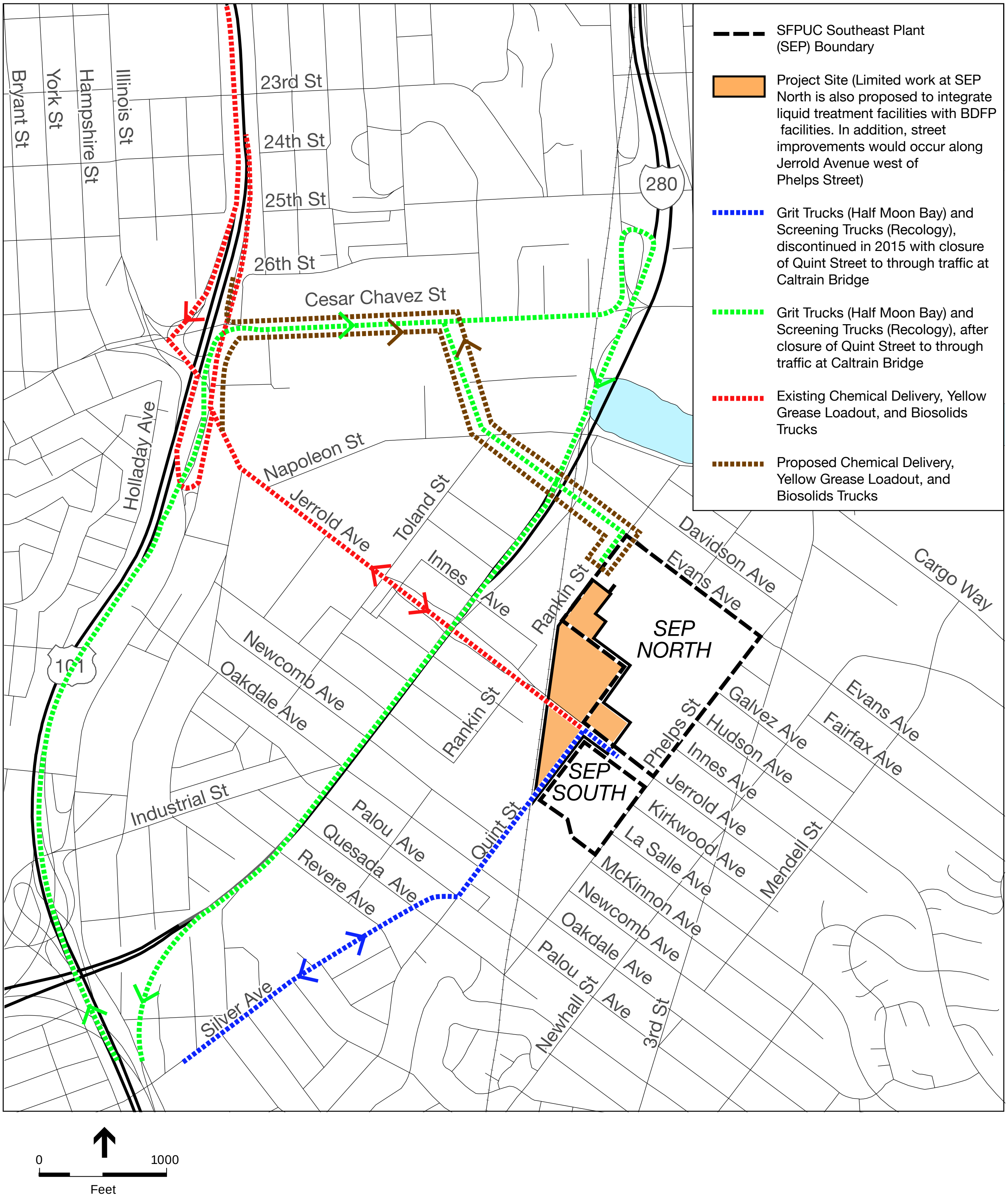
2.5.2 Plant Capacity, Operating Hours, and Work Force

As indicated in Table 2-1, the existing overall capacity of the SEP for wastewater treatment is 250 mgd wet weather flow and 85 mgd dry weather flow; the BDFP would not change this capacity. The BDFP facilities at the SEP would be designed to reliably treat year 2045 projected flows and loads. Similar to current conditions, proposed solids treatment facilities constructed as part of the BDFP would operate as needed, 24 hours per day, seven days per week. No increase in the existing operations staff levels of about 280 people for the entire SEP is anticipated from the project. During long-term operations, there would be approximately the same amount of on-site parking for employees at the SEP as under existing (2015) conditions.

2.5.3 Truck Trips and Routes

Overall, the number of daily trucks delivering or hauling materials associated with SEP solids handling operations would be a slight increase over the existing condition, from about 33 to about 36 trucks per day. Currently there are approximately 7 to 10 biosolids hauling truck trips per day, and under the BDFP, the estimated number of daily truck trips required for biosolids hauling would increase to approximately 10 to 14 haul trips per day in 2045. In the future, however, if the current solids treatment processes were to continue, the number of truck trips is estimated to be between 14 to 18 haul trips per day in 2045. (Refer to Table 4.6-16 in Section 4.6, Transportation and Circulation, for a breakdown and existing and future truck trips.)

Regarding truck routing, proposed permanent changes to vehicle entrances and exits and to on-site circulation roads (described in Section 2.4.2) would alter traffic patterns associated with the SEP's operations, shifting some truck traffic off of Jerrold Avenue and onto Rankin Street at Evans Avenue. **Figure 2-12** shows the existing truck routes for operational truck trips at the SEP together with the proposed future truck routes under the BDFP.



SOURCE: San Francisco Public Works 2005 GIS data;
Adavant Consulting and LCW Consulting, Data developed in 2016 for BDFP

SFPUC Biosolids Digester Facilities

Figure 2-12
Existing and Proposed Operational Truck Routes

2.5.4 Equipment Maintenance and Replacement

Similar to existing conditions, the SFPUC would maintain new equipment throughout the life of the proposed facilities, through replacement or repair. Major pieces of equipment (e.g., gravity belt thickeners, THP, centrifuges, and belt filter presses) would be replaced every 20 to 30 years. Minor pieces of equipment or those items subject to wear and tear would be replaced more frequently (i.e., every few years, depending on the equipment). For example, the belts for the gravity belt thickener would be replaced every one to three years and the belts for the belt filter press would be replaced every three months if operated continuously.

2.5.5 Energy Use and Supply

As shown in Table 2-1 and described under *Digester Gas Production and Power Generation* in Section 2.4.1.5, proposed energy recovery facilities would supply an estimated 4.2 MW energy from 1.6 million cubic feet of digester gas generated per day in 2023. As the total volume of solids to be treated by the BDFP increases over time due to anticipated population growth, the amount of digester gas generated would increase commensurately to 2 million cubic feet per day, which in turn would increase the amount of energy supplied by the turbines to approximately 5.2 MW. As shown in **Table 2-8**, based on 2045 projections, in the long term the BDFP would generate more energy than needed for BDFP operations; excess energy would be used by other SEP facilities.

TABLE 2-8
ESTIMATED ENERGY DEMAND AND SUPPLIES FOR SOLIDS PROCESSES, EXISTING AND FUTURE-WITH-PROJECT CONDITIONS

Description		Existing Biosolids Facilities (2014)	Future with Biosolids Digester Facilities Project (BDFP) Facilities	
			2023	2045
Electricity Demand, SEP Solids Treatment Process, megawatts (MW)		1 MW (estimated)	4.4 MW	4.9 MW
Electricity Produced from Cogeneration	From Digester Gas	0.66 MW[a]	4.2 MW[b]	5.2 MW
	Digester gas generation, cubic feet per day	*Approximately 1.3 million*	*Approximately 1.6 million*	*Approximately 2 million*
	From Natural Gas[c]	0.02 MW[d]	0	0
Electricity from Hetch Hetchy Hydropower to Supplement Electricity Generated from Digester Gas		0.32 MW	0.2 MW	0
Diesel Use, gallons per year[e]		50	5,250	5,250
Natural Gas/Propane Gas		Minor volumes to supplement digester gas for startup and during emergencies		

NOTES:

a Based on 2014 cogeneration engine operating record. The existing cogeneration engine can generate up to 2 MW power and provides thermal energy used to heat the digesters. When engine output exceeds the biosolids facility demand of 1 MW, the surplus power is used by liquid processes.

b Full production may not be realized until 2025, when the BDFP is fully commissioned.

c Natural gas is currently purchased from the State Department of General Services Natural Gas Services program, but delivered through Pacific Gas and Electric Company (PG&E) pipeline.

d The cogeneration engine consumes a small stream of natural gas.

e For purposes of calculating operations-phase air pollutant emissions, future diesel use was based on operation of the proposed 1.5-MW standby power generator for a maximum 50 hours annually for maintenance and testing purposes. Actual maintenance and testing hours are anticipated to be less (i.e., six hours annually).

SOURCE: SFPUC, Request for Information response regarding existing and future energy demand, e-mail from S. Chau, October 16, 2015.

BDFP operations would include energy monitoring to manage energy use. The BDFP would meet California Code of Regulations Title 24 requirements, where applicable, for energy efficiency.[36]

2.5.6 Chemicals Storage, Use, and Handling

Similar to existing operations, the BDFP treatment processes would involve the storage, use, and handling of various chemicals, including polymer (in the thickening, pre-THP dewatering, and final dewatering processes), ferric chloride (upstream/downstream of digesters for struvite[37] control), and sodium sulfite (to condition feedwater as part of the energy recovery process). **Table 2-9** indicates the net change in the volume of chemicals and on-site fuels needed for the project. Increases in chemical use are due to new technologies proposed for improved odor control and to treat increased solids loadings from projected population growth.

TABLE 2-9
PROPOSED CHANGES IN ON-SITE CHEMICAL AND FUEL USAGE

Chemical	Treatment Process or Use	Existing Use for Biosolids Handling Facilities (2014, average)	Proposed Biosolids Digester Facilities Project (BDFP) Quantity (2045)	Net Change in Usage
Polymer	Thickening, pre-thermal hydrolysis process (THP) dewatering and biosolids dewatering	Thickening: 200 pounds/day (liquid) Dewatering: 690 pounds/day (liquid)	3,600 pounds/day (annual average) (dry)	+2,710 pounds/ day (dry)
Ferric Chloride	Various injection points (upstream/downstream of digesters) for struvite control	Dewatering: 1,100 gallons/day (37% solution)	3,300 gallons/day (annual average) (41% solution)	+2,200 gallons/ day
Sodium Sulfite	Oxygen scavenger for boiler feed water de-aerator	Not currently used	120-gallon storage tank	+< 7 gallons/day
Diesel	Backup diesel generator	50 gallons/year	5,250 gallons/year	+5,200 gallons/year
Propane Gas	Turbine startup fuel	Not currently used	Two 20-pound storage cylinders	Infrequent use, negligible
Sulfuric Acid	Solids odor control (pH control and backup)	Not currently used	550 gallons/month	+550 gallons/month
Anti-Scalant	Cooling tower	Not currently used	< 1 pound/day	+< 1 pound/day
Sodium Hypochlorite	Cooling tower	Not currently used for solids handling	< 1 pound/day	+< 1 pound/day

SOURCE: SFPUC, Request for Information response regarding existing and future chemical usage, e-mail from S. Chau, September 29, 2015.

[36] The California Energy Commission has adopted and periodically updates standards (codified in Title 24, Part 6 of the California Code of Regulations) to ensure that building construction, system design, and installation achieve energy efficiency and preserve outdoor and indoor environmental quality. The standards establish a minimum level of building energy efficiency.

[37] Struvite, chemically equivalent to magnesium ammonium phosphate hexahydrate, forms when concentrations of soluble magnesium, ammonium, and orthophosphate exceed levels that promote the formation of crystals. Struvite can build up and clog wastewater treatment equipment.

Dry polymer would be stored in the Solids Pretreatment Facility and the Biosolids Dewatering Facility. Ferric chloride use is expected to increase to accommodate the proposed treatment processes. New ferric chloride storage tanks would be used. Two new 15,500-gallon ferric chloride storage tanks (up to 24 feet in height, with concrete pad dimensions of approximately 1,300 square feet) with secondary containment would be installed on-site. Either natural gas or propane gas would be provided as a starting fuel for the gas turbine generators. If required, the propane system would consist of a 20-pound storage cylinder that would supply the two gas turbines and a backup second storage cylinder. Each 20-pound cylinder would be sufficient to start a turbine 250 times. The project would also include an 1,000-gallon storage tank for diesel storage for the backup diesel generator.

All chemicals would be stored in accordance with applicable federal, state, and local regulations (e.g., chemical storage with secondary containment). Polymer, ferric chloride, and diesel are currently used at the SEP for existing processes. Sodium hypochlorite is currently used for the liquid treatment processes but not the solids handling processes. Sodium sulfite, sulfuric acid, anti-scalant, and propane gas are new chemicals not currently used at the SEP. The SFPUC maintains a Hazardous Materials Business Plan (HMBP) for SEP operations. The HMBP, which contains information including but not limited to a hazardous materials inventory and emergency response, would be updated to reflect changes in the amount of chemicals stored, used, and handled by the BDFP facilities at the SEP, in compliance with regulatory requirements. Refer to Section 4.17, Hazards and Hazardous Materials, for more information.

2.6 Project Construction

2.6.1 Construction Schedule, Work Hours, Work Force, and Coordination

2.6.1.1 Schedule and Work Hours

Table 2-10 shows the estimated construction schedule and duration by activity. Project construction would require about five years, from approximately February 2018[38] through January 2023. For most of the construction period, construction activities at the project site would occur Monday through Friday from 7:00 a.m. to 3:30 p.m., with some activities extending to 8:00 p.m. as needed. Construction could also occur on Saturdays and Sundays when needed. Work would occur on holidays and 24 hours per day only if needed for critical facility connections. Pile driving would generally occur between 7:00 a.m. and 3:30 p.m. Monday to Friday and at times until 8:00 p.m. consistent with the City's Noise Ordinance. During the peak of construction, a period of approximately one year (between mid-2021 and mid-2022), and other times during critical functions, construction would occur in two shifts per day if needed: Monday through Saturday from 7:00 a.m. to 3:30 p.m. and from 2:30 p.m. to 11:00 p.m. Nighttime work (after 8:00 p.m.) would be limited to interior facility work (e.g., electrical work) and outside work that would not result in noise exceeding

[38] Based on the Conceptual Engineering Report (SFPUC, *BDFP Conceptual Engineering Report*, March 2016), construction activities could start anytime from February 2018 to August 2018, with a five-year construction duration regardless of the start date. For the purposes of this EIR, February 2018 is assumed to be the start date.

5 dBA (A-weighted decibels) over ambient levels, pursuant to the City's Noise Ordinance. The SFPUC expects that construction activities outdoors between 8:00 p.m. and 11:00 p.m. could include:

- Large concrete placements
- Welding
- Minor backfill and road grading (related to shutdowns)
- Pipefitting
- Installation of electrical and security components
- Crane use (setting of pre-cast concrete structures, large-diameter pipe and steel supports)
- Groundwater dewatering
- Moving equipment and material between structures (associated with indoor work)
- Connections between proposed facilities and existing facilities

TABLE 2-10
APPROXIMATE CONSTRUCTION SCHEDULE AND WORK FORCE

<table>
<tr><th colspan="2">Construction Activity</th><th>Expected Duration</th><th>Estimated Schedule[a]</th><th>Approximate Average Daily Construction Work Force</th></tr>
<tr><td colspan="5">Biosolids Digester Facilities Construction</td></tr>
<tr><td colspan="2">Demolition and Site Preparation</td><td>6 months</td><td>February 2018 - July 2018</td><td>133</td></tr>
<tr><td colspan="2">Soil Excavation[b]</td><td>5 months</td><td>August 2018 - December 2018</td><td>194</td></tr>
<tr><td colspan="2">Foundations and Facilities Construction</td><td>49 months</td><td>January 2019 - January 2023</td><td>372 (average)
550 (peak)</td></tr>
<tr><td colspan="2">Total Biosolids Digester Facilities Construction</td><td>60 months</td><td>February 2018 - January 2023</td><td>333</td></tr>
<tr><td colspan="5">Post-Construction Activities</td></tr>
<tr><td rowspan="2">Transition from Existing to Proposed Biosolids Treatment Systems[c]</td><td>Performance Testing (Start up)</td><td>6 months</td><td>February 2023 - July 2023</td><td>133</td></tr>
<tr><td>Full Facility Commissioning</td><td>24 months</td><td>August 2023 - July 2025</td><td>< 50[d]</td></tr>
<tr><td colspan="2">Existing Digester Decommissioning[e]</td><td>6 months</td><td>After 2025</td><td>< 20</td></tr>
</table>

NOTES:

[a] Based on the Conceptual Engineering Report, construction activities could start anytime from February 2018 to August 2018, with a five-year construction duration. For the purposes of this EIR, February 2018 is assumed to be the start date.

[b] The majority of excavation would occur during this period, with additional excavation for other facilities later in construction.

[c] As described in Chapter 4, Section 4.8, Air Quality, the analysis of air pollutant emissions conservatively assumed that the entire transition period could occur for the shortest possible time frame and that the proposed facilities could become fully operational as soon as 2023 to avoid understating emissions with daily thresholds.

[d] Full facility commissioning would be performed by Southeast Water Pollution Control Plant (SEP) staff (with some additional non-SEP staff on-site assisting with the work).

[e] Potential demolition of the existing digesters and solids handling facilities to be determined under a separate project.

SOURCE: SFPUC, *BDFP Conceptual Engineering Report*, March 2016.

2.6.1.2 Work Force

As shown in Table 2-10**,** the size of the construction work force would vary over the five-year construction period, averaging about 333 workers and ranging from about 133 to 550 workers. The work force would peak between approximately May 2021 and July 2022. If construction workers park at the Piers 94 and 96 staging areas, a worker shuttle would be provided and run approximately one hour before and one hour after the construction hours (see Section 2.6.2).

2.6.1.3 Construction Coordination

Southeast Area Program Construction Manager

Given the multitude of planned projects and ongoing operations at the SEP, the SFPUC has formed a Site Logistics Committee to coordinate future site construction and ongoing operations activity at the SEP. This committee works with program managers, project managers, and SEP operations staff to establish and update preconstruction plans for coordinated construction staging, parking, project interfaces, and traffic control. A Southeast Area Program Construction Manager would be hired by the SFPUC prior to the start of construction of major SEP projects (i.e., Headworks and BDFP) and would manage implementation of these plans and lead coordination efforts between projects and SEP operations throughout construction. The Southeast Area Program Construction Manager would also be responsible for coordinating with the project teams to update the SFMTA as needed to address local traffic, transit, bicycle, and pedestrian issues.

The SFPUC would conduct all construction activities in compliance with applicable regulations and ordinances. Relevant requirements would be included in the contract specifications that are issued for construction of the project.

Traffic Control Plan

In accordance with the SFPUC's Standard Construction Measures (discussed below in Section 2.6.7 and presented in **Appendix SCM**), the SFPUC or its contractor would prepare and implement a Traffic Control Plan that conforms to the SFMTA's *Regulation for Working in San Francisco Streets* (Blue Book). Elements of the Traffic Control Plan would include:

- Development of circulation and detour routes to minimize impacts on local street circulation during roadway and lane closures, taking into account a.m. and p.m. peak commute periods. Flaggers and/or signage shall be used to guide vehicles through and/or around the construction zone, and roadside construction safety protocols shall be implemented.

- Placement of advance warning signs outside the perimeter of work areas advising motorists, bicyclists, and pedestrians of the construction zone ahead in order to minimize hazards associated with construction activities, including the construction vehicle entry and egress of project-related construction activities.

- Implementation of roadside safety protocols, such as advance "Road Work Ahead," "One Lane Road Ahead," "Flagger Ahead," "Prepare to Stop," and "Trucks Entering Road" signs. Warning signs and speed control shall be provided, as appropriate, to achieve speed reductions for safe traffic flow in the project vicinity.

- Identification of construction truck routes that minimize truck traffic on local roadways and residential streets to the extent possible.
- Development of sufficient staging areas.
- Control and monitoring of construction vehicle movement by on-site inspectors through the enforcement of the standard construction specifications.
- Scheduling of truck trips on roads that would remain open to the public during hours of the day other than the peak morning and evening commute hours to the extent possible.
- Maintenance of pedestrian and bicycle access and circulation during project construction where safe to do so. The contractor shall be required to maintain bicycle lanes/lane widths to accommodate bicycle traffic or seek a permit from the SFMTA to address bicycle route detours and signage for any lane closures. Where construction activities encroach on a bicycle lane, advance warning signs (e.g., "Bicyclists Allowed Use of Full Lane" and/or "Share the Road") shall be posted to indicate that bicycles and vehicles are sharing the lane and to warn bicyclists and drivers of upcoming traffic hazards. If construction activities encroach on a sidewalk, safe crossings and appropriate signage (e.g., "Sidewalk Closed") shall be provided for pedestrians.
- Storage of all equipment and materials in designated contractor staging areas on or adjacent to the work site so that traffic obstruction is minimized.
- Coordination of construction with facility owners or administrators of police and fire stations (including all fire protection agencies), transit stations, hospitals, and schools. Facility owners or operators would be notified in advance regarding the timing, location, and duration of construction activities and the locations of detours and lane closures. Emergency service vehicles shall be given priority for access.

While not requirements of the SFMTA's Blue Book, the following additional elements would also be included in Traffic Control Plan, with the intent of minimizing disruptions to surrounding neighborhoods, resources, and land uses during project construction activity:

- A public information plan shall be developed to provide adjacent residents and businesses with regularly updated information regarding project construction in their area, including construction activities, durations, peak construction vehicle activities, travel lane and other lane closures, and full road closures. This information shall also be presented on the SFPUC website and updated regularly as construction conditions change.
- The Traffic Control Plan shall provide transportation demand management methods such as providing secure bicycle parking spaces, providing shuttle van service to the BART 24th Street Mission station, participating in emergency ride home program through the City and County of San Francisco, and providing transit information to construction workers to encourage carpool, bicycle, walk, and transit access to the project site.

Construction Noise Control Plan

The SFPUC would implement a noise control plan during construction requiring contractors to use non-impact equipment that meets the City's Noise Ordinance limit of 80 dBA at 100 feet and including monitoring to confirm the limit is not exceeded. In addition, the SFPUC would require contractors to follow regulations of the California Division of Occupational Safety and Health (DOSH) (better known as Cal/OSHA), including those related to noise exposure, to ensure the health and well-being of their employees. Refer to Chapter 4, Section 4.7, Noise and Vibration, for discussion of noise levels in the project vicinity and applicable noise regulations.

2.6.2 Construction Staging, Worker Parking, Truck and Delivery Access, and Temporary Relocation of Muni Route

Figures 2-1 and 2-2 in Section 2.1.1 show the locations of potential construction staging areas. The project would require up to 12 acres of total construction staging area (in addition to the project site itself) which could be divided among various potential areas. The potential construction staging areas are as follows:

- **Within the SEP Site.** Some limited areas within the existing SEP boundaries may be available and could be used during construction for laydown of equipment and materials, parking, and office trailers.
- **Within Quint Street.** In October 2015, Quint Street between Oakdale Avenue and the Caltrain tracks was permanently closed to through traffic as part of Caltrain's Quint Street project.[39] This closure resulted in a dead-end segment of Quint Street adjacent to the project site between the Caltrain railroad tracks and Jerrold Avenue. As described in Section 2.1.1.1, the SFPUC would acquire and permanently close this same block of Quint Street. This segment of Quint Street is proposed as a staging/parking area during construction. No improvements would be needed for use of Quint Street for construction staging.
- **Within Jerrold Avenue.** To maintain a safe construction work area, as part of the BDFP the SFPUC proposes a temporary closure of approximately two blocks of Jerrold Avenue to public through traffic (starting at the Caltrain right-of-way and up to the SEP entrance on Jerrold Avenue west of Phelps Street) during the five-year project construction period. During this time, the closed segment of Jerrold Avenue could be used as a staging/parking area. Emergency vehicles would be allowed access through Jerrold Avenue if requested by emergency providers during advance coordination. Trucks related to plant operations would continue to have access to the SEP via the main entrance on Jerrold Avenue outside of the construction area. No improvements would be needed for use of Jerrold Avenue for construction staging.
- **Port of San Francisco Properties.** The project could use up to 12 acres at Piers 94 and 96 for construction staging, on lands available for lease from the Port of San Francisco (shown on **Figure 2-13**). The area would be used as staging for construction office trailers, construction equipment and materials, and parking for construction worker vehicles. If the Piers 94 and 96 staging areas are used for construction work force parking, shuttle buses with seating for up to 50 passengers would transport workers between the parking area and the project site; **Figure 2-14** shows the proposed shuttle route. There would be up to 17 shuttle bus round trips at the beginning and end of each work shift, and during periods when there are two work shifts, there would be a morning, mid-day, and evening round trip for a maximum of 51 shuttle bus round trips per day. No staging areas would be located within 100 feet of the Bay shoreline or any known or potential wetlands.

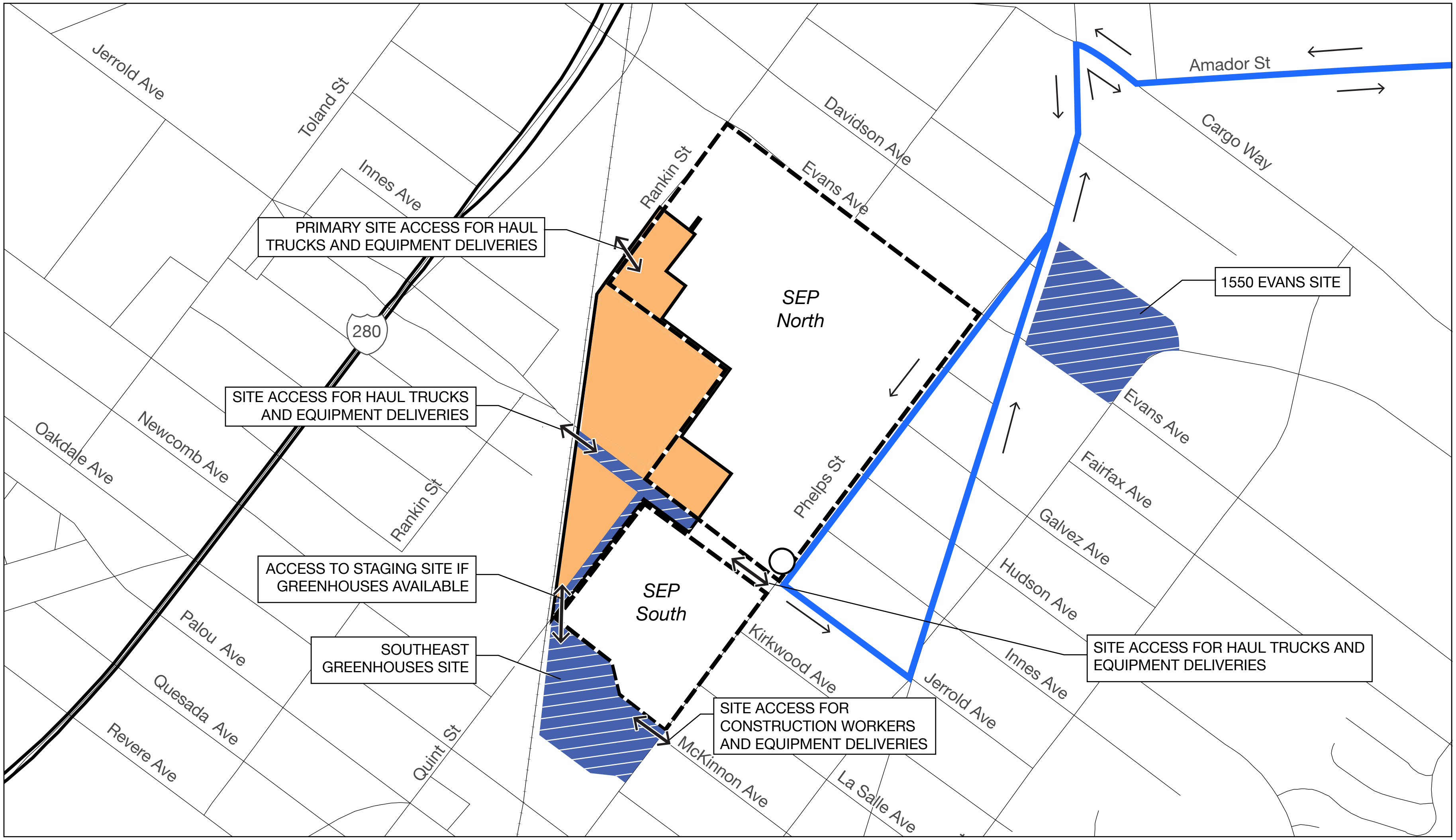
[39] The Caltrain Quint Street Bridge Replacement Project permanently closed Quint Street between Oakdale Avenue and the Caltrain tracks in October 2015 for replacement of the existing Quint Street Bridge. Caltrain, Quint Street Project. Available online at http://www.caltrain.com/projectsplans/Projects/Caltrain_Capital_Program/Quint_Street_Project.html. Accessed on April 5, 2017.

NOTE: Areas shown are approximate. The SFPUC may lease up to 12 acres from the Port of San Francisco within these areas.

SOURCE: Google Maps Imagery from 2015; ESA+Orion, data developed in 2016 for BDFP

SFPUC Biosolids Digester Facilities

Figure 2-13
Piers 94 and 96 Construction Staging Areas



SFPUC Southeast Plant (SEP) Boundary

Project Site (Limited work at SEP North is also proposed to integrate liquid treatment facilities with BDFP facilities. In addition, street improvements would occur along Jerrold Avenue west of Phelps Street)

Potential Construction Staging Areas (Staging may also occur within the existing SEP boundary)

Proposed Shuttle Stop

Proposed Shuttle Route Direction

BDFP Proposed Shuttle Route

NOTE: See Figure 2-15 regarding truck haul routes

0 1000
Feet

SOURCE: SFPUC, BDFP Conceptual Engineering Report, March 2016, adapted by ESA+Orion

SFPUC Biosolids Digester Facilities

Figure 2-14
Construction Staging and Access Plan for Project Site

The Port of San Francisco has a number of sites available for leasing, including the following:

Pier 94 Backlands. The Pier 94 Backlands is an approximately 27-acre site located west of Amador Street, approximately 0.75 mile northeast of the SEP. This area is currently undeveloped and used for storage of soil and aggregate. As part of a separate project, the Port of San Francisco plans to spread gravel currently stockpiled at the site to create a gravel pad throughout the site, and to install solar lights, potable water, electricity, and compostable toilets. Wastewater would be collected in temporary restrooms and hauled to the SEP for treatment.

Pier 94 (East of Amador Street). This 4.8-acre paved area of Pier 94, extending east of Amador Street to the Bay, is currently used for construction staging for various other projects and storage of flatbed trailers, vehicles, and equipment. The use of this area may require installation of electric lines and potable water lines, which would likely remain following completion of construction.

Pier 96. The Pier 96 property is approximately 30.9 acres in size and extends from southeast of Jennings Street and Cargo Way to the eastern edge of the pier, which has several cranes for cargo ship loading/unloading. The site is divided by the access road to the Recology Recycle Central recycling facility located to the south of the potential staging area. The portion of the site to the east of the access road is an asphalt paved lot with traffic cones delineating the San Francisco Police Department (SFPD) emergency vehicle operations course. Trucks, containers, vehicles, and miscellaneous items (e.g., stacked wooden telephone poles) are stored around the edges of this portion of the proposed Pier 96 staging area. To the west of the access road, the staging area is occupied by the Pier 96 Administration Building, the MJB Steel rebar fabrication facility, and an unoccupied building that may have been a weigh station. The Pier 96 Administration Building has about six listed tenants, including the SFPD. Tenant parking areas are south of the building; police vehicles are parked to the east of the building. This EIR assumes the administration building and adjacent fabrication facility uses would continue throughout the project construction period. The use of this area may require installation of electric lines and potable water lines, which would likely remain following completion of construction.

- **Adjacent to the SEP at the Southeast Greenhouses (if available).** Another potential staging area is the SFPUC's four-acre site and currently occupied by the Southeast Greenhouses, southwest of the existing digester structures (as shown on Figure 2-14). The Southeast Greenhouses were originally constructed as part of a community measure for the legally mandated expansion of the SEP circa 1986 and are currently owned by the SFPUC. The greenhouse structures occupy approximately 113,000 square feet (2.6 acres) and are located at 1150 Phelps Street (Block 5304; Lots 01-08, 13, 16, 17, and 23), directly southwest of the existing digester structures. If the site becomes available, it would be used for parking, material storage, and/or office trailers. As the site is already connected to electricity, no new electric lines would need to be installed. However, temporary communication lines, potable water, a sewer line, lighting, fencing, and construction management office trailers may need to be set up or extended at the site. There would be no grading, excavation, or other ground disturbance at the site prior to its use as a staging area. Biosolids truck traffic (from the existing dewatering/loadout facility operations) may be rerouted through this area if available. The SFPUC has not yet determined if the site would be available for BDFP construction staging; staging and future use will depend upon the outcome of a separate community planning process for the rebuilding of the greenhouses. Therefore, future uses of this site are unknown at this time and would be subject to separate environmental review; they are not evaluated in this EIR.

- **1550 Evans Avenue (if available).** Another potential staging area is an approximately 4.2-acre SFPUC property at 1550 Evans Avenue site, located at the northeast corner of Third Street and Evans Avenue, a few hundred feet east of the SEP. Two vacant buildings currently occupy the property: a 31,600-square-foot two-story office building and a 19,100-square-foot one-story warehouse building with a 2,930-square-foot office mezzanine. There are also eight warehouse loading bays and approximately 200 off-street parking spaces within the property. The property is surrounded on all four sides by landscaping trees, including a berm and trees along the Third Street frontage. The site is currently under consideration for other SFPUC uses. However, depending on the schedule for these other uses, the site could potentially become available for temporary construction staging for the BDFP. If the site becomes available, the existing structures would be demolished and the site would be used for materials staging, parking, and/or temporary office space. Trees within the fence line and near structures to be demolished would be removed. No trees would be removed within 30 feet of Third Street as there is an easement on this portion of the property.

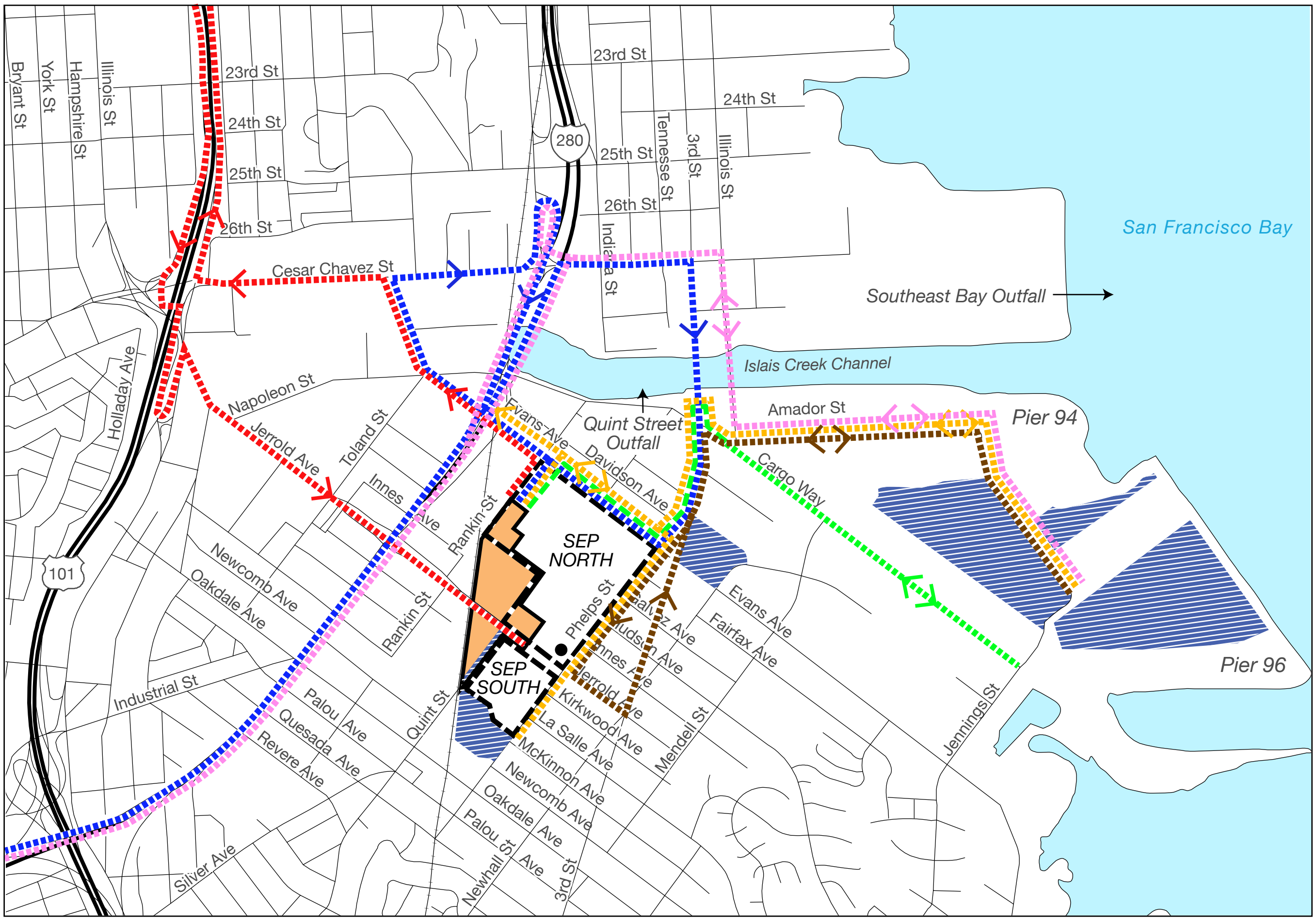
Construction worker parking would occur primarily at the Pier 94 Backlands or Piers 94 and 96 staging areas, and/or at the 1550 Evans Avenue site and the Southeast Greenhouses site, if available. For purposes of analysis in this EIR, the peak construction months in terms of maximum construction trucks and maximum construction workers were evaluated. Two conservative allocations of construction workers between the staging sites were also evaluated (see Chapter 4, Section 4.6, Transportation and Circulation). Potential construction staging area uses and activities are further detailed below.

2.6.2.1 Construction Truck and Delivery Access

The primary vehicle access route for construction haul trucks and deliveries to the project site would be via Rankin Street. Haul trucks are anticipated to travel from Rankin Street to Highway 101 and Interstate 280 using Evans Avenue and Cesar Chavez Street.[40] **Figure 2-15** depicts the anticipated construction haul and delivery truck routes to and from the project site and staging areas. Trucks delivering materials to the Piers 94 and 96 staging areas would likely travel from Highway 101 and Interstate 280 via Cesar Chavez Street, Illinois Street, and Amador Street. Deliveries from the Piers 94 and 96 staging areas would primarily travel to the Rankin Street entrance via Evans Avenue, Third Street, and Cargo Way. Deliveries to the Southeast Greenhouses staging area would travel to and from the site via Phelps Street.

During the construction period, with the closure of Jerrold Avenue, the normal SEP operational truck routes (shown on Figure 2-12) would be altered. **Figure 2-16** shows interim truck delivery and off-haul routes for SEP operations, including the existing solids treatment processes, for temporary use during the five-year construction period.

[40] These are the presumed truck routes because they represent the shortest logical route to freeways. Evans Avenue is identified as a route with significant truck traffic between Cesar Chavez Street and Jennings Street.



SFPUC Southeast Plant (SEP) Boundary

Project Site (Limited work at SEP North is also proposed to integrate liquid treatment facilities with BDFP facilities. In addition, street improvements would occur along Jerrold Avenue west of Phelps Street)

Potential Construction Staging Areas (Staging may also occur within the existing SEP boundary)

Excavated Soil (Altamont) and Lead/Asbestos Building Materials (Vacaville)

Recyclable and Unrecyclable Materials (Half Moon Bay)

Contaminated Excavated Soil (Rail Transfer)

Equipment Deliveries and Concrete Trucks (These trips could originate within or outside of San Francisco; routes to and from the project site and staging areas would vary)

Construction Worker Shuttle Bus

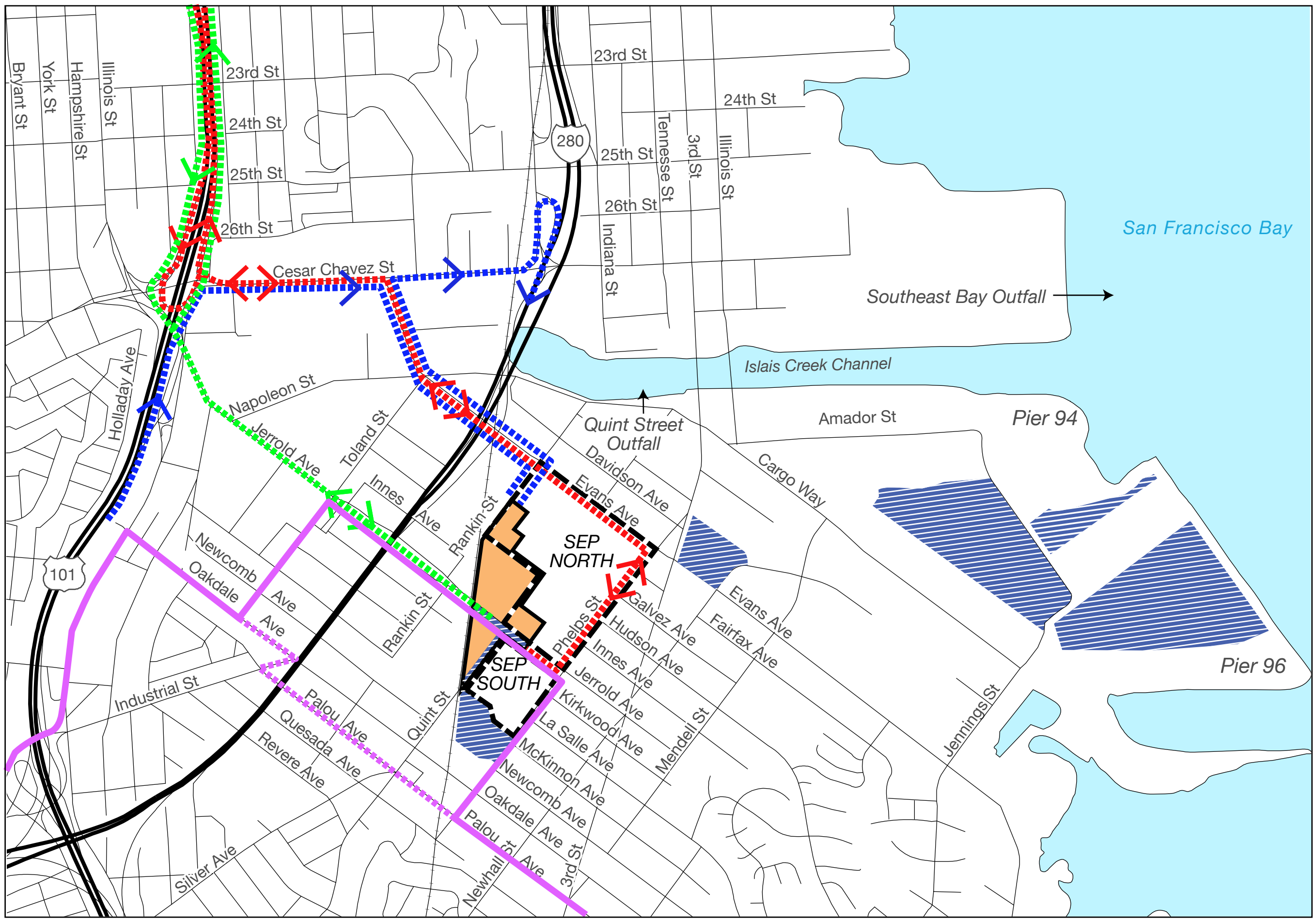
Equipment Deliveries to Piers 94/96

Shuttle Bus Stop

SOURCE: San Francisco Public Works 2005 GIS data;
Adavant Consulting and LCW Consulting, Data developed in 2016 for BDFP

SFPUC Biosolids Digester Facilities

Figure 2-15
Construction Haul Routes



SFPUC Southeast Plant (SEP) Boundary

Project Site (Limited work at SEP North is also proposed to integrate liquid treatment facilities with BDFP facilities. In addition, street improvements would occur along Jerrold Avenue west of Phelps Street)

Potential Construction Staging Areas (Staging may also occur within the existing SEP boundary)

Biosolids Off Haul During Nighttime Hours (2:00 a.m. to 3:00 a.m.)

Chemical Delivery Trucks, Yellow Grease Loadout, and Biosolids Off Haul During Daytime Hours

Grit Trucks (Half Moon Bay), Screening Trucks (Recology)

Existing Muni 23 Monterey Route

Temporary Relocation of Muni 23 Monterey Route

0 2000
Feet

SOURCE: San Francisco Public Works 2005 GIS data; Adavant Consulting and LCW Consulting, Data developed in 2016 for BDFP

SFPUC Biosolids Digester Facilities

Figure 2-16
SEP Operational Truck Routes During Project Construction

2.6.2.2 Temporary Relocation of Muni 23 Monterey Bus Route

Due to the proposed temporary closure of Jerrold Avenue during the construction period, the Muni 23 Monterey bus route would need to be relocated. As described further in Chapter 4, Section 4.6, Transportation and Circulation, for the purposes of this EIR, it is assumed that the temporary relocated route and stops would be on Oakdale and Palou Avenues (as shown on Figure 2-16), consistent with the Muni Forward implementation plan.[41] It is also assumed that this Muni line would return to Jerrold Avenue once construction is completed, since the schedule for the long-term relocation of the Muni 23 Monterey route is currently unknown.

2.6.3 Construction Equipment

Table 2-11 lists the types of equipment that would be used during construction. All equipment would be compliant with the San Francisco Clean Construction Ordinance. Further detail regarding scheduled use of listed equipment is included in Chapter, 4, Section 4.7, Noise and Vibration.

TABLE 2-11
CONSTRUCTION EQUIPMENT[a]

• Auger Drill Rig	• Crawler Crane	• Horizontal Boring Hydraulic Jack
• Backhoe, including large backhoe	• Demolition Hammer	• Impact Hammer
• Bar Bender	• Dozer	• Jackhammer (pneumatic)
• Boring Jack Power Unit	• Drill Rig Truck	• Man Lift
• Chain Saw	• Dump Truck	• Pickup Truck
• Compactor	• Excavator	• Pneumatic Tools
• Compressor	• Flat Bed Truck	• Pumps
• Concrete Mixer Truck	• Front End Loader	• Roller
• Concrete Pump Truck	• Generators	• Scraper
• Concrete Saw	• Gradall 544D	• Shears
• Tower Crane	• Grader	

NOTES
[a] Pile driving would be accomplished using a crane and impact hammer.

SOURCE: SFPUC, *BDFP Conceptual Engineering Report*, March 2016.

2.6.4 Demolition of Existing Structures

Initial construction activities would include demolition of about 136,000 square feet of existing buildings and structures within the project site, as shown in **Table 2-12,** in order to make space for the BDFP facilities or for construction staging. **Figure 2-17** shows the location of the buildings proposed to be demolished. Structures to be demolished include the following currently utilized SEP facilities: Building 855 (office trailers), Building 870 (service building), Building 925 (pump stations), and Electrical Substations SS5A/5B. In addition, subsurface facilities remaining on the Asphalt Plant

[41] San Francisco Municipal Transportation Agency, Muni Forward, 2016. Available online at https://www.sfmta.com/projects-planning/projects/muni-forward-0. Accessed on March 21, 2016. For the citation specific to the Muni 23 Monterey route: https://www.sfmta.com/sites/default/files/routemaps/23%20Monterey.pdf

site would be removed during excavation for project construction.[42] The vacant office building and warehouse at 1550 Evans Avenue would also be demolished. Based on investigations conducted to date, two buildings at the Central Shops property (Buildings A and B) and one building at SEP North (Building 870, Service Building) proposed for demolition have been assessed as historic structures (see Chapter 4, Section 4.5, Cultural Resources).[43,44] Demolition, site preparation, and utility relocation activities are expected to take about six months, from approximately February 2018 to July 2018.

TABLE 2-12
EXISTING STRUCTURES PROPOSED FOR DEMOLITION OR RELOCATION[a]

Building Name or Number		Existing Use	Year Built	Square Footage of Structures to be Demolished	Square Footage of Structures to be Relocated
Central Shops	Building A	Administration office, body shop, locker room	1959	16,200	--
	Building B	Car shop, truck shop, spray booth, welding shop, machine shop, tire shop	1959	50,000	--
	Building C	Repair, maintenance, smog check, storage. Former gas station facility.	1959	12,900	--
SEP North	Building 855[b]	Engineering Offices Annex	2009	--	3,200
	Building 870	Service Building	1952	3,800	
	Building 925	Water 1 and 2 Pump Stations	1981	1,600	
	SS5A/5B	Electrical substations	1980	800	
Belowground structures at Asphalt Plant site		Building piles, structural footings, underground storage tank	1954	n/a	
1550 Evans Avenue	Warehouse	Currently vacant	1978	19,100	--
	Office Building	Currently vacant	1978	31,600	--
Total Demolition / Relocation (approximate)				**136,000**	**3,200**

NOTES: n/a = not applicable

a Numbers rounded to the nearest 1,000 square feet (for demolition) and nearest 100 square feet (for relocation).
b Building 855 is a modular, temporary building that would be relocated elsewhere at the Southeast Water Pollution Control Plant (SEP) prior to construction.

SOURCE: SFPUC, Request for Information response regarding building demolition and construction details, e-mail from S. Chau, July 23, 2015.

42 Aboveground asphalt plant facilities will be removed as part of a separate SFPUC project, prior to BDFP construction.
43 JRP Historical Consulting, Department of Parks and Recreation Primary Record for 1800 Jerrold Avenue, August 20, 2014.
44 ESA, Department of Parks and Recreation Primary Record for 750 Phelps Street, June 30, 2015.

SOURCE: Google Maps Imagery from 2015; ESA+Orion, data developed in 2016 for BDFP

Note: Demolition of aboveground structures at the Asphalt Plant site to occur as part of the Land Reuse - 1801 Jerrold Avenue project (refer to Project No. 16 on Table 4.1-1).

SFPUC Biosolids Digester Facilities

Figure 2-17
Existing Structures to be Demolished

Based on previous investigations of site buildings, demolition would require licensed removal and appropriate disposal of lead- and asbestos-containing building materials. Demolition debris would be recycled to the extent feasible and in accordance with Chapter 14 and Section 708 of the San Francisco Environment Code. The amount of demolition debris is estimated at 27,000 cubic yards, which is anticipated to consist of lead/asbestos building materials, recyclable materials (mostly metal, glass, and concrete), and non-recyclable materials. About 1,500 total truck loads would be needed to haul demolition debris to appropriate sites for disposal or recycling. Lead- and asbestos-containing debris would be hauled to the Recology Hay Road Landfill in Vacaville or to the Altamont Landfill in Livermore, as needed; other demolition debris would be hauled to the Republic Ox Mountain Landfill in Half Moon Bay. **Table 2-13** provides estimates of demolition volumes and truck loads from the BDFP site.

TABLE 2-13
DEMOLITION DEBRIS VOLUME AND TRUCK LOAD ESTIMATES

Area of the Project Site	Total Volume (cubic yards)	Total Truck Loads[a]			
		Lead/Asbestos Building Materials[b]	Recyclable Materials[c]	Non-Recyclable Materials[c]	Total[d]
Asphalt Plant (below-grade structures only)	5,000	93	93	93	280
Central Shops	11,000	205	205	205	615
Structures within Existing SEP North	7,000	130	130	130	390
1550 Evans Avenue buildings	4,000	75	75	75	225
Total [d]	***27,000***	***500***	***500***	***500***	***1,500***

NOTES: SEP = Southeast Water Pollution Control Plant

[a] Assumes a truck capacity of 18 cubic yards.
[b] The proposed disposal site for lead- and asbestos-containing building materials from demolition is the Recology Hay Road Landfill in Vacaville (about 65 miles from the project site) or the Altamont Landfill in Livermore (about 60 miles from the project site).
[c] The proposed destination for recyclable materials and non-recyclable waste from demolition is the Republic Ox Mountain Landfill in Half Moon Bay (about 24 miles from the project site).
[d] Numbers may not total due to rounding.

SOURCE: SFPUC, *BDFP Conceptual Engineering Report*, March 2016; SFPUC revised Tables A5 and A6, August 2016.

2.6.5 Site Preparation

2.6.5.1 Subsurface Construction, Pile Driving, and Retaining Walls

Construction would require substantial excavation and subsurface construction, particularly for the digesters. The digesters location would be excavated to approximately 41 feet bgs. Several other facilities would require excavation to 25 to 30 feet bgs, with the excavation depth generally 3 to 5 feet below the building foundation. Following demolition to clear the site, subsurface excavation support would be installed for structures within the project site. Structures at grade and near grade would need to be supported on deep foundations (e.g., driven, drilled, or augured piles). Deep foundations would also be required for partially buried structures (i.e., buildings with basements, odor control facilities, and utility tunnel and pipe chases).

For the digesters, a pile-supported foundation is not practical. The excavation support would consist of secant pile walls[45] or other system that allows for excavation of a pit approximately 40 feet deep and subsequent construction of the digesters. Contractors would construct a rectangular secant pile wall around the perimeter of the digesters to support the soil to facilitate excavation, limit groundwater intrusion, and provide a dry work area during construction. Secant pile walls would be installed using contiguous augur piles (to form a wall to support soil) to a maximum depth of 75 feet bgs. Due to soil loads and the depths of pits, secant pile tieback anchors likely would be used to secure the secant wall.[46] Tieback anchors would extend approximately 16 feet beyond the western project site boundary, approximately 50 to 60 feet beneath the Caltrain tracks. The tiebacks would remain in place after construction is complete. All remaining structures and equipment pads are assumed to be pile-supported. Based on current design estimates, the BDFP would require approximately 1,200 piles overall. (This estimate may change as design progresses.)

Methods for installing piles include drilling shafts (cast-in-drilled-hole piles/auger cast piles) and driving piles (likely pre-stressed concrete pile). Based on current geotechnical and design information, most of the piles would be drilled while piles for large-diameter pipes would be driven. The specific pile-driving equipment used would be identified by the contractor. The depth of the piles would be up to 75 feet bgs, depending on their individual locations.[47] In addition, temporary sheet piles may also be installed in some areas to provide support during construction.

2.6.5.2 Groundwater Dewatering

Most shallow excavations that do not extend below the young bay mud would either be shored with a temporary flexible support system such as sheet piles or soldier pile-and-lagging. Alternatively, the excavation sidewalls could be sloped. In either case, limited active dewatering systems such as use of a sump pump may be required to maintain a dry working space in these shallow excavations.

The excavation for the digesters would extend below the young bay mud and would be supported with a secant pile retaining wall system. This method of support reduces the infiltration of groundwater into the work area, results in less water to be disposed of, and makes it easier to maintain a dry construction site. Other deeper excavations that could extend beneath the young bay mud would be shored with a system such as a flexible wall system supported with tie backs or internal bracing.

45 Secant pile walls are formed by constructing a series of overlapping concrete-filled drill holes surrounding the area to be excavated to avoid the intrusion of groundwater into the excavated pit. Secant piles are excavated by alternately advancing a temporary sectional casing and excavating the soil from inside the casing with drill tools. After a hole has been excavated to the design depth, it is filled with concrete and the casing is removed.

46 Tieback anchors consist of a high-strength steel tendon (bar or strand) grouted into a drilled hole and tensioned against the secant pile wall.

47 The depth of piles (installed either by drilling a shaft or pile driving) would vary based on location. For the purposes of current design, it is assumed that competent soil occurs at approximately 35 feet bgs throughout the entire site and that the piles would need to extend approximately 40 feet into competent soil; consequently, the depth of the piles would be about 75 feet bgs.

Deeper excavations may encounter groundwater under pressure, which could require more extensive dewatering to provide a dry work area and to reduce groundwater within the excavations.[48] The dewatering system in the deeper excavations would be designed to lower the groundwater and maintain relatively dry and firm working surface. The volume of groundwater produced during dewatering is not known. The groundwater would be tested and pre-treated, as required pursuant to City ordinances, prior to discharge into the combined sewer system for treatment at the SEP.

2.6.5.3 Utility Relocation

An existing 36-inch sewer line is within the proposed footprint for the digesters. The BDFP would remove segments of this pipeline, abandon in place pipeline segments outside the footprint of the digesters, and construct a replacement sewer line within the SEP using conventional open trench construction methods. Construction activities associated with the relocation of the 36-inch sewer would occur during the first six months of construction.

2.6.5.4 Soil Removal and Backfill

As noted above, soil would be excavated to different depths for different facilities. Some of the buildings would be at grade and others would be excavated between 25 and 30 feet below grade except for the digesters location, where soil would be excavated to a depth of about 41 feet. If suitable, excavated soils would be reused on-site as backfill. For the purposes of this EIR, it is assumed that some of the excavated soils would be unsuitable for reuse due to geotechnical or environmental considerations and thus would be hauled off-site. An estimated 190,000 cubic yards of soil, including an estimated 45,000 cubic yards of contaminated soil, would be removed and hauled off-site. The contaminated soil would be trucked approximately one mile to the Port of San Francisco transfer facility on Cargo Way (at Pier 94), from which it would be shipped by rail to the ECDC Landfill in Utah. Any soil that is not contaminated would be transported by truck to the Altamont Landfill in Livermore. Any asbestos-containing waste would be disposed of at either the Recology Hay Road Landfill or the Altamont Landfill, as needed. Backfilling would occur during and after foundation and structure installation. Preliminary investigations indicate that because existing on-site soils could be used as backfill, no additional fill material would need to be imported to the site for use as backfill.

Most site excavation would take approximately five months, from August through December 2018, during which time the most intensive truck traffic would occur. As summarized in **Table 2-14**, excavation would involve off-site transport of about 10,600 truck loads of soil from the project site during this period. At the peak of the soil excavation period, up to approximately 60 round trips (total of 120 truck trips) per day attributed to soil excavation would occur.

[48] As discussed in Chapter 4, Section 4.16, Hydrology and Water Quality.

TABLE 2-14
SOIL EXCAVATION VOLUME AND TRUCK LOAD ESTIMATES

	Quantity (cubic yards)	Truck Capacity (cubic yards)	Total Truck Loads[a]
Excavated Soil[b, c]	190,000	18	10,600

NOTES:
[a] The table entitled "Construction Trucks – Daily" in **Appendix TR** displays total number of truck trips for all aspects of construction (e.g., demolition, materials delivery, excavation).
[b] Only includes excavated soil for off-site hauling; some excavated soil would be reused on-site as backfill material.
[c] The proposed disposal site for the contaminated soil (approximately 45,000 cubic yards) is the ECDC Landfill in Utah. Soil would be transported via rail from the Port of San Francisco transfer facility. The remainder of the unsuitable soil would be transported to the Altamont Landfill.

SOURCE: SFPUC, *BDFP Conceptual Engineering Report*, March 2016; SFPUC revised Tables A5 and A6.

2.6.5.5 Tree Removal and Tree Protection Plan

As part of the BDFP construction activities, about 90 trees would be removed. Maps and tables contained in **Appendix BIO** depict trees to be removed, while Figure 2-11 (in Section 2.5) depicts proposed landscaping to be installed as part of the project. Consistent with standards contained in Article 16 of the San Francisco Public Works Code (described in Chapter 4, Section 4.14, Biological Resources), prior to project construction the SFPUC would retain a certified arborist to prepare a Tree Protection Plan where excavation, construction, or street work could occur within the dripline of trees. The Tree Protection Plan, which would be submitted to San Francisco Public Works for informational purposes, would document procedures for protecting trees, including but not limited to identification of tree protection zones, tree protection fencing at the dripline of the tree or as directed by a certified arborist to preclude work in this area including any staging of heavy equipment or materials, and monitoring requirements.

2.6.5.6 Water Use During Construction

During construction, recycled water would be used for dust control on roads and streets consistent with Article 21 of the Public Works Code and with Title 22 California Code of Regulations, Division 4. The SEP recycled water fill station located on Quint Street directly adjacent to the project site provides safe, disinfected recycled water for these uses. Article 21 of the Public Works Code restricts the use of potable water for soil compaction and dust control activities associated with construction and requires that recycled water, well water, or groundwater be used. Title 22 California Code of Regulations, Division 4, allows use of recycled water for dust control on roads and streets; backfill consolidation around non-potable piping; soil compaction; and cleaning of roads, sidewalks, and outdoor work areas. However, pursuant to state regulations, SEP recycled water cannot be used for demolition, pressure washing, or dust control through aerial spraying. In addition, due to high salinity, SFPUC guidelines do not allow SEP recycled water to be used for mixing concrete.

2.6.6 Facilities Construction

The largest construction effort associated with the BDFP would be the construction of the digesters, as described below. The digester foundation and substructure construction would take about two years, from October 2018 through January 2021. The aboveground portion of the digester facilities would take another two years (until January 2023) to complete.

2.6.6.1 Digesters

Once the secant pile wall is in place, a base slab, ring wall, and top slab would be constructed to form the digester foundation. The digesters would then be built within the ring wall. With the silo-shaped digester design, a reinforced concrete cone that serves as the digester floor would be constructed underground. Additional seismic cables would then be installed to provide a connection between the base and the digester walls. The silo digester likely would use a cast-in-place concrete core wall with a dome cover. After digester foundations are in place, the digester excavation could be backfilled to the surface with suitable fill materials.

2.6.6.2 Other Facilities

Most other facility foundations and superstructures would be constructed using standard techniques involving reinforced concrete, steel, and architectural treatments. The final construction stage would include installing equipment within the buildings and connecting electrical systems and mechanical equipment. Many of the proposed facilities (e.g., the THP, Solids Odor Control Facility transformers, chemical tanks, switchgears, and digester gas storage) would be installed on concrete pads and would not be enclosed within buildings.

2.6.7 SFPUC Standard Construction Measures

The SFPUC has adopted[49] standard construction measures to reduce potential environmental effects during construction. The standard construction measures apply to all SFPUC-sponsored projects, including the BDFP, and would be implemented during project construction. Presented in Appendix SCM of this EIR, these standard construction measures include seismic and geotechnical studies, air and water quality measures, traffic and noise control measures, hazardous materials measures, biological resources screening measures for special-status species and/or migratory birds, visual and aesthetic considerations, and cultural resources measures. In some cases (e.g., for cultural resources), SFPUC's standard construction measures would be superseded by mitigation measures developed by the Planning Department for the BDFP.

[49] SFPUC standard construction measures were originally adopted in August, 2006, and were updated most recently as directed by the General Manager in July 2015.

2.7 Intended Uses of this EIR and Required Actions and Approvals

This EIR is intended to provide the information and describe the environmental consequences of the project in accordance with CEQA requirements for public disclosure and to assist public agency decision-makers in considering the approvals necessary for implementing the project. The permits and approvals anticipated to be required from federal, state, and local agencies are listed below. The SFPUC would also obtain any other regulatory approvals as required by law.

2.7.1 Federal Actions and Approvals

The project is not expected to require any federal permits or approvals.

2.7.2 State Actions and Approvals

- State Water Resources Control Board:
  - Construction General Permit and Stormwater Pollution Prevention Plan, if more than one acre of land were disturbed[50]
  - Consideration for Clean Water State Revolving Fund loan and review of environmental review requirements that must be completed to apply for a loan
- State Historic Preservation Officer: Review under Section 106 of the National Historic Preservation Act (as part of the State Revolving Fund loan application process)

2.7.3 Regional and Local Actions and Approvals

- San Francisco Planning Commission: Certification of the BDFP Final EIR
- San Francisco Public Works (SFPW): Approval of Sidewalk Changes (SFDPW Order) and Street Improvement Permit
- San Francisco Department of Public Health: Approval of Site Mitigation Plan
- San Francisco Board of Supervisors: Approval of Sidewalk Legislation (if needed)
- San Francisco Municipal Transportation Agency: Approval of On-Street Parking Legislation (if needed)
- San Francisco Public Utilities Commission:
  - Adoption of CEQA Findings and Mitigation Monitoring and Reporting Program
  - Approval of the BDFP
- Bay Area Air Quality Management District: Authority to Construct and Permit to Operate
- San Francisco Port Commission: Approval of use of Pier 94 and Pier 96 for construction staging

[50] Applicable to areas that do not drain to the City's combined sewer system; therefore, not applicable to the project site but potentially applicable to the Piers 94 and 96 staging areas.

CHAPTER 3
Plans and Policies

3.1 Overview

Pursuant to the California Environmental Quality Act (CEQA) Guidelines Section 15125(d), this chapter describes land use plans and policies that may apply to the Biosolids Digester Facilities Project (BDFP or project) and discusses potential inconsistencies between the project and applicable plans. Policy conflicts do not, in and of themselves, indicate a significant environmental effect within the context of CEQA environmental review, in that the intent of CEQA is to determine physical effects associated with a project. Many of the plans of the City and County of San Francisco (CCSF or City) and the other relevant jurisdictions contain policies that address multiple goals pertaining to various resource areas. To the extent that physical environmental impacts of the project could result from conflicts with one of the goals related to a specific resource topic, such impacts are analyzed in this environmental impact report (EIR) in the respective topical sections in Chapter 4, such as Section 4.5, Cultural Resources; Section 4.6, Transportation and Circulation; Section 4.7, Noise and Vibration; Section 4.8, Air Quality; Section 4.9, Greenhouse Gas Emissions; and Section 4.14, Biological Resources.

Land use plans typically contain numerous policies emphasizing differing legislative goals, and an interpretation of consistency requires a balanced understanding of relevant policies. The board or commission that adopted the plan determines the meaning of such policies and how individual projects satisfy those policies at the time it considers approval of the project. Whether a project is consistent with particular plans will be determined at the time of project approval by the agency charged with making that consistency determination. In the case of this project, the San Francisco Planning Department and Planning Commission will evaluate the project in accordance with the *San Francisco General Plan* (General Plan) including the *Bayview Hunters Point Area Plan*, the Accountable Planning Initiative, the *San Francisco Bicycle Plan*, the *Climate Action Plan*, and the *San Francisco Better Streets Plan*. The San Francisco Public Utilities Commission (SFPUC) will evaluate the project in accordance with relevant SFPUC policies described below. Use of the off-site staging areas at Piers 94 and 96 will be evaluated by the Port of San Francisco for consistency with its *Waterfront Land Use Plan*. In each case, the approving or reviewing agency will consider any potential inconsistencies between the project and adopted plans or policies in the context of applicable objectives and policies and will determine consistency based on a balancing of relevant policies as part of the approval process.

Section 2.7 in Chapter 2, *Project Description*, describes approval requirements for the BDFP. Topical sections in Chapter 4, *Environmental Setting and Impacts*, describe resource-specific plans and policies relevant to the project.

3.2 Plans and Policies Relevant to the BDFP

3.2.1 CCSF Plans and Policies

The project is subject to the *San Francisco General Plan*, as amended; the *Bayview Hunters Point Area Plan*, which is part of the General Plan and provides policies and objectives for the Bayview Hunters Point area of San Francisco; the Accountable Planning Initiative, which establishes priority policies to guide decision-makers in balancing the objectives of the General Plan; the *San Francisco Bicycle Plan*, which includes a citywide transportation plan and specific bicycle improvements; the *Climate Action Plan*, which sets greenhouse gas reduction targets and describes recommended emissions reduction actions; and the *Better Streets Plan*, which creates a unified set of standards, guidelines, and implementation strategies for the City's public streets and rights-of-way.

3.2.1.1 San Francisco General Plan

The General Plan[1] provides general policies and objectives to guide land use decisions. The General Plan contains 10 elements—Commerce and Industry, Recreation and Open Space, Housing, Community Facilities, Urban Design, Environmental Protection, Transportation, Air Quality, Community Safety, and Arts—that set forth goals, policies, and objectives for the physical development of San Francisco.

The project would not be obviously or substantially inconsistent with any General Plan goals, policies, or objectives. There is one relevant objective, and one policy under this objective, that directly applies to the BDFP. Specifically, the project would further Community Facilities Element Objective 10: "Locate wastewater facilities in a manner that will enhance the effective and efficient treatment of storm and wastewater"; and Policy 10.1: "Provide facilities for treatment of storm and wastewater prior to discharge into the Bay or ocean. Locate such facilities according to the Wastewater and Solid Waste Facilities Plan." The Wastewater and Solid Waste Facilities Plan (Map 5 of the Community Facilities Element) identifies the general boundaries of the Southeast Water Pollution Control Plant (Southeast Plant or SEP).

The consistency of the project with General Plan goals, policies, and objectives will be considered by decision-makers as part of their assessment of whether to approve or disapprove the project. Any potential inconsistencies identified as part of this process would not alter the physical environmental effects of the project.

[1] City and County of San Francisco, *San Francisco General Plan*, 1996. Available online at http://generalplan.sfplanning.org/. Accessed March 29, 2017.

3.2.1.2 Bayview Hunters Point Area Plan

The *Bayview Hunters Point Area Plan*,[2] an area plan within the General Plan, is the CCSF's plan for the Bayview Hunters Point area of San Francisco. The *Bayview Hunters Point Area Plan* includes objectives and policies pertaining to the area covered by the plan. These objectives and policies address land use, transportation, housing, commerce, industry, urban design, recreation and open space, community facilities and services, public safety, and energy. The plan area encompasses the southeastern portion of San Francisco and is bounded roughly by Cesar Chavez Street to the north, Bayshore Boulevard/U.S. Highway 101 to the west, and San Francisco Bay to the northeast, east, and south. The project site is in the northwest part of the plan area, within the Northern Gateway activity node identified by the plan. The potential staging area at the Southeast Greenhouses is within the Town Center activity node identified by the plan. The plan assigns the Public Facilities and Light Industrial land use designations to the project site. The plan designates the Southeast Greenhouses staging area as Light Industrial. The Piers 94 and 96 staging areas are designated as Maritime Industrial and identified as Port land in the plan. The plan also identifies this area as a "required soil testing zone" for hazardous materials. Regarding land use planning for Piers 94 and 96, refer also to the *Waterfront Land Use Plan* discussed below.

The project would not be obviously or substantially inconsistent with any *Bayview Hunters Point Area Plan* objectives or policies. The relevant objectives and policies address issues such as improving the relationship between industry and housing, managing traffic, preserving residential neighborhoods, and implementing energy conservation programs.

3.2.1.3 Accountable Planning Initiative

In November 1986, the voters of San Francisco approved Proposition M, the Accountable Planning Initiative, which added Section 101.1 to the Planning Code[3] to establish the following eight priority policies:

1. Preservation and enhancement of neighborhood-serving retail uses
2. Protection of neighborhood character (see Section 4.2, Land Use; Section 4.3, Aesthetics; and Section 4.5, Cultural Resources)
3. Preservation and enhancement of affordable housing
4. Prevention of commuter automobiles from impeding Muni transit service or overburdening streets or neighborhood parking (see Section 4.6, Transportation and Circulation)
5. Protection of industrial and service land uses from commercial office development and enhancement of resident employment and business ownership

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[2] San Francisco Planning Department, *Bayview Hunters Point Area Plan*, amended on June 3, 2010. Available online at http://www.sf-planning.org/ftp/General_Plan/Bayview_Hunters_Point.htm. Accessed on August 12, 2015.

[3] City and County of San Francisco, San Francisco Planning Code, Section 101.1, 2015. Available online at http://library.amlegal.com/nxt/gateway.dll/California/planning/planningcode?f=templates$fn=default.htm$3.0$vid=amlegal:sanfrancisco_ca$anc=JD_Planning. Accessed on October 29, 2015.

6. Maximization of earthquake preparedness (see Section 4.15, Geology, Soils, and Paleontological Resources)

7. Landmark and historic building preservation (see Section 4.5, Cultural Resources)

8. Protection of parks and open space and their access to sunlight and vistas (see Section 4.3, Aesthetics; Section 4.10, Wind and Shadow; and Section 4.11, Recreation)

Prior to issuing a permit for any project that requires an Initial Study under CEQA, or issuing a permit for any demolition, conversion, or change of use, and prior to taking any action that requires a finding of consistency with the General Plan, the CCSF is required to find that the project would be consistent with these priority policies.

The project would not be obviously or substantially inconsistent with the priority policies, with the potential exception of Policy 7 regarding landmark and historic building preservation. Section 4.5, Cultural Resources, identifies the project's impact on historical resources as significant and unavoidable, and identifies a mitigation measure to reduce the severity of the impact; see Section 4.5 for further discussion.

3.2.1.4 San Francisco Bicycle Plan

In August 2009, the Board of Supervisors approved the *San Francisco Bicycle Plan*[4] (Bicycle Plan), which includes a citywide bicycle transportation plan (comprising a Policy Framework and a Network Improvement document). The Bicycle Plan contains objectives and identifies policy changes to enhance bicycle access and safety with respect to San Francisco's "bike-ability." It also describes the existing bicycle route network (a series of interconnected streets in which bicycling is encouraged)[5] and identifies gaps within the citywide bicycle route network that require improvement. The 2009 Bicycle Plan updates the 1997 Bicycle Plan. The final EIR analyzing the Bicycle Plan assessed 56 short-term and long-term bicycle improvement projects.

In the vicinity of the project site and the off-site staging areas, the Bicycle Plan identifies Evans Avenue, Phelps Street, and Oakdale Avenue as being part of the existing bicycle route network, and recommends near-term bicycle improvement projects (bicycle lanes) on Cargo Way, long-term bicycle improvement projects on Jennings Street, and minor improvements as necessary to the bicycle route network on Third Street.

The project would not result in a significant impact on bicycle travel during construction or operation, as discussed in Section 4.6, Transportation and Circulation. As a result, the project would not be expected to impede implementation of the Bicycle Plan.

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[4] San Francisco Municipal Transportation Agency, *San Francisco Bicycle Plan*, June 26, 2009. Available online at https://www.sfmta.com/projects-planning/projects/2009-san-francisco-bicycle-plan.

[5] In describing the bicycle route network, the Bicycle Plan (page 1-1) states as follows: "The facilities along the bicycle route network should include conventional treatments depending on the design of the bicycle improvements and conditions such as…off-street bicycle and mixed-use paths…bicycle lanes…on-street signed bicycle routes…shared roadway bicycle markings (sharrows)…[and]..traffic-calmed streets."

3.2.1.5 Climate Action Plan

In February 2002, the San Francisco Board of Supervisors passed the Greenhouse Gas Emissions Reduction Resolution (Number 158-02) committing the CCSF to a greenhouse gas (GHG) emissions reductions goal of 20 percent below 1990 levels by the year 2012. The resolution also directed the San Francisco Department of the Environment, the SFPUC, and other appropriate City agencies to complete and coordinate an analysis and planning of a local action plan targeting GHG emission reduction activities. In September 2004, the Department of the Environment and the SFPUC published the *Climate Action Plan for San Francisco: Local Actions to Reduce Greenhouse Gas Emissions (Climate Action Plan)*[6] The *Climate Action Plan* examines the causes of global climate change and human activities that contribute to global warming and provides projections of climate change impacts on California and San Francisco from recent scientific reports; presents estimates of San Francisco's baseline GHG emissions inventory and reduction targets; describes recommended emissions reduction actions in the key target sectors—transportation, energy efficiency, renewable energy, and solid waste management—to meet stated goals by 2012; and presents next steps required over the near term to implement the plan. Although the Board of Supervisors has not formally committed the City to perform the actions addressed in the *Climate Action Plan*, and many of the actions require further development and commitment of resources, the plan serves as a blueprint for GHG emission reductions, and several actions are now in progress. The *Climate Action Plan* cites an array of potential environmental impacts on San Francisco from climate change, including rising sea levels that could threaten coastal wetlands, infrastructure, and property; increased storm activity that could increase beach erosion and cliff undercutting; warmer temperatures that could result in more frequent El Niño storms causing more rain than snow in the Sierra, reducing snow pack that is an important source of the region's water supply; decreased summer runoff and warming ocean temperatures that could affect salinity, water circulation, and nutrients in the Bay, potentially altering Bay ecosystems; other possible effects on food supply and the viability of the state's agricultural system; possible public health effects related to degraded air quality and changes in disease vectors; and other social and economic impacts.

The plan presents estimates of San Francisco's baseline GHG emissions inventory and reduction targets. It indicates that burning fossil fuels in vehicles and for energy use in buildings and facilities are the major contributors to San Francisco's GHG emissions. The plan includes GHG reduction strategies such as targeting emission reductions from fossil fuel use in cars, power plants, and commercial buildings; developing renewable energy technologies; and expanding residential and commercial recycling programs. The plan recognizes that achieving these goals will require the cooperation of a number of different City agencies. Chapter 4, Section 4.9, Greenhouse Gas Emissions, presents an analysis of potential project effects on global warming and GHG emissions.

[6] San Francisco Department of the Environment/San Francisco Public Utilities Commission. 2004. *Climate Action Plan for San Francisco: Local Actions to Reduce Greenhouse Gas Emissions*. September 2004. Available online at: http://www.sfenvironment.org/sites/default/files/fliers/files/climateactionplan.pdf.

3.2.1.6 Better Streets Plan

The *San Francisco Better Streets Plan* (*Better Streets Plan*)[7] was adopted in 2010 to support the City's efforts to enhance the streetscape and the pedestrian environment. Consisting of two major components, the Streetscape Master Plan and the Pedestrian Transportation Master Plan, the *Better Streets Plan* classifies the City's public streets and rights-of-way and creates a unified set of standards, guidelines, and implementation strategies, which govern how the City designs, builds, and maintains its public streets and rights-of-way. Major concepts applicable to the BDFP include (1) pedestrian safety and accessibility features, such as enhanced pedestrian crossings, corner or midblock curb extensions, pedestrian countdown and priority signals, and other traffic calming measures; (2) universal pedestrian-oriented streetscape design with incorporation of street trees, sidewalk plantings, streetscape furnishing, street lighting, efficient utility location for unobstructed sidewalks, shared single surface for small streets/alleys, and sidewalk/median pocket parks; and (3) integrated pedestrian/transit functions using bus bulb-outs and boarding islands (bus stops located in medians within the street). (Please see Section 2.4.2 in Chapter 2, *Project Description*, for a description of long-term improvements to Jerrold Avenue that would occur in accordance with the *Better Streets Plan* and Section 4.6, Transportation and Circulation, for an analysis of the project's impacts on pedestrian circulation.)

3.2.2 SFPUC Plans and Policies

The SFPUC's 2011 *Strategic Sustainability Plan*[8] provides a framework for planning, managing, and evaluating SFPUC-wide performance, taking into account the long-term economic, environmental, and social impacts of the SFPUC's business activities. This plan consists of a "Durable Section" that contains goals, objectives, and performance indicators to implement the SFPUC's vision and values. The goals and objectives are then used to drive the Sustainability Plan's "Dynamic Section," which contains specific actions, targets, measures, and budgeting. The SFPUC uses this document to evaluate its performance semiannually, to provide an annual score card, and to help the SFPUC measure progress on an annual basis. The plan contains objectives to "optimize planning to meet water, wastewater, and power demand" and "improve capital facilities through construction," with actions to "complete planning for the Sewer System Improvement Program (SSIP)" and "prioritize sewer replacement (SSIP) and begin the increase of sewer replacement."

3.2.3 Other Plans

The proposed off-site staging areas at Piers 94 and 96 are owned by the Port of San Francisco (Port) and addressed in whole or in part in the Port's *Waterfront Land Use Plan*, the San Francisco Bay Conservation and Development Commission's (BCDC) *San Francisco Bay Plan*, the BCDC/ Metropolitan Transportation Commission (MTC) *San Francisco Bay Area Seaport Plan*, and the BCDC *San Francisco Waterfront Special Area Plan*.

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[7] City and County of San Francisco, *San Francisco Better Streets Plan*, adopted on December 7, 2010. Available online at http://www.sf-planning.org/ftp/BetterStreets/proposals.htm#Final_Plan.

[8] SFPUC, *Strategic Sustainability Plan*, March 2011. Available online at http://www.sfwater.org/modules/showdocument.aspx?documentid=987.

3.2.3.1 Waterfront Land Use Plan

The Port's *Waterfront Land Use Plan*,[9] initially adopted by the Port Commission in 1997, defines acceptable uses and policies, and provides land use information applicable to properties under the Commission's jurisdiction. The plan contains goals and general land use policies, along with objectives and development standards for defined subareas of the port.

The *Waterfront Land Use Plan* designates part of the proposed staging areas (Pier 94 Backlands) as a "Waterfront Mixed Use Opportunity Area" and identifies portions of the areas as either "Existing Maritime Areas" or "Maritime Expansion Areas." The proposed use of these areas for construction staging would be an interim use that would not be inconsistent with *Waterfront Land Use Plan* policies. The plan contains policies encouraging interim uses as a means of generating revenues and reserving maritime properties that are not currently in demand. In its "General Policies for Areas South of China Basin Channel," where the proposed staging areas are located, the plan allows interim uses generally for periods of one to ten years and requires compliance with all existing environmental regulations (e.g., restrictions on noise, emissions, and transportation congestion).

3.2.3.2 San Francisco Bay Plan

BCDC's *San Francisco Bay Plan*[10] generally applies to San Francisco Bay and a 100-foot-wide band of shoreline along the Bay. The Bay Plan contains policies that address fish, other aquatic organisms, and wildlife; water quality; water surface area and volume; tidal marshes and tidal flats; smog and weather; shell deposits; fresh water inflow; subtidal areas; climate change; safety of fills; shoreline protection; dredging; water-related industry; ports; airports; transportation; commercial fishing; recreation; public access; appearance, design, and scenic views; salt ponds; managed wetlands; other uses of the Bay and shoreline; fills in accord with the Bay Plan; mitigation; public trust; and navigational safety and oil spill prevention. The proposed staging areas are not within the BCDC's 100-foot-wide shoreline band. The Bay Plan designates portions of the Piers 94 and 96 staging areas for "port priority" use. The Bay Plan contains a policy stating that, on land reserved for port use, "other uses may be allowed in the interim that, by their cost and duration, would not preempt future use of the site for water-related industry or port use." The proposed interim uses of the Piers 94 and 96 staging areas staging would not be obviously or substantially inconsistent with the Bay Plan.

3.2.3.3 San Francisco Bay Area Seaport Plan

The *San Francisco Bay Area Seaport Plan*[11] is the product of a cooperative planning effort of MTC and BCDC. The Seaport Plan constitutes the maritime element of MTC's *Regional Transportation Plan* and is incorporated into BCDC's *San Francisco Bay Plan*, where it is the basis of the Bay Plan port policies. MTC uses the Seaport Plan to assist in making project funding decisions and managing the

[9] Port of San Francisco, *Waterfront Land Use Plan*, 1997, revised version October 2009. Available online at http://www.sfport.com/index.aspx?page=199.

[10] BCDC, *San Francisco Bay Plan*, 1969 (with periodic amendments). Available online at http://bcdc.ca.gov/pdf/bayplan/bayplan.pdf.

[11] BCDC/MTC, *San Francisco Bay Area Seaport Plan*, April 18, 1996 as amended through January 2012. Available online at http://www.bcdc.ca.gov/seaport/seaport.pdf.

metropolitan transportation system, and BCDC uses the Seaport Plan to help guide its regulatory decisions on permit applications, consistency determinations, and related matters.

The Seaport Plan designates a portion of the proposed construction staging areas at Piers 94 and 96 as a "port priority use area." For port priority use areas, the Seaport Plan contains a policy stating the following:

> Interim uses should be of a nature that allow [*sic*] the site to be converted to port use when it is needed for marine terminal development or other port priority use. The length of the interim use period should be determined on a case-by-case basis for each site and proposed use. Factors to be considered in determining the length of the interim use should include, but are not limited to: (1) the amortization period of investments associated with the proposed use; (2) the lead time necessary to convert the site to the designated marine terminal or port use; and (3) the need for the site as measured by the Bay Area volume of the cargo type specified to be handled at that site and the available capacity at other ports in the Bay Area to accept the specified cargo.

An additional policy states that "no Bay fill should be authorized for interim uses that are not water-oriented."

3.2.3.4 San Francisco Waterfront Special Area Plan

BCDC's *San Francisco Waterfront Special Area Plan*[12] (April 1975, as amended through April 2012) applies the requirements of the McAteer-Petris Act and the provisions of the *San Francisco Bay Plan* to the San Francisco waterfront in greater detail. The *San Francisco Waterfront Special Area Plan* designates a portion of the proposed construction staging areas (Pier 94 staging area east of Amador Street and Pier 96) as a "port priority area." In this area, the plan permits maritime and public access uses on new or replacement fill, and states that "development permitted in this area should be consistent with the provisions of the Seaport Plan."

3.2.4 Regional Plans and Policies

Plan Bay Area,[13] which includes the region's Sustainable Communities Strategy, is a collaboration led by the Association of Bay Area Governments (ABAG) and MTC, in partnership with the Bay Area Air Quality Management District (BAAQMD) and BCDC. *Plan Bay Area*, adopted by ABAG and MTC in July 2013, is the region's first integrated land use and transportation plan, combining elements of ABAG's former Projections series of housing and employment growth forecasts and MTC's former stand-alone *Regional Transportation Plan*. The plan calls for concentrating housing and job growth around transit corridors, particularly within areas identified by local jurisdictions as Priority Development Areas. *Plan Bay Area* also specifies strategies and investments to maintain, manage, and improve the region's multi-modal transportation network, and proposes transportation projects and

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[12] BCDC, *San Francisco Waterfront Special Area Plan,* April 1975, as amended through April 2012. Available online at http://www.bcdc.ca.gov/sfwsap/SFWSAP_Final_2012.pdf.

[13] ABAG/MTC, *Plan Bay Area: Regional Transportation Plan and Sustainable Communities Strategy for the San Francisco Bay Area, 2013-2040*, adopted July 18, 2013. Available online at http://files.mtc.ca.gov/pdf/Plan_Bay_Area_FINAL/Plan_Bay_Area.pdf.

programs to be implemented with reasonably anticipated revenue. The plan will be updated every four years. The project site and potential staging areas, like much of eastern San Francisco, are within a Priority Development Area, where growth is anticipated and planned for near transit.

Other regional plans pertinent to the project include:

- BAAQMD's 2010 *Clean Air Plan*[14] (2010 CAP) demonstrates how the San Francisco Bay Area will reduce emissions and decrease concentrations of harmful air pollutants, achieve compliance with the state ozone standards, and reduce the transport of ozone and ozone precursors to neighboring air basins. Refer to Section 4.8, Air Quality, for further discussion of the 2010 CAP.

- The San Francisco Regional Water Quality Control Board (RWQCB) *Water Quality Control Plan for the San Francisco Bay Basin*[15] (commonly referred to as the Basin Plan) guides water quality control planning in the San Francisco Bay Basin. The Basin Plan designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. It also includes implementation programs to achieve water quality objectives. Refer to Section 4.16, Hydrology and Water Quality, for further discussion of the Basin Plan.

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14 BAAQMD, Clean Air Plan, 2010. Available online at http://www.baaqmd.gov/plans-and-climate/air-quality-plans/current-plans. As described in Section 4.8, Air Quality, the 2010 CAP is being updated.

15 RWQCB, *Water Quality Control Plan for the San Francisco Bay Basin*, approved March 20, 2015.Available online at http://www.waterboards.ca.gov/sanfranciscobay/basin_planning.shtml.

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CHAPTER 4
Environmental Setting and Impacts

4.1 Overview

This chapter provides an analysis of the physical environmental effects of implementing the Biosolids Digester Facilities Project (BDFP or project) as described in Chapter 2, *Project Description*. This chapter describes the environmental setting, assesses impacts, and identifies mitigation measures for significant impacts.

4.1.1 Scope of Analysis

This chapter is organized by environmental resource topics, as follows:

Chapter 4 Sections	
4.1 Overview	4.11 Recreation
4.2 Land Use	4.12 Utilities and Service Systems
4.3 Aesthetics	4.13 Public Services
4.4 Population and Housing	4.14 Biological Resources
4.5 Cultural Resources	4.15 Geology, Soils, and Paleontological Resources
4.6 Transportation and Circulation	4.16 Hydrology and Water Quality
4.7 Noise	4.17 Hazards and Hazardous Materials
4.8 Air Quality	4.18 Mineral Resources, Energy Resources, and Water Use
4.9 Greenhouse Gas Emissions	4.19 Agriculture and Forest Resources
4.10 Wind and Shadow	

Each section of Chapter 4 contains the following elements, based on the requirements of the California Environmental Quality Act (CEQA):

- **Setting.** This subsection describes the existing physical environmental conditions in the project area with respect to each resource topic, at an appropriate level of detail to allow the reader to understand the impact analysis.

- **Regulatory Framework.** This subsection describes the relevant laws and regulations that apply to protecting the environmental resources within the project area, and the governmental agencies responsible for enforcing those laws and regulations.

- **Impacts.** This subsection evaluates the potential for the project to result in adverse effects on the physical environment described in the setting. Each impact analysis section defines significance criteria for evaluating environmental impacts, and the Approach to Analysis explains how the significance criteria are applied in evaluating the project impacts. The conclusion of each impact analysis is expressed in terms of the impact significance under CEQA, which is discussed further in Section 4.1.2 below. For longer impact discussions (in general, those exceeding two pages), a summary paragraph of the impact conclusion is presented.

- **Mitigation Measures.** Each impact subsection identifies mitigation measures for all of the impacts considered significant, consistent with CEQA Guidelines Section 15126.4, which states that an environmental impact report (EIR) "shall describe feasible measures which could minimize significant adverse impacts…" In this EIR, mitigation measures are identified (where feasible) for all of the significant impacts and residual effects after mitigation are noted. If additional impacts could result from implementation of a mitigation measure, those impacts are identified, consistent with CEQA Guidelines Section 15126.4.[1]

- **Cumulative Impacts.** As described below in Section 4.1.3, each section discusses cumulative impacts, if applicable, immediately following the description of the project-specific impacts and identified mitigation measures. The cumulative impacts consider the impacts of the BDFP in combination with the impacts of other past, present, and probable future projects in the vicinity of the BDFP.

4.1.2 Significance Determinations

The significance criteria used in this EIR are based on guidance from the Environmental Planning (EP) Division of the San Francisco Planning Department regarding the thresholds of significance used to assess the severity of the environmental impacts of the project. EP guidance is based on CEQA Guidelines Appendix G, with some modifications. Each section of Chapter 4 presents, before the discussion of impacts, the significance criteria used to analyze each resource topic. The categories used to designate impact significance are as follows:

- **No Impact (NI).** An impact issue is considered not applicable (no impact) if there is no potential for impacts or the environmental resource does not occur within the project area or the area of potential effect. For example, there would be no impacts related to grading if there is no grading proposed at a particular project site.

- **Less than Significant (LS).** This determination applies if there is a potential for some limited impact but not a substantial, adverse effect that qualifies under the significance criteria as a significant impact. No mitigation is required for impacts determined to be less than significant.

- **Less than Significant with Mitigation (LSM).** This determination applies if there is a potential for the project to result in an adverse effect that would or could meet or exceed the significance criteria, but feasible mitigation is available that would reduce the impact to a less-than-significant level. An impact described as "potentially" significant indicates there is a potential for this impact to occur, but there is not enough project information or site-specific information

1 CEQA Guidelines Section 15126.4 states that "if a mitigation measure would cause one or more significant effects in addition to those that would be caused by the project as proposed, the effects of the mitigation measure shall be discussed but in less detail than the significant effects of the project as proposed."

to determine definitively whether or not it qualifies under the significance criteria as significant. Impacts identified as "potentially significant" are treated the same as significant impacts in this EIR.

- **Significant and Unavoidable (SU).** This determination applies if the project would result in an adverse effect that would or could meet or exceed the significance criteria and for which there is no feasible mitigation available.

- **Significant and Unavoidable with Mitigation (SUM).** This determination applies if the project would result in an adverse effect that would or could meet or exceed the significance criteria and there is feasible mitigation available to lessen the severity of the impact, but either the residual effect after implementation of the measure would remain significant or there is some uncertainty as to the effectiveness of the mitigation measure.

4.1.3 Approach to Cumulative Impact Analysis and Cumulative Projects

4.1.3.1 CEQA Provisions Regarding Cumulative Impacts

Cumulative impacts, as defined in Section 15355 of the CEQA Guidelines, refer to two or more individual effects that, when taken together, are "considerable" or that compound or increase other environmental impacts. A cumulative impact from several projects is the change in the environment that would result from the incremental impact of each project when added to those of other closely related past, present, or probable future projects. Section 15130 of the CEQA Guidelines provides the following pertinent guidance for cumulative impact analysis:

- An EIR shall discuss cumulative impacts of a project when the project's incremental effect is "cumulatively considerable" (i.e., the incremental effects of an individual project are considerable when viewed in connection with the effects of past, current, and probable future projects, including those outside the control of the agency, if necessary).

- An EIR should not discuss impacts that do not result in part from the project evaluated in the EIR.

- A project's contribution is less than cumulatively considerable, and thus not significant, if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact.

- The discussion of impact severity and likelihood of occurrence need not be as detailed as for effects attributable to the project alone.

- The focus of analysis should be on the cumulative impact to which the identified other projects contribute, rather than on attributes of the other projects that do not contribute to the cumulative impact.

CEQA Guidelines Section 15130(b)(1) provides two approaches to a cumulative impact analysis. The analysis can be based (a) on a list of past, present, and probable future projects producing related or cumulative impacts; or (b) a summary of projections contained in a general plan or related planning document.

4.1.3.2 Approach to Cumulative Impact Analysis in this EIR

The cumulative impact analysis considers the effects of the project together with those of other past, present, or probable future projects proposed by the San Francisco Public Utilities Commission (SFPUC) or others. In Sections 4.2 through 4.19 of this chapter, the cumulative impact analysis for each resource topic follows the analysis of the project-specific impacts. Each analysis of cumulative impacts is based on the same setting, regulatory framework, and significance criteria as the project-specific analysis. Additional mitigation measures are identified if the cumulative analysis determines that a significant cumulative impact could occur and the project's contribution to a significant cumulative impact would be considerable, even with project-level mitigation. As permitted in CEQA Guidelines Section 15130(b)(1), the analysis in this EIR employs the list-based approach for defining projects to be considered in the cumulative impact analysis — that is, the analysis is based on a list of past, present, and probable future projects that could result in related or cumulative impacts. A probable future project is defined as one that is "reasonably foreseeable," which is generally a project for which an application has been filed with the approving agency or that has approved funding. Some other projects, such as Demolition of the Existing SEP Digesters and Southside Renovation Project, are also considered reasonably foreseeable because it is reasonable to expect that they would be implemented, even if an application has not been filed and there is no approved funding at this time. The probable future projects are subject to independent environmental review and consideration by approving agencies. Consequently, it is possible that some of the projects will not be approved or will be modified prior to approval (e.g., as a result of the CEQA process).

Projects that are relevant to the cumulative analyses include those that could contribute incremental effects on the same environmental resources and would have similar environmental impacts as those identified for the BDFP in this EIR. The following factors were used to determine an appropriate list of relevant projects to be considered in the cumulative analyses:

- **Similar Environmental Impacts.** A relevant project contributes to effects on the same environmental resources that are also affected by the BDFP and would have similar or related environmental impacts as those discussed in this EIR (Sections 4.2 through 4.19 in this chapter).
- **Geographic Scope and Location.** A relevant project is located within the defined geographic scope for the cumulative effect. The geographic scope of cumulative projects depends on the resource topic affected and is identified within each section. The geographic scope generally coincides with the physical environment described in the setting and could include the areas adjacent to the proposed construction activities that are within and adjacent to the project site. For some resource topics, however, the geographic scope can extend farther, such as for the discussion of traffic in which the regional roadway network is relevant, or the evaluation of air quality effects in which the regional air basin is the appropriate geographic scope for the analysis.
- **Timing and Duration of Implementation.** The schedule of activities for a relevant project would need to coincide in timing with the effects of the BDFP to result in cumulative impacts. For temporal impacts such as noise and traffic, the cumulative analyses consider the short-term cumulative effects of those projects with overlapping construction schedules as well as the long-term cumulative effects of those projects that would be in operation concurrently with the BDFP and would affect the same environmental resources and sensitive receptors.

The cumulative analyses presented in Sections 4.2 through 4.19 first consider whether there is an impact of the project that could result in adverse physical effects on the environment. If so, the cumulative analysis considers whether any of the relevant projects would result in related impacts or affect the same environmental resources as the BDFP, resulting in a cumulative impact. If the cumulative impact is considered significant based on the identified significance criteria, the analysis considers whether the project's contribution would be cumulatively considerable (significant) or not cumulatively considerable (less than significant). If the project's contribution would be cumulatively considerable, mitigation measures are identified to reduce the project's contribution to a less-than-cumulatively-considerable level (less than significant with mitigation). If there is no feasible mitigation to reduce the project's contribution to a less-than-significant level, the project's contribution to the cumulative impact is considered significant and unavoidable.

Table 4.1-1 describes the past, present, and probable future projects that are considered in the cumulative analyses (based on the factors described above), and their locations are shown on **Figure 4.1-1**. The list includes projects that have overlapping construction schedules with the BDFP (or would be completed prior to or following project construction) and that would be constructed in the general vicinity of the project, with the potential to result in cumulative impacts during construction. The list also includes projects that would be in operation concurrently with the BDFP and that would have similar environmental impacts to the BDFP operations, with the potential to result in cumulative operational impacts.

As discussed in Chapter 2, *Project Description*, Section 2.6.7, the SFPUC has adopted standard construction measures to reduce potential environmental effects during construction. Because the standard construction measures apply to all SFPUC projects, the analysis of cumulative projects assumes that like the BDFP, all SFPUC-sponsored projects would implement the standard construction measures.

TABLE 4.1-1
PROJECTS CONSIDERED IN CUMULATIVE IMPACT ANALYSIS

Project No. on Map	Project Name (Project Sponsor or Jurisdiction)	Project Description[a]	Construction Dates
1	Southeast Plant Headworks Replacement Project (SFPUC)	This project would construct a new 250 million gallon per day (mgd), all-weather headworks facility to provide better screening and grit removal at the Southeast Water Pollution Control Plant (Southeast Plant or SEP). This project would replace two existing headworks facilities, modify the Bruce Flynn Pump Station (BFS), and construct a new odor control facility. It would provide redundant infrastructure to provide reliability and ensure operational reliability. It would also improve the seismic reliability of the headworks facility and improve odor control. The new headworks facility would include an odor control facility, an influent junction structure, a bar screen facility, grit tanks, a primary influent distribution structure, a process/operations control room, and an electrical control room. The project would modify and eventually demolish the influent control structure (ICS)/Southeast Lift Station. The two existing headworks buildings (SEP 011 and SEP 012) would also be demolished. The BFS would be converted to all-weather operations. Phase 1 of the BFS upgrades consists of first constructing a new junction structure on Rankin Street, just south of Davidson Avenue. A new sewer line would extend from the junction structure to the BFS and would run along Davidson Avenue. Construction of this sewer would require the closure of the southern half of Davidson Avenue between Rankin Street and the BFS. A second phase of BFS upgrades includes constructing a junction structure on Rankin Street, just north of Evans Avenue. A new sewer line would be constructed along Rankin Street between the two new junction structures. Both new sewers would be installed using open cut excavation, and the sewers would be supported on piles 50 to 75 feet deep. An existing sewer line crossing the intersection of Rankin Street and Evans Avenue would be abandoned and replaced. Construction of this new line would require the closure of the sidewalk, one parking lane, and two travel lanes on the northern half of Evans Avenue, beginning from the western edge of the Evans Avenue and Rankin Street intersection and continuing east approximately 60 feet. This change would leave two travel lanes available after repurposing of the south parking lane and restriping. A new sewer line would be constructed within the existing sewer line between the Southeast Lift Station and the new junction structure at the intersection of Rankin Street and Evans Avenue. Shallower local sewers would be rerouted to accommodate the new sewer flow. During construction of these modifications, one travel lane in each direction would remain open on Evans Avenue and at least one travel lane (with flaggers) would remain open on Davidson Street at all times. Pedestrians would have access through Evans Avenue between Phelps and Rankin Streets at all times. The project components would be constructed in several phases to allow the SEP preliminary treatment facilities to continue operating. The BFS upgrades and modifications would occur first; these modifications would allow the pump station to receive and reliably pump all-weather flow currently handled by the Southeast Lift Station. Site preparation would occur concurrently with the BFS upgrades and would include constructing a temporary 78-inch pipe to reroute wet-weather flow during construction. The headworks project would also use a staging area on the SEP property along Phelps Street by the existing liquid processing facilities. Off-site staging would take place in the parking lane and one travel lane on the south side of Evans Avenue between Rankin and Quint Streets, in the lot adjacent to BFS, and at Piers 94 and 96. Lane closures are anticipated along Evans Avenue for the duration of the project. Two travel lanes (one in each direction) would be maintained throughout the construction period to accommodate through traffic. The sidewalk adjacent to the SEP between Quint and Rankin Streets would also be closed during construction. Trees would be removed in the project area as well as along Phelps Street to accommodate temporary construction trailers.	January 2017 to December 2021

TABLE 4.1-1 (Continued)
PROJECTS CONSIDERED IN CUMULATIVE IMPACT ANALYSIS

Project No. on Map	Project Name (Project Sponsor or Jurisdiction)	Project Description[a]	Construction Dates
2	SEP Chemical System Relocation and Facilities Upgrade (SFPUC)	This project constructed a new sodium hypochlorite chemical feed station adjacent to Building SEP 042 (Primary Sedimentation) to replace the existing feed station at Building 511. Structural and mechanical repairs as well as upgrades to the odor control systems were also be made in various buildings. In addition, the SFPUC installed a new 200-kilowatt (kW) emergency generator.	March 2014 through June 2016
3	SEP Existing Digester Roof Repairs (SFPUC)[b]	This project repaired/replaced the roofs on five existing digesters and associated appurtenances to maintain sufficient capacity and reliability to produce Class B biosolids until new facilities constructed under the Biosolids Digester Facilities Project (BDFP) are online. Repairs to two existing digester covers and replacement of three covers with new floating covers have been completed.	April 2013 through December 2015
4	SEP Existing Digester Gas Handling Improvements (SFPUC)	This project involves construction of improvements to digester gas handling facilities in various buildings to maintain sufficient capacity and reliably produce Class B biosolids until new facilities constructed under the BDFP are online. The project would improve the digester gas control system. The project could use the 2 Rankin Street property (across the street from the existing BFS) for staging.	May 2016 through March 2018
5	SEP Building 521 Replacement/ 522 Disinfection Upgrade (SFPUC)	The project would consist of moving the functions of Building 521 to a new building (Building 522) to house electrical equipment for power distribution and process control of motors associated with secondary and primary effluent in the vicinity of the chlorination control station. Changes to Building 521 would include interior modifications to accommodate other uses. The project would also include internal modifications of the chlorine contact channel (SEP 530), which is located underground along Evans Avenue and Phelps Street. New No. 3 water pumps (not enclosed) would be constructed adjacent to the new building. A portion of an existing wall that is within the SEP along Evans Avenue would be removed and a new access gate along Evans Avenue (approximately 200 feet west of the Evans Avenue and Phelps Street) would be installed to accommodate construction traffic; the gate would be converted to a permanent gate in the future. In addition, 2 Rankin Street would be used for off-site staging (for material storage, worker trailers, and worker parking). Several trees would be removed to address damage to the existing chlorine contact channels. Off-site staging would require installing fencing around the property, putting up power poles, and installing utilities. A shuttle bus service traveling between the work sites and the Rankin Street property may be necessary to transport workers.	April 2016 through July 2018
6	SEP Power Feed and Primary Switchgear Upgrades (SFPUC)	The project would upgrade the existing SEP electrical infrastructure from 9 to 12 megavolt amperes (MVA) to provide redundancy for SEP facilities when cogeneration facilities are not operational or during maintenance of SEP equipment Anticipated improvements include constructing a two-story structure to house the new primary switch gear station, and integrating nearby pump stations into the SEP power system. The project also includes replacement/upgrading of the existing unit substations and installation of an Energy Monitoring and Management System.	November 2017 through January 2020

TABLE 4.1-1 (Continued)
PROJECTS CONSIDERED IN CUMULATIVE IMPACT ANALYSIS

Project No. on Map	Project Name (Project Sponsor or Jurisdiction)	Project Description[a]	Construction Dates
7	SEP Primary/Secondary Clarifier Upgrades (SFPUC)	This project would replace and retrofit mechanical, structural, and electrical components related to the primary and secondary clarifiers. Specifically, it would construct a ventilation system to exhaust and dilute the head space in seven primary clarifier tanks at SEP 042. The ventilation system includes the installation of two 27,000 cubic foot per minute dilution fans, ducts, dampers, and fabric-type covers. Concrete crack repair, coating, replacement of the flight system supports, air compressor system, motor control centers, and associated electrical work are included at SEP 042. Work at SEP 230 includes the replacement of secondary clarifier mechanisms and concrete repairs and coating for 8 of the 16 secondary clarifiers. Associated secondary clarifier electrical upgrades would be completed at SEP 260. No. 3 water system improvements at SEP 230 would include the replacement of piping and the installation of water monitors for odor control and wash down purposes.	Construction March 2016 through October 2017, final completion March 2018
8	SEP Seismic Reliability and Condition Assessment Improvements (SFPUC)	Activities could include rehabilitation (such as concrete spalling and crack repair) as well as seismic retrofit of process tanks and buildings. The project would be conducted in two phases: retrofit and rehabilitate the channel under the post-chlorination building and SEP 530 channel and the remaining channel structures, and retrofit of SEP 042. Proposed staging could include 2 Rankin Street and lot adjacent to the BFS.	May 2016 to August 2019
9	SEP Northside Reliability Project (SFPUC)	This project implemented multiple phases of improvements to increase the reliability of the SEP. Phase 1 addressed corrosion and ventilation issues at Building 040/041. Phase 2 addressed the return activated sludge pumps and motors and associated variable frequency drives as well as aging secondary treatment electrical and mechanical equipment at Building 260.	All major work was completed as of July 2012, and minor work was completed in October 2015
10	SEP Oxygen Generation Plant Replacement (SFPUC)	This project consists of installing new equipment (used for feeding oxygen to the aeration deck) next to the existing building (new facilities known as SEP 275). Upon completion of the new equipment installation, the project would involve demolition of the existing facility (SEP 270) and installation of new liquid oxygen storage tanks (double layer vacuum insulated tank) and vaporizers.	January 2013 through February 2018
11	SEP Repair and Replacement (R&R) Projects (SFPUC)	In order to maintain operational reliability of existing facilities at the SEP, ongoing repair and maintenance activities are conducted including replacement of equipment that has reached the end of its useful life, is no longer operational due to structural defects caused by continuous operation in a highly corrosive environment, or does not meet current operational requirements. Known R&R activities in 2016 and 2017 include upgrades to the SEP fire and evacuation alarm systems; heating, ventilation, and air conditioning (HVAC) and mechanical system improvements; handrail/guardrail replacement; and other parts replacements in existing facilities.	Ongoing
12	Demolition of the Existing SEP Digesters and Southside Renovation Project (SFPUC)	This Phase II Sewer System Improvement Program (SSIP) project (Phase II has not yet been approved) would include demolition of the existing SEP digesters and associated control buildings, and improvements within the south side of the SEP. This project has not yet begun the planning phase and the SFPUC has not yet determined the specific improvements to be constructed. The schedule is not available at this time, but the project would not be implemented until the new digesters constructed under the BDFP are operational and have been tested to ensure that they are working as designed.	After 2025, schedule to be determined
13	Eastside Recycled Water Project (SFPUC)	The purpose of the Eastside Recycled Water Project is to deliver high-quality recycled water to a variety of customers on the east side of the city for non-drinking uses such as irrigation and toilet flushing. The project has been on hold in part to allow for better coordination with the SSIP. In the future, construction is anticipated at the SEP, a potential site and water source for the eastside recycled water facility.	2026 through 2029

TABLE 4.1-1 (Continued)
PROJECTS CONSIDERED IN CUMULATIVE IMPACT ANALYSIS

Project No. on Map	Project Name (Project Sponsor or Jurisdiction)	Project Description[a]	Construction Dates
14	Central Bayside System Improvement Project (SFPUC)[c]	This project would construct improvements to address long-term infrastructure needs in the Central Bayside basin of the City and County of San Francisco (City) combined sewer system. Several options are under evaluation for this project including different alignment and shaft locations; specific project improvements that would be constructed in the immediate vicinity of the SEP would include improvements to the BFS and construction of a tunnel portal at 2 Rankin Street. Under all options, the SFPUC would construct the Channel Tunnel to convey dry weather and wet weather flows from the Channel Pump Station to the SEP. The tunnel would be a maximum 30-foot diameter and would be more than 8,000 feet long. One of the tunnel portals could be located at 2 Rankin Street, near the SEP. In addition to the tunnel, the SFPUC would repurpose the existing Channel Pump Station; rehabilitate the Channel Force Main; modify the BFS; construct a new Channel Tunnel Dewatering Pump Station; and connect to the new Headworks facility (see Project 1 above), Islais Creek Transport/Storage Box, and Channel Pump Station. The SFPUC would also construct two connector tunnels; the Inner Mission Connector Tunnel would be a maximum 17-foot diameter and maximum 6,500 feet long, and the Mariposa Connector Tunnel would be a maximum 5-foot diameter and maximum 3,800 feet long. Green infrastructure to be constructed under this project would include the Wiggle Neighborhood Green Corridor as well as green and grey watershed projects within the Channel and Islais Creek watersheds. The SFPUC is considering three alternative alignments for the Channel Tunnel along Arkansas Street, Carolina Street, or Indiana Street. Specific locations for tunnel shafts and construction staging areas have not been identified.	Construction date uncertain, no sooner than early 2019
15	Central Shops Relocation and Land Reuse (SFPUC and GSA)	The General Services Agency (GSA) would acquire new sites for Central Shops at two locations (450 Toland Street as well as at 1975 Galvez Avenue and 555 Selby Street [between Galvez Avenue and Innes Avenue]), demolish or refurbish existing buildings, and construct new buildings to house the new Central Shops facilities. The SFPUC is expected to acquire the existing 6.04-acre Central Shops site at 1800 Jerrold Avenue adjacent to the SEP. The central shop functions (vehicle repair) would be relocated to the new facility. This project consists of the acquisition of the properties and relocation of Central Shops only; any demolition, soil excavation, or cleanup of hazardous materials would be conducted under separate environmental review. 1800 Jerrold Avenue (the Central Shops site) is part of the proposed BDFP project site.	January 2016 through January 2017
16	Land Reuse - 1801 Jerrold Avenue (SFPUC and SFPW)	The SFPUC has acquired jurisdiction over a 1.54-acre site near the SEP that was previously under the jurisdiction of San Francisco Public Works (SFPW). Formerly used as an asphalt plant, the existing aboveground facilities would be demolished but no excavation would be conducted. The adjacent one-block segment of Quint Street would also be acquired and closed to public access. The site would serve a variety of functions to support the SEP's short- and long-term needs. 1801 Jerrold Avenue (the asphalt plant site) is part of the proposed BDFP project site.	Spring 2016 through Fall 2016
17	Kansas and Marin Streets Sewer Improvements (SFPUC)	This project would construct a new 18-by-24-by-15-foot transport and storage box to improve the sewer system conveyance from the Islais Creek watershed east of Highway 101 to the Islais Creek transport and storage box. Acquisition of new right-of-way would be required.	November 2017 through October 2018
18	Griffith Yard Improvements (SFPUC)	This project is on SFPUC property next to the Griffith Pump Station, which is at 1601 Griffith Street. Plans for the site include installation of a wall around the site, paving, installation of trailers, and installation of two vactor waste stations.[2]	September 2016 to February 2017

2 A vactor waste station is where the sewage collected by vactor (vacuum) trucks at various locations is disposed and sent to the treatment plant.

TABLE 4.1-1 (Continued)
PROJECTS CONSIDERED IN CUMULATIVE IMPACT ANALYSIS

Project No. on Map	Project Name (Project Sponsor or Jurisdiction)	Project Description[a]	Construction Dates
19	Southeast Outfall Islais Creek Crossing Replacement (SFPUC)	The Southeast Outfall Islais Creek Crossing has reached the end of its useful life and must be replaced. A project to replace the two existing ductile iron underwater crossing pipes beneath Islais Creek is underway.	April 2017 through March 2018
20	Southeast Community Facility Revitalization (SFPUC)	The existing Southeast Community Facility (1800 Oakdale Avenue) is more than 30 years old and has been under used. With limited parking, old mechanical systems, and outdated design elements, the building no longer adequately meets the needs of its users. This project consists of rehabilitating the Southeast Community Facility in place or relocating the center to a new site such as at SFPUC property at 1550 Evans Avenue. The SFPUC could partner with other academic entities for a campus at the 1550 Evans Avenue site.	Not yet determined; planning has begun with outreach to the public
21	Southeast Greenhouses Demolition (SFPUC)[d]	This project would demolish the 113,400 gross square foot greenhouses and the 22,280 gross square foot administrative building and exhibit gallery on the Southeast Greenhouses site to the south of the SEP. These buildings were constructed in 1986 and are not historic structures. The demolition debris would be off-hauled and recycled or disposed of in accordance with applicable solid waste regulations. There would be no grading, excavation, or other ground disturbance at the site as part of the demolition activities.	Spring 2017
22	Jerrold Bridge North Span Replacement (Caltrain)[e]	This project replaced the northern approach span to the Jerrold Avenue Bridge and installed a new worker walkway. Improvements included replacing four pre-cast concrete north span segments with an earthen berm, supporting the existing vertical concrete support structures with micro-piles, and installing a new walkway at track level to meet Federal Railroad Administration (FRA) requirements.	Completed in 2011
23	Quint Street Bridge Replacement Project (Caltrain)[f]	This project would remove the existing Quint Street bridge and construct a new 325-foot-long-by-80-foot-wide berm in its place. The new berm would be supported by retaining walls and soil improvements would be made to address seismic vulnerabilities. The new berm would also cross Quint Street, making it a dead end near the SEP. (Note: Quint Street was permanently closed to through traffic in October 2015.) Some night and weekend work would be required to maintain operations during construction. In the future, a new Caltrain Station may be constructed atop the berm at Oakdale Avenue (one block from Quint Street).	October 2015 through mid-2016
24	Quint-Jerrold Connector Road (San Francisco County Transportation Authority)[g]	This project would construct a new 950-foot-long roadway to provide access between existing Quint Street and Jerrold Avenue. The roadway would consist of two 13-foot-wide lanes (within a 50-foot-wide corridor), one northbound and one southbound. In addition, the project would construct or install several other elements along or beneath the length of the new roadway. Along the western side of the new roadway, the project would construct a new 5.5-foot-wide to 20-foot-wide sidewalk, depending on location; construct a new 27-foot-wide curb cut located along the San Francisco Wholesale Produce Market property (Project 25, below); and install street trees and street lighting. Along the eastern side of the new roadway, the project would construct a new 6.5-foot-tall reinforced concrete retaining wall. A new stop sign would be installed at the intersection of the new roadway and Jerrold Avenue. New sewer and water pipelines would be installed beneath the new roadway to provide on-site drainage and overall system reliability. The new road would support a potential new Caltrain station at Oakdale Avenue. The intersection with Jerrold Avenue also would accommodate trucks, although some movements would require wide turns. The San Francisco County Transportation Authority, Caltrain, and SFPW have coordinated project schedules to minimize the duration of the street closure.	Late 2018 to 2019 (dependent on land acquisition)

TABLE 4.1-1 (Continued)
PROJECTS CONSIDERED IN CUMULATIVE IMPACT ANALYSIS

Project No. on Map	Project Name (Project Sponsor or Jurisdiction)	Project Description[a]	Construction Dates
25	San Francisco Wholesale Produce Market Expansion (City and County of San Francisco Market Corporation)[h]	This project consists of phased development to expand the existing San Francisco Wholesale Produce Market. Two development scenarios are under consideration. The maximum development scenario would demolish 12 of the existing 13 buildings and construct five new warehouse buildings. Two of the new buildings would have rooftop parking. One hall would include a meeting hall/education center and demonstration kitchen. Under the maximum development scenario, there would be a total of 440 parking spaces (42 more than existing) and 186 loading spaces, and the total building floor area would be 525,855 square feet. The new buildings would be 16 to 45 feet tall and would have a larger footprint than the existing buildings. Under both scenarios, Jerrold Avenue would be reconfigured to direct through traffic around the site onto Innes and Kirkwood Avenues. To accomplish this, the following street segments would be vacated (i.e., closed to public traffic): • Jerrold Avenue between Toland and Rankin Streets • Kirkwood Avenue to the east of Rankin Street • The Lettuce Lane and Milton I Ross Lane rights-of-way and a portion of the Rankin Street right-of-way on the project site • Innes Avenue would be improved and portions of the project site would also be dedicated to create two new intersections where Toland Street crosses Innes and Kirkwood Avenues. The existing dead-ends on Innes and Kirkwood Avenues would be removed from the street grid. Rankin Street would be relocated between Kirkwood and Innes Avenues to parallel the west side of the Caltrain right-of-way, and the intersection of Rankin Street and Jerrold Avenue would be reconfigured. A portion of Selby Street between Innes and Kirkwood Avenues would be leased. All roadway improvements would be constructed under Phase 1.	Uncertain; development decisions would be market-driven
26	1995 Evans Avenue (San Francisco Police Department)[i]	This project would demolish the existing four vacant buildings and construct a new four-story 128,000-square-foot building with a separate two-level 47,000-square-foot parking garage to house the San Francisco Police Department's Forensic Services Division and Traffic Company. The Traffic Company includes a fleet of motorcycle police officers.	2018 through 2020
27	Candlestick Point-Hunters Point Shipyard Phase I and II Development Project (Lennar Urban)[j]	This project would redevelop the 702-acre Candlestick Point-Hunters Point Shipyard area along the waterfront between south of India Basin and Candlestick Point. The project includes a mixed-use community with a wide range of residential, retail, office, research and development, civic, and community uses, and parks and recreational open space. In addition, a 300-slip marina would be constructed as would shoreline improvements to stabilize the shoreline. Phase I is already underway, including demolition of Candlestick Park Stadium. Phase II includes 6,225 units of housing (including rebuilding the Alice Griffith Public Housing), a regional retail center, a 220-room hotel, a performance venue, and 160 acres of new and revitalized open space.	Phased construction over the next 15 to 20 years
28	Event Center and Mixed-Use Development (Golden State Warriors Arena) at Mission Bay Blocks 29-32 (GSW Arena LLC)[k]	This project would construct a multi-purpose event center and a variety of mixed uses, including office, retail, open space, and structured parking, on an approximately 11-acre site on Blocks 29-32 within the Mission Bay South Redevelopment Plan Area of San Francisco. The event center would serve as the new home court for the Golden State Warriors professional basketball team. It would have a capacity of 18,064 seats for basketball games, but could be reconfigured for concerts for a maximum capacity of about 18,500. Two office and retail buildings would be located on the west side of the project site. These buildings would each be 11 stories (160 feet tall at building rooftop) and could serve a variety of office and/or research and development uses, with retail uses on the lower floors. Additional retail uses would front on South Street and Terry A. Francois Boulevard. Approximately 3.2 acres of open space would be provided within the site.	2017 through early 2019

TABLE 4.1-1 (Continued)
PROJECTS CONSIDERED IN CUMULATIVE IMPACT ANALYSIS

Project No. on Map	Project Name (Project Sponsor or Jurisdiction)	Project Description[a]	Construction Dates
29	Pier 70 Waterfront Site (Forest City Development CA)[l]	This project consists of redevelopment of approximately 28 acres (identified as the "Waterfront Site") of the former industrial shipyard at Pier 70 and an additional 7 acres of land owned by the Port and PG&E. The site would be developed into a new mixed-use community with new commercial office development, new residential development, and a retail and arts component. New above-grade and below-grade parking and approximately 8 acres of new and expanded parks and shoreline access would be constructed. The project also includes the rehabilitation and adaptive reuse of Buildings 2, 12, and 21, which contribute to the eligible Pier 70 National Register Historic District. Overall, the project would construct a maximum of 4.2 million gross square feet in four phases over about 11 years. Two land use scenarios are under consideration, each with different amounts of commercial and residential land uses. The project would include up to 3,025 new residential units and up to 2.4 million square feet of commercial, restaurant, retail, and arts/light industrial land uses.	2018 through 2029
30	Blue Greenway Project and Heron's Head Park Improvements (Port of San Francisco)[m]	The Blue Greenway is the City's project to improve a portion of the 500-mile, nine-county, region-wide Bay Trail, as well as the newly established Bay Area Water Trail and associated waterfront open space system. In San Francisco, the alignment of the Blue Greenway generally follows the alignment of the Bay Trail and Bay Area Water Trail from Mission Creek on the north to the County line on the south. The project includes open space improvements at numerous points along the trail, including Heron's Head Park.	Undetermined
31	Pier 90-94 Backlands Improvements Project (Port of San Francisco)[n]	This project would improve 23 acres of unimproved land previously used as a landfill. Proposed uses for the site include construction lay down, marshalling of trucks, auto storage, self-storage, construction material recycling, and eco-industrial uses such as batching operations and biofuel production. The site would be filled and graded to create a level surface using existing materials stockpiled at the site. A new road, utilities, and stormwater management facilities would be constructed to prepare the site for future uses. This site is currently used to recycle concrete for use as structure fill materials at construction sites and in road construction. Adjacent existing uses that hold long-term leases with the Port include the SF Recycle Central facility, aggregate operations by Hanson, recycling, rendering operations by Darling International, and ready-mix concrete operations by Cemex and Bode. The tracks of San Francisco Bay Railroad border the northwest boundary of the backlands.	Undetermined – still in planning stages
32	Asphalt and Concrete Recycling and Production Plant at Pier 94 (Port of San Francisco and SFPW)[o]	The City and Port are in negotiations with NewCo to build and operate an asphalt and concrete recycling and production facility within approximately 204,688 square feet of land located at Pier 94/ Seawall Lot 352. The City would require a companion long-term purchase contract negotiated by the parties that would provide the City with a reliable, high-quality and competitively priced source of recycled asphalt and concrete	Undetermined – still in planning stages
33	Quint Street Lead Track (Port of San Francisco and Federal Railroad Administration)[p]	The Quint Street Lead is a one-mile-long freight rail spur track connecting the Peninsula corridor mainline with the Port of San Francisco (Port) cargo terminals and rail yard. It is on the south side of Islais Creek, just east of Third Street. The mainline is owned and operated by the Peninsula Corridor Joint Powers Board, primarily for Caltrain commuter rail. The lead is jointly owned by Burlington Northern Santa Fe (BNSF) Railway and Union Pacific Railroad. There are no other rail lines serving the Port. The project includes reconstruction of the rail track between Jerrold Avenue and Third Street to upgrade it from an industrial lead to a Federal Railroad Administration Class I track, along with construction of associated improvements. This project would improve the safety and efficiency of freight rail service to the Port at Piers 80, 90, 92, 94, and 96. Rankin Street would be closed temporarily as part of this project.	Summer 2016 through early 2017

TABLE 4.1-1 (Continued)
PROJECTS CONSIDERED IN CUMULATIVE IMPACT ANALYSIS

Project No. on Map	Project Name (Project Sponsor or Jurisdiction)	Project Description[a]	Construction Dates
34	Pier 96 Bulk Export Terminal (Port of San Francisco)[q]	This project would construct a new terminal to facilitate the export of bulk cargo on approximately 30 acres at Pier 96, including 900 linear feet of deep-water berth space at Pier 96. The project would provide on-dock rail access.	Undetermined – in planning stages
35	Peninsula Corridor Electrification Project (Caltrain Peninsula Corridor Joint Powers Board)[r]	This project consists of converting Caltrain from diesel-hauled to electric multiple unit trains for service between the 4th and King Street Station in San Francisco and the Tamien Station in San Jose. The project would require the installation of 130 to 140 single-track miles of overhead contact system for the distribution of electrical power to new electric rolling stock. In the vicinity of the SEP, the project would include construction of vertical steel poles on either side of the Caltrain tracks from which conductors would be suspended. The electrical infrastructure provided by this project would be compatible with future high-speed rail service. Improvements for the section of the California High Speed Rail Project between San Francisco to San Jose would affect the same portions of Caltrain tracks as the electrification project, but the timing and scope of improvements required under the High Speed Rail project are uncertain at this time.[s]	As early as 2017 and lasting 3 to 4 years
36	Griffith Pump Station Project (SFPUC)	The project consists of replacing/upgrading the electrical, mechanical, and structural systems of Griffith Pump Station, an all-weather facility that serves as the primary sewage and stormwater pumping station in southeast San Francisco. The project would extend the life of the existing facility as well as modernize it to increase the station's reliability and operational flexibility. The majority of the work would occur inside the station (e.g., replacement of pumps, piping, bar screens, water-tight doors; modification of the HVAC system; installation of roof-access ladder; replacement of the lighting with LED). Proposed outdoor work would include the installation of canopies over the chemical storage and transformer areas to protect equipment and exterior lighting in the chemical storage area and storage yard to aid operations. No soil disturbance would be required as part of this project. The pump station would not increase in capacity.	2017 - 2018
37	2225 Jerrold Avenue Facility (Academy of Art University)[t]	The Academy of Art University (AAU) is seeking approval of modifications to six different buildings that house university activities. One of the facilities is located near the SEP: an existing 91,367-square-foot building at 2225 Jerrold Avenue that houses office space, storage and janitorial functions, which would be modified to allow recreational use. Construction would include laying down flooring for athletic courts, renovation of bathrooms, creation of locker room facilities, and painting of the building and interior spaces. Internal utility upgrades, including electrical and plumbing, would be required but structural improvements are not anticipated at this time. ADA accessibility would require improvements to pedestrian access points, bathroom facilities, and locker rooms. Because institutional and recreational uses are not permitted in the zoning district, a legislated text change to the Planning Code would be required to allow AAU's uses as either a permitted or conditional use.	No external construction required. Dates for internal construction not established.
38	Marin Street Sewer Replacement Project (SFPUC)[u]	This project would replace about 1,800 feet of the existing 24-inch Marin Street sewer line from Third Street., westward to the Marin Outfall at Islais Creek. The sewer line is concrete-encased vitrified pipe and was constructed in 1954; it is part of the City's combined sewer system. The new pipeline would be constructed of reinforced concrete pipe and the diameter would be increased to 30-inches to accommodate development to the north of Islais Creek. The new pipeline would follow the same alignment as the existing pipeline. Up to eight support pilings could be replaced to a depth of 60 feet. Construction access would be provided via Cesar Chavez Street. A portion of the pipeline alignment adjacent to Islais Creek is within the jurisdiction of the Bay Conservation and Development Commission. Construction would require temporary easements between Tennessee and Third Streets, within the SFMTA yard, and between the southwest edge of the yard and the Marin Street Outfall.	March 2017 through February 2018

TABLE 4.1-1 (Continued)
PROJECTS CONSIDERED IN CUMULATIVE IMPACT ANALYSIS

Project No. on Map	Project Name (Project Sponsor or Jurisdiction)	Project Description[a]	Construction Dates
39	India Basin Mixed-Use Development (Build, Inc. and San Francisco Recreation and Parks Department)[v]	This project would encompass publicly and privately owned parcels, including existing streets, totaling approximately 38.8 acres at 700 Innes Avenue, 900 Innes Avenue, India Basin Shoreline Park, and India Basin Open Space locations. The project at 700 Innes Avenue would develop 17.12 acres of privately owned land plus 5.94 acres of developed and undeveloped public rights-of-way in phases; proposed uses include residential, retail, commercial, office, research and development/laboratory and clinical care space, institutional, flex space, recreational and art uses, parking, and a shoreline network of publicly accessible open space. Two options are being considered for the 700 Innes Avenue property: the “proposed project” (a residential-focused mixed-use development including approximately 1,240 dwelling units and 275,330 gross square feet [gsf] of ground-floor retail, commercial, or flex space); and a “project variant” (up to approximately 1,000,000 gsf of commercial/institutional uses and 500 dwelling units). The project at 900 Innes Avenue, India Basin Shoreline Park, and India Basin Open Space would include improvement of 14.2 acres of publicly owned parcels along the shoreline plus 1.58 acres of unimproved “paper” streets to create a publicly accessible network of new and/or improved parkland and open space. The 900 Inness Avenue properties would be enhanced for park and open space use and would be combined to create a network of new and/or improved parkland and open space. This new shoreline network would extend the Blue Greenway/Bay Trail and would provide pedestrian and bicycle connections to and along the shoreline, fronting San Francisco Bay.	2018 through 2024
40	San Francisco Gateway (Prologis, Inc.)[w]	The San Francisco Gateway Project would redevelop two City blocks to serve as a new industrial center for the City. The Project Sponsor would demolish the four existing buildings on site (constructed around 1945), vacate Selby Street between Kirkwood and McKinnon Avenues, and create a new multi-level, multi-building Production Distribution and Repair (PDR) facility. The existing structures provide about 448,000 square feet of PDR space. The San Francisco Gateway Project would include four main buildings totaling approximately 1,160,000 square feet along with two 3-level central vehicle staging/truck court/parking structures totaling approximately 688,400 square feet. The maximum height of the buildings would be 115 feet.	TBD

SOURCES:

a Project descriptions without noted sources were prepared by the SFPUC.
b San Francisco Public Utilities Commission, e-mail from Sue Chau to Jill Hamilton and others, Subject: BDFP – Schedule Change, OCR, Existing Conditions Photos, Cumulative Projects, Etc., December 17, 2015.
c San Francisco Public Utilities Commission, Central Bayside System Improvement Project Description Information, provided to ESA+Orion on December 22, 2015.
d San Francisco Public Utilities Commission, E-mail from Sue Chau to BDFP and Headworks Project Teams, August 8, 2016.
e San Francisco County Transportation Authority (SFCTA), My Streets Project Map. Available online at http://www.sfcta.org/mystreetsf-projects-map#/?address=750%20phelps%20street%20San%2BFrancisco&radius=805. Accessed on August 22, 2016.
f Caltrain, Quint Street Project. Available online at http://www.caltrain.com/projectsplans/Projects/Caltrain_Capital_Program/Quint_Street_Project.html. Accessed on August 8, 201.
g San Francisco Planning Department, Preliminary Mitigated Negative Declaration, Quint-Jerrold Connector Road Project, Case No. 2013.0858E, August 5, 2015.
h San Francisco Planning Department, Final Mitigated Negative Declaration, San Francisco Wholesale Produce Market Project, Case No. 2009-1153E, May 11, 2011, as amended July 5, 2011.
i San Francisco Planning Department, Final Mitigated Negative Declaration, 1995 Evans Avenue/ San Francisco Police Department (SFPD) Forensic Service Division (FSD) & Traffic Company (TC), Case No. 2013.0342E, October 2, 2013, amended on November 15, 2013.
j City and County of San Francisco, Office of Community Investment and Infrastructure, Candlestick Point-Hunters Point Shipyard Stadium Demolition. Available online at http://sfocii.org/index.aspx?page=446. Accessed on August 22, 2016.
k Office of Community Investment and Infrastructure, Subsequent Environmental Impact Report, Event Center and Mixed-Use Development at Mission Bay Blocks 29 to 32, State Clearinghouse No. 2014112045, November 3, 2015.
l San Francisco Planning Department, Notice of Preparation of an Environmental Impact Report and Notice of a Public Scoping Meeting, Pier 70 Mixed-Use District Project, Case No. 2014-001272ENV, August 14, 2013.
m Port of San Francisco, Blue Greenway Project. Available online at http://sfport.com/index.aspx?page=1433. Accessed on August 22, 2016.
n Port of San Francisco, Pier 90-94 Backlands Planning. Available online at http://sfport.com/index.aspx?page=222. Accessed on August 8, 2016.
o San Francisco Public Works, Bid listing for Sustainable Recycled Asphalt and Concretes Plants and Lease Opportunity, DPW ID No. NPE15108. Available online at https://stgint.sfdpw.org/_Layouts/DPWPORTAL/Construction.aspx?ID=1539. Accessed on August 22, 2016.

TABLE 4.1-1 (Continued)
PROJECTS CONSIDERED IN CUMULATIVE IMPACT ANALYSIS

SOURCES (cont.)

p Port of San Francisco, Federal Railroad Administration (FRA) Categorical Exclusion Worksheet, September 25, 2013.
q Port of San Francisco, Request authorization to advertise and issue a Request for Proposals (RFP) soliciting a developer and operator for a Bulk Export Maritime Terminal Operation at Pier 96, March 5, 2015.
r Peninsula Corridor Joint Powers Board, Peninsula Corridor Electrification Project Final Environmental Impact Report, State Clearinghouse No. 2013012079, December 2014.
s California High Speed Rail Authority, Notice of Preparation of a Project Environmental Impact Report/Environmental Impact Statement for the California High-Speed Rail System, San Francisco to San Jose Project Section, Blended System Project, State Clearinghouse No. 2016052019, May 9, 2016.
t San Francisco Planning Department, Draft Environmental Impact Report, Academy of Art University, Case No. 2008.0586E, State Clearinghouse No. 2010092080.
u San Francisco Planning Department, CEQA Categorical Exemption Form, SFPUC Marin Street Replacement Project. September 12, 2016.
v San Francisco Planning Department, Notice of Preparation of an Environmental Impact Report and Public Scoping Meeting, India Basin Mixed-use Project, which entails the 700 Innes Avenue, 900 Innes Avenue, India Basin Shoreline Park, and India Basin Open Space locations, Build Inc. and San Francisco Recreation and Parks Department, Case No. 2014-002541ENV, June 1, 2016.
w Prologis, Application for Preliminary Project Assessment, December 20, 2016.

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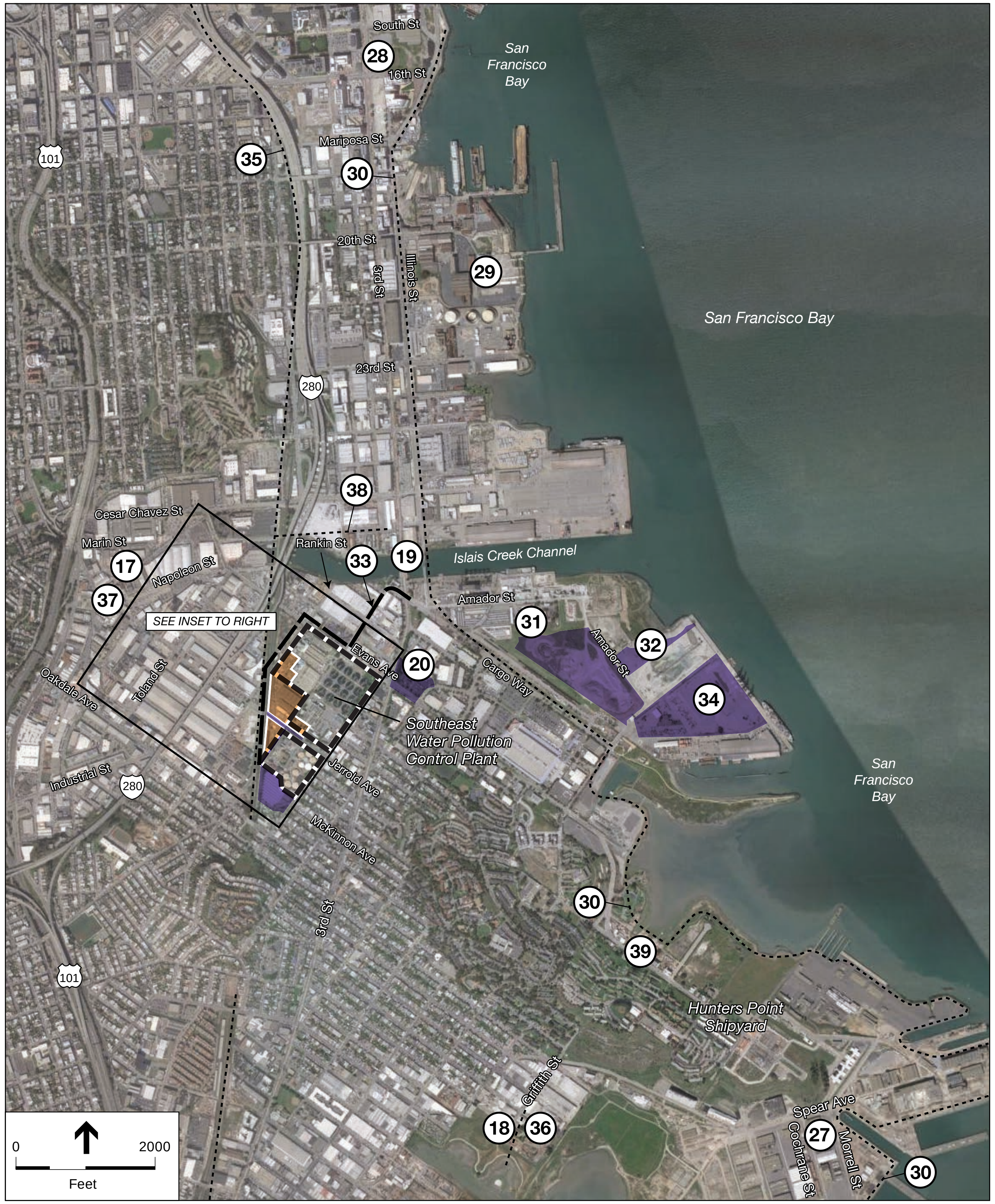

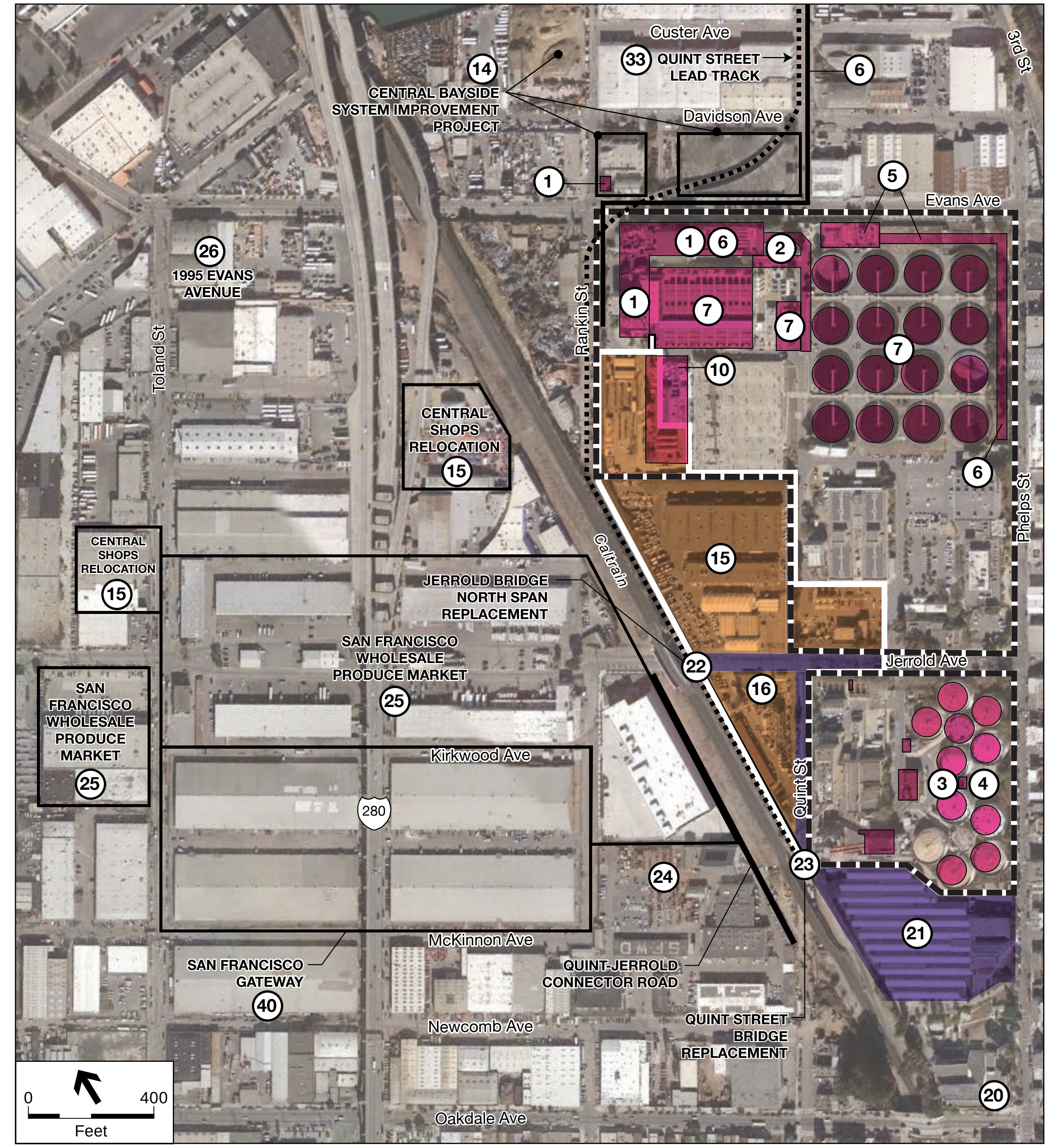

CUMULATIVE PROJECTS

1. Southeast Plant Headworks Replacement Project
2. SEP Chemical System Relocation and Facilities Upgrade
3. SEP Existing Digester Roof Repairs
4. SEP Existing Digester Gas Handling Improvements
5. SEP Building 521 Replacement/ 522 Disinfection Upgrade
6. SEP Power Feed and Primary Switchgear Upgrades
7. SEP Primary/Secondary Clarifier Upgrades
8. SEP Seismic Reliability and Condition Assessment Improvements*
9. SEP Northside Reliability Project*
10. SEP Oxygen Generation Plant Replacement
11. SEP Repair and Replacement Projects*
12. Demolition of the Existing SEP Digesters and Southside Renovation Project*
13. Eastside Recycled Water Project*
14. Central Bayside System Improvement Project
15. Central Shops Relocation and Land Reuse
16. Land Reuse - 1801 Jerrold Avenue
17. Kansas and Marin Streets Sewer Improvements
18. Griffith Yard Improvements
19. Southeast Outfall Islais Creek Crossing Replacement
20. Southeast Community Facility Revitalization
21. Southeast Greehouse Demolition
22. Jerrold Bridge North Span Replacement
23. Quint Street Bridge Replacement Project
24. Quint-Jerrold Connector Road
25. San Francisco Wholesale Produce Market Expansion
26. 1995 Evans Avenue (SF Police)
27. Candlestick Point-Hunters Point Shipyard Phase I and II Development Project
28. Event Center and Mixed-Use Development at Mission Bay Blocks 29-32
29. Pier 70 Waterfront Site
30. Blue Greenway Project and Heron's Head Park Improvements
31. Pier 90-94 Backlands Improvements Project
32. Asphalt and Concrete Recycling and Production Plant at Pier 94
33. Quint Street Lead Track
34. Pier 96 Bulk Export Terminal
35. Peninsula Corridor Electrification Project
36. Griffith Street Pump Station Project
37. 2225 Jerrold Avenue Facility (Academy of Art)
38. Marin Street Sewer Replacement Project
39. India Basin Mixed-Use Development
40. San Francisco Gateway Project

NOTE: A project with an asterisk (*) has not been mapped either because it occurs in several locations, because no specific location has been identified, or because the project has been completed.

- Southeast Plant (SEP)
- Project Site
- Potential Construction Staging Area
- Potential Cumulative Projects at the SEP

SOURCE: Google Maps Imagery from 2015; ESA+Orion data developed in 2016 for BDFP

SFPUC Biosolids Digester Facilities

Figure 4.1-1

Cumulative Projects

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4.2 Land Use

This section describes existing land uses in the vicinity of the Biosolids Digester Facilities Project (BDFP or project) and the potential for implementation of the project to adversely affect an established community or conflict with applicable land use plans or policies. The impact analysis evaluates the potential land use impacts of the project and identifies mitigation measures to avoid or reduce adverse impacts, as appropriate.

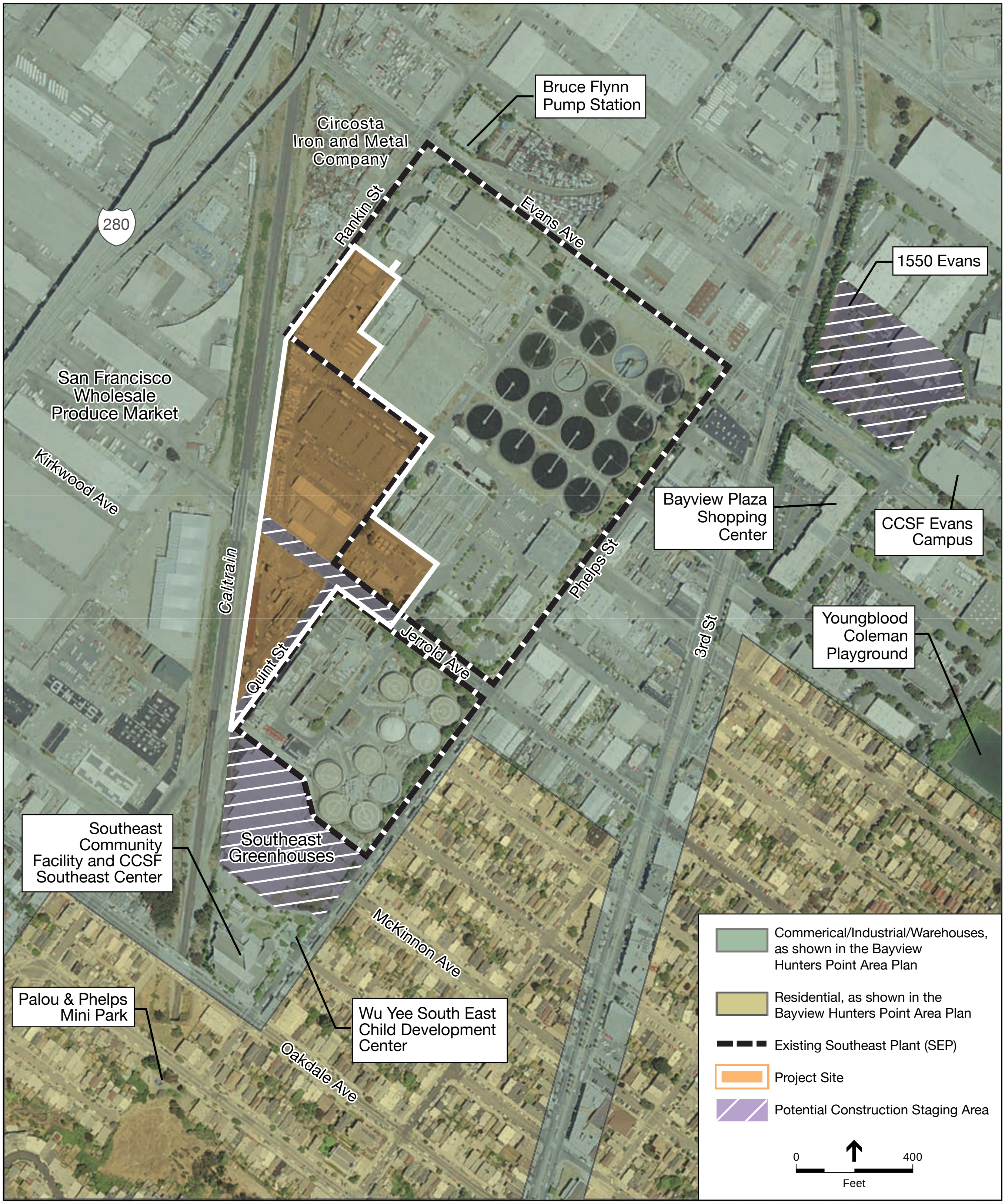
4.2.1 Setting

4.2.1.1 Existing Land Uses at the Southeast Plant and in Surrounding Areas

The Southeast Water Pollution Control Plant (Southeast Plant or SEP) is located in San Francisco's Bayview-Hunters Point neighborhood, in an area consisting of a mix of residential, commercial, and light/heavy industrial land uses. The San Francisco Planning Department identifies the Bayview-Hunters Point neighborhood as the area east of Highway 101 extending from the southern City boundary north to Cesar Chavez Street. As shown on **Figure 4.2-1**, the SEP is bounded by Evans Avenue to the northeast, Quint and Rankin Streets to the northwest, Phelps Street to the southeast, and the Caltrain railroad tracks to the west. The Southeast Community Facility and Southeast Greenhouses are located southwest of the SEP.

Jerrold Avenue bisects the SEP, dividing it into SEP North (i.e., facilities north of Jerrold Avenue) and SEP South (facilities south of Jerrold Avenue). Facilities on SEP North are associated with processing the liquids portion of the wastewater. Facilities on SEP South are associated with processing the solids portion of the wastewater and include the existing digesters and energy recovery facilities. The project site includes portions of the existing SEP at 750 Phelps Street and 1700 Jerrold Avenue, adjacent properties at 1800 Jerrold Avenue (the Central Shops site) and 1801 Jerrold Avenue (the decommissioned Asphalt Plant site), and construction staging areas along Jerrold Avenue and Quint Street. The Central Shops facility is currently operated by the City and County of San Francisco (CCSF or "City") General Services Agency (GSA) and provides vehicle and equipment maintenance services for multiple City agencies through the Fleet Management Department; the site is pending transfer to the San Francisco Public Utilities Commission (SFPUC) as part of a separate action. The Asphalt Plant has been decommissioned and is non-operational; jurisdiction of this City-owned property was recently transferred to the SFPUC. The site is currently used for City vehicle parking and dispatch. Prior to BDFP construction, the non-operational, aboveground facilities will be demolished.

Multiple land use types surround the SEP and the project site. Industrial uses (e.g., warehouses, auto dismantlers, a scrap iron and metal company (Circosta), and the San Francisco Wholesale Produce Market) are located to the northeast, northwest, and west of the SEP. Residential and commercial land uses are located directly across Phelps Street along the southeast boundary of the SEP. The Southeast Greenhouses are located southwest of the existing digester structures, at 1150 Phelps Street. As a separate action from the BDFP, the SFPUC is proposing to demolish the existing greenhouses at the Southeast Greenhouses site (refer to Table 4.1-1 in Section 4.1); future use of the site is undetermined. If this site becomes available, it would be used for BDFP construction staging.



SOURCE: National Agriculture Imagery Program, Imagery from 2014;
City and County of San Francisco, Bayview Hunters Point Area Plan, 2010

SFPUC Biosolids Digester Facilities

Figure 4.2-1
Generalized Land Uses Near the SEP

NOTE: Generalized land uses around the SEP based on the Bayview Hunters Point Area Plan; some mixed residential and commercial uses occur within commerical/industrial/warehouse areas

The 1550 Evans site is located east of the SEP and is surrounded by industrial and commercial uses to the west (across Third Street), north, and south, and is adjacent to the City College of San Francisco Evans Campus to the southeast. An office building and warehouse building, both vacant, currently occupy the site, along with a parking lot (containing approximately 200 off-street parking spaces). The site is currently used for parking and storage.

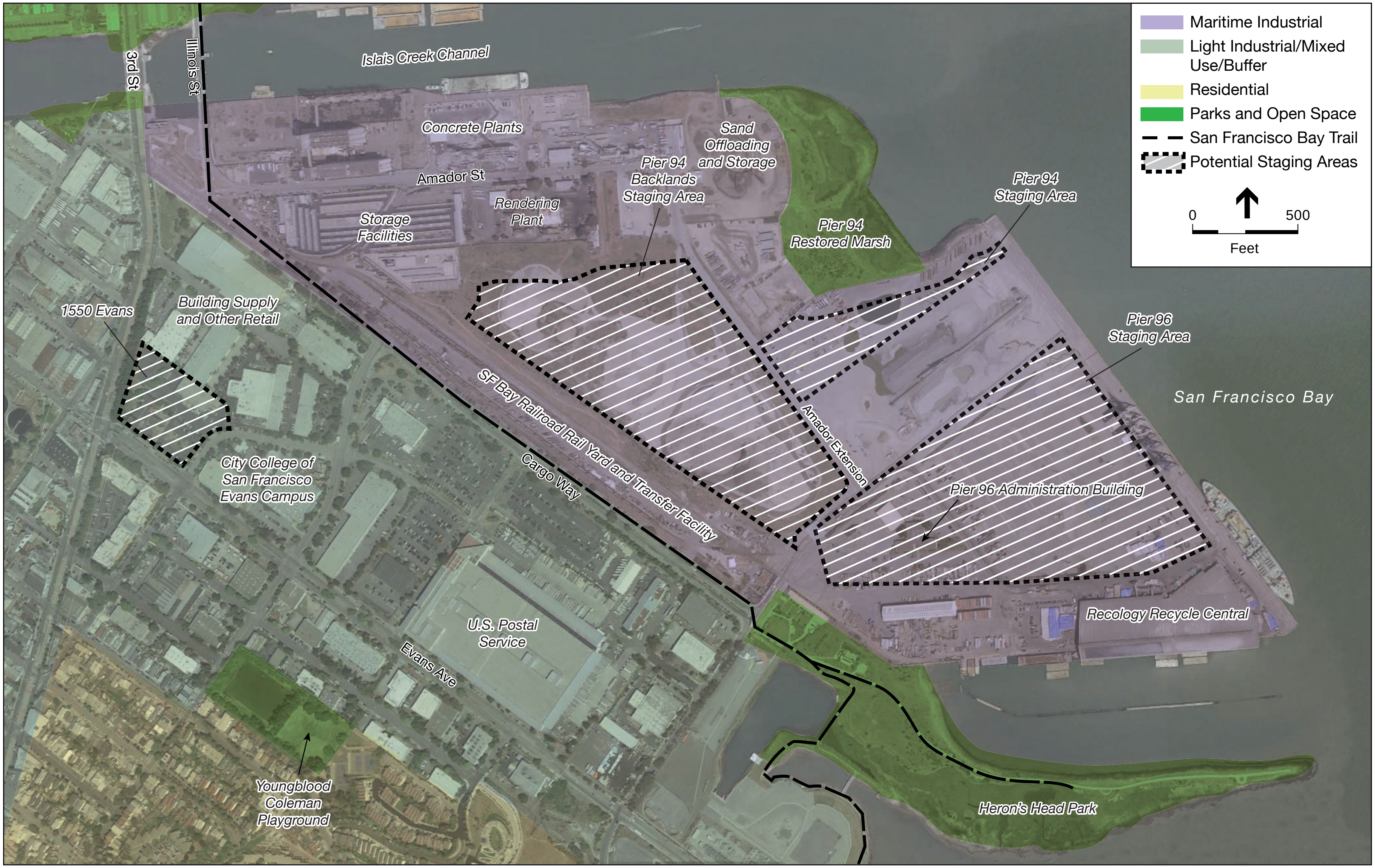
Additional surrounding land uses include parks, places of worship, and schools. Palou & Phelps Mini-Park is located at the southeast corner of Palou Avenue and Phelps Street, approximately 0.2 mile south of the SEP boundary. The Youngblood Coleman Playground is located at 1398 Hudson Street, approximately 0.3 mile southeast of the SEP. There are no elementary, middle, or high schools within one-quarter mile of the project site. The following schools and daycare center are located within one-quarter mile of the project site:

- City College of San Francisco, Southeast Center at the Southeast Community Facility (1800 Oakdale Avenue) is located less than 0.1 mile from the project site. City College of San Francisco uses space within the Southeast Community Facility for classrooms, a computer laboratory, library, and administrative services. Services provided include admissions and enrollment, new student counseling, biotech outreach, financial aid, and tutoring services.[1]
- City College of San Francisco, Evans Campus (1400 Evans Avenue), is located approximately 0.2 mile east of the project site and adjacent to the 1550 Evans construction staging site. The Evans Campus provides day, evening, and weekend classes in automotive and motorcycle technology, construction, welding, fashion, business, and custodial training, as well as construction industry workforce training and job placement services for San Francisco residents.[2]
- The Wu Yee South East Child Development Center (1300 Phelps Street), a children's daycare, shares space with the City College Southeast Center at the Southeast Community Facility, less than 0.1 mile from the project site.[3] Early Head Start and Head Start services, for children from birth through age five, are offered at this location.[4]

4.2.1.2 Existing Land Uses at Piers 94 and 96 Staging Areas and in Surrounding Areas

The Piers 94 and 96 staging areas, shown on **Figure 4.2-2**, are largely undeveloped. The Pier 94 staging area east-northeast of Amador Street is currently undeveloped and used for construction staging and storage of flatbed trailers and other pieces of construction vehicles and equipment. The Pier 96 staging area consists of an undeveloped, paved eastern portion that is currently used primarily as a San Francisco Police Department emergency vehicle operations course (with traffic cones

1 City College of San Francisco, *City College of San Francisco, Southeast: One Stop Service Center*, 2016. Available online at http://www.ccsf.edu/en/our-campuses/southeast/1stop.html. Accessed on July 15, 2016.
2 City College of San Francisco, *City College of San Francisco, Evans Campus: Administrative Services*, 2016. Available online at http://www.ccsf.edu/en/our-campuses/evans/administrative_services.html. Accessed on July 15, 2016.
3 Wu Yee Children's Services, *Early care and education*, 2016. Available online at http://www.wuyee.org/center-based-care/. Accessed on July 15, 2016.
4 U.S. Department of Health & Human Services, *Head Start: About us*, 2016. Available online at https://eclkc.ohs.acf.hhs.gov/hslc/hs/about. Accessed on July 15, 2016.



SFPUC Biosolids Digester Facilities

Figure 4.2-2
Generalized Land Uses in the Vicinity of Piers 94 and 96 Staging Areas

SOURCE: National Agriculture Imagery Program, Imagery from 2014; City and County of San Francisco, Bayview Hunters Point Area Plan, 2010; Port of San Francisco, Piers 90-94 Backlands Planning, http://sfport.com/pier-90-94-backlands-planning, accessed July 24, 2016; San Francisco Planning, San Francisco Zoning Map, July 2016.

NOTE: Generalized land uses around Piers 94 and 96 staging areas based on the Bayview Hunters Point Area Plan; some mixed residential and commercial uses occur within commerical/industrial/warehouse areas.

delineating the course); trucks, containers, and miscellaneous equipment are stored around the edges of this area. Several structures occupy the west side of the Pier 96 staging area: a pier administration building, which includes about six tenants, a steel fabrication facility beneath a metal canopy, and an unoccupied building that appears to have been part of a former weigh station. The Pier 94 Backlands is part of Seawall Lot 352 and currently used for storage of large stockpiles of soil and aggregate; a small one-story shed and water tank are also located in this part of the staging area.

The Piers 94 and 96 staging areas are generally bounded by industrial uses to the south, Cargo Way to the southwest, and industrial uses and San Francisco Bay to the north and east (see Figure 4.2-2).

South of the Piers 94 and 96 staging areas, a Recology recycling facility (Recycle Central) is located along the south side of Pier 96. Heron's Head Park is located at the foot of Cargo Way at Jennings Street, approximately 0.2 mile to the south. The Bay Trail crosses Heron's Head Park near the park entrance and a spur of the Bay Trail extends through the park.

West of the Piers 94 and 96 staging areas, a paved portion of the Bay Trail extends along Cargo Way from Heron's Head Park to Amador Street. The San Francisco Bay Railroad Company operates a yard along the eastern side of Cargo Way (between Cargo Way and the Pier 94 Backlands), where Port cargo and other materials are transferred to railcars.[5] Up to 300 cars can be stored at this rail yard. A mix of primarily commercial and light industrial uses are located on Cargo Way and Evans Avenue between Cargo Way and the nearest residential land uses, which are approximately 0.4 mile southwest of the staging areas. The Youngblood Coleman Playground is approximately 0.4 mile southwest. The nearest school is the City College of San Francisco, Evans Campus, located southwest of Cargo Way at 1400 Evans Avenue, approximately 0.2 mile southwest of the staging areas.

North of the Piers 94 and 96 staging areas, industrial land uses, including concrete plants (Cemex and Central/Bode Concrete), a rendering plant (Darling International), and a sand offloading and storage area (Hanson Aggregate), occupy the area between the Pier 94 Backlands and the Islais Creek Channel. A restored marsh area along San Francisco Bay is located directly north of the Pier 94 staging area east of Amador Street.

4.2.2 Regulatory Framework

Chapter 3, *Plans and Policies*, discusses the land use regulatory framework relevant to the project, and includes summaries of the following applicable land use planning documents: *San Francisco General Plan*, *Bayview Hunters Point Area Plan*, *San Francisco Bicycle Plan*, *Climate Action Plan*, *Plan Bay Area*, *2010 Clean Air Plan*, and *San Francisco Better Streets Plan*.

[5] Union Pacific Rail Road, 2016. *San Francisco Bay Railroad Company SFB #543*. Available online at http://www.up.com/customers/shortline/profiles_q-s/sfb/index.htm. Accessed July 15, 2016.

4.2.3 Impacts and Mitigation Measures

4.2.3.1 Significance Criteria

The project would have a significant impact related to land use if the project were to:

- Physically divide an existing community;
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect; or

4.2.3.2 Approach to Analysis

Construction and Operational Impacts

This analysis considers the project's potential to physically divide a community by evaluating the project's location and characteristics in relation to existing land uses in the vicinity and by evaluating whether the project could result in a change in land use at the project site or off-site staging areas (during construction) by creating new facilities and operations that affect established land uses. Regarding consistency with land use plans and policies, the analysis compares the project to applicable policies of the *San Francisco General Plan* and other relevant land use plans and policies adopted for the purpose of avoiding or mitigating an environmental effect. Pursuant to California Environmental Quality Act (CEQA) Guidelines Section 15382, which defines a significant effect as one that would result in a substantial change in the physical environment, and related guidance in Section 15064(d), the analysis does not identify policy conflicts in and of themselves as significant effects.

Cumulative Impacts

Section 4.1.3, Approach to Cumulative Impact Analysis and Cumulative Projects, describes the overall approach to the cumulative analysis for those topics using a list-based approach and summarizes reasonably foreseeable future projects in the vicinity of the project that could contribute to a cumulative impact; please refer to Table 4.1-1 and Figure 4.1-1 for a description and location of potential cumulative projects in the vicinity of the BDFP. The cumulative analysis for land use uses a list-based approach to analyze the effects of the project in combination with other past, present, and probable future projects in the immediate vicinity. The cumulative impact analysis assumes that similar to the project, construction and operations of other projects in the geographical area, listed in Table 4.1-1, would be required to comply with all applicable regulatory requirements, which in some cases would serve to avoid and reduce many impacts to less-than-significant levels on a project-by-project basis.

The cumulative analysis first considers whether or not the proposed project in combination with past, present, and probable future projects in the geographical area would result in a significant, adverse cumulative impact relative to the significance criteria identified above. If not, then the cumulative impact would be less than significant. If so, the analysis then determines whether or not the project's incremental contribution to the impact would be cumulatively considerable. Both conditions must apply in order for a project's contribution to cumulative effects to be deemed significant. If the project would have a cumulatively considerable contribution to a significant cumulative impact, mitigation measures are identified to reduce the project's contribution to the extent feasible. The geographic scope for potential cumulative land use impacts encompasses areas in the vicinity of project facilities. These areas generally include the SEP and the areas around the SEP within the Bayview-Hunters Point community.

4.2.3.3 Impact Evaluation

Construction and Operational Impacts

Impact LU-1: The project would not physically divide an established community. (Less than Significant)

Project construction would temporarily affect land uses in the project vicinity. During the five-year construction period, the segment of Jerrold Avenue between Phelps Street and the Caltrain right-of-way would be closed to public through-traffic to maintain a safe construction work area. Land uses to the west of this segment of Jerrold Avenue are a mix of commercial and industrial warehouse-type operations (including the San Francisco Wholesale Produce Market), while land uses to the east are a mix of residential and commercial uses. This closure would be temporary. As detailed in Section 4.6, Transportation and Circulation, alternative routes are available and a detour around the temporary road closure would be provided and signed. Moreover, due to the distinct nature of land uses on either side of this segment of Jerrold Avenue (e.g., industrial warehouses to the west and residences and commercial uses to the east), along with the large-scale intervening industrial land uses that comprise the existing SEP site, the area affected by the proposed road closure does not clearly constitute an established community. For these reasons, the closure of Jerrold Avenue would not physically divide an established community.

Proposed temporary use of the Piers 94 and 96 staging areas would occur on parcels without an established community and in areas that are not used by the public, and would not divide or block access between adjacent land uses. Therefore, the proposed use of these sites for staging areas would not divide an established community. Similarly, repurposing 1550 Evans Avenue and the Southeast Greenhouses site for constructing staging also would not divide an established community. The temporary impacts of BDFP construction would thus be less than significant with respect to physically dividing an established community.

Once constructed, the BDFP would operate new solids treatment, odor control, energy recovery, and associated facilities within the existing SEP as well as on property adjacent to the existing SEP. Implementation of the BDFP would effectively expand SEP wastewater treatment operations to the Central Shops and Asphalt Plant sites. As discussed above, the Central Shops and Asphalt Plant sites are currently being used for storage and for industrial uses and are not accessible by the public, similar to the SEP. As the SEP is an existing industrial use, the project would not divide any established land uses. Because the facilities would be constructed in areas that are not currently accessible by the public, and would not block access between adjacent land uses, operation of these facilities would not divide an established community. In addition, the project would include long-term streetscape and landscape improvements along Jerrold Avenue that would generally enhance the safety and connectivity of this street segment for various transportation modes (e.g., bikes, pedestrians) in the vicinity. Therefore, no adverse impact related to dividing an established community would result from operation of the project.

For the reasons described above, neither construction nor operation of the project would divide an established community and this impact would be ***less than significant.***

Mitigation: None required.

Impact LU-2: The project would not conflict with land use plans and policies adopted for the purpose of avoiding or mitigating an environmental effect. (Less than Significant)

The project would construct wastewater treatment facilities in an area designated as Public Facilities and Light Industrial in the *San Francisco General Plan*, as discussed in Chapter 3, and would implement landscaping and streetscape improvements along Jerrold Avenue. As also discussed in Chapter 3, the project would advance the General Plan objective and policy concerning the location of wastewater facilities and provision of effective and efficient wastewater treatment — the one General Plan objective and one policy under that objective that directly apply to the BDFP. The project would not conflict with relevant objectives and policies of the Bayview-Hunters Point Area Plan, including policies that concern improving the relationship between industry and housing, managing traffic, preserving residential neighborhoods, and implementing energy conservation programs. The proposed streetscape improvements would be consistent with the *Better Streets Plan*.

The project could conflict with General Plan policies related to the preservation of historic resources (refer to Section 4.5, Cultural Resources). As discussed in Chapter 3, land use plans typically contain numerous policies emphasizing differing legislative goals. As such, policies and goals may conflict with one another, depending on the project. On the whole, the BDFP would not conflict with applicable land use plans and policies adopted for the purpose of avoiding or mitigating an environmental effect. This impact is therefore considered ***less than significant***. Whether the project is consistent with particular plans will ultimately be determined at the time of project approval by the agency charged with making that consistency determination.

Mitigation: None required.

Cumulative Impacts

Impact C-LU-1: The project, in combination with past, present, and probable future projects, would not physically divide an established community, nor would it conflict with applicable land use plans and policies adopted for the purpose of avoiding or mitigating an environmental effect. (Less than Significant)

A cumulative land use impact would occur if the proposed project in combination with the cumulative projects were to result in the physical division of an established community or conflict with applicable land use plans, policies, or regulations adopted for the purpose of avoiding or mitigating an environmental effect. During the five-year construction period, the project would close the segment of Jerrold Avenue between Phelps Street and the Caltrain right-of-way, which would disrupt access between land uses east of and west of this segment of Jerrold Avenue. Among the cumulative projects identified in Table 4.1-1 and Figure 4.1-1 (in Section 4.1), the following would also affect access in the project vicinity, potentially resulting in the cumulative effect of physically dividing an established community:

- **Land Reuse – 1801 Jerrold Avenue**. This SFPUC and San Francisco Public Works project involves the acquisition by the SFPUC of 1801 Jerrold Avenue and the closure of a one-block segment of Quint Street between Jerrold Avenue and the Caltrain right-of-way.
- **Quint Street Bridge Replacement Project.** This Caltrain project removed the existing Quint Street bridge and constructed a berm in its place, permanently closing Quint Street to through traffic by making it a dead end on either side of the Caltrain tracks.
- **Quint-Jerrold Connector Road**. This project, proposed by the San Francisco County Transportation Authority, is intended to remedy the disruption to travel on Quint Street caused by the preceding project.[6] The Quint-Jerrold Connector Road project would construct a new roadway and related amenities (e.g., sidewalk, street trees, and lighting) to provide access on the west side of the Caltrain tracks between Quint Street and Jerrold Avenue. The new road would also support a potential new Caltrain station at Oakdale Avenue.
- **San Francisco Wholesale Produce Market Expansion**. This project consists of phased development to expand the existing San Francisco Wholesale Produce Market. Two development scenarios are under consideration for this long-term project, both of which would involve reconfiguring Jerrold Avenue to direct through traffic around the Produce Market onto Innes and Kirkwood Avenues. To accomplish this, several streets in the vicinity of the Produce Market (e.g., Jerrold Avenue between Toland and Rankin Streets) would be closed to public traffic.

The proposed road changes/closures listed above would not divide an established community because (as indicated under Impact LU-1) the land uses on either side of the area where street closures or changes would occur – that is, the industrial warehouses to the west of the Caltrain tracks and residences and commercial uses to the east of the Caltrain tracks and the SEP – are distinct areas. Together these areas do not constitute a unified, established community that changes proposed by the cumulative projects would divide. In addition, some land uses directly adjacent to the proposed street

[6] San Francisco Planning Department, *Mitigated Negative Declaration Quint-Jerrold Connector Road Project*, Case No. 2013.0858E, amended September 23, 2015.

changes would be more unified by them. For example, it is expected that the San Francisco Wholesale Produce Market would be more unified by the changes to Jerrold Avenue associated with that project, and the closure of the block of Quint Street between Jerrold Avenue and the Caltrain tracks would help unify the existing SEP site with the Asphalt Plant site that is becoming part of the SEP. Consequently, implementation of the above projects would not result in a significant cumulative impact related to the physical division of an established community. During construction, detours would be provided around affected street segments, and a permanent alternative route would be provided by one of the projects, the Quint-Jerrold Connector Road, which would reduce potential adverse effects on circulation and ensure adequate connections between the different communities on either side of the road closures. For more information on the effects of the roadway changes identified above, refer to the discussion of Traffic Circulation Effects under Impacts C-TR-1 and C-TR-2 in Section 4.6, Transportation and Circulation.

The project is not expected to conflict with any land use plans, policies, or regulations adopted for the purpose of avoiding or mitigating an environmental effect, as discussed under Impact LU-2. The project in combination with past, present and probable future projects identified in Table 4.1-1 would intensify uses in the project vicinity but, like the BDFP, the cumulative projects would be required to comply with applicable regulations and would not substantially change the mix of land uses in the project vicinity. It is therefore expected that, in general, implementation of the cumulative projects in combination with the BDFP would be consistent with relevant plans and policies. An exception to this conclusion may be the San Francisco Gateway project, which proposes to construct new industrial facilities to a height of 115 feet in an area currently zoned with a 65-foot height limit. The consistency of that project with applicable plans, policies, and regulations will be addressed in the environmental impact report (EIR) prepared for it and will be considered by the agency responsible for making a consistency determination about it. Regardless of such determination, the BDFP's incremental contribution to a related cumulative impact would not be cumulatively considerable given the BDFP's overall consistency with applicable plans, policies and regulations. Regarding cumulative impacts related to cultural resources and air quality noted in Impact LU-2, refer to Section 4.5, Cultural Resources, and Section 4.8, Air Quality.

On the basis of the factors discussed above, cumulative land use impacts are considered ***less than significant***.

Mitigation: None required.

4.3 Aesthetics

This section describes the existing visual character of the project site and vicinity and analyzes the potential for the Biosolids Digester Facilities Project (BDFP or project) to affect those conditions, including effects on views from surrounding public areas. This section includes photographs to show existing visual conditions in the project area from various perspectives and photo simulations of visual conditions with implementation of the BDFP. The impact analysis evaluates potential aesthetic impacts of the project and identifies mitigation measures to avoid or reduce significant adverse impacts, as appropriate.

4.3.1 Setting

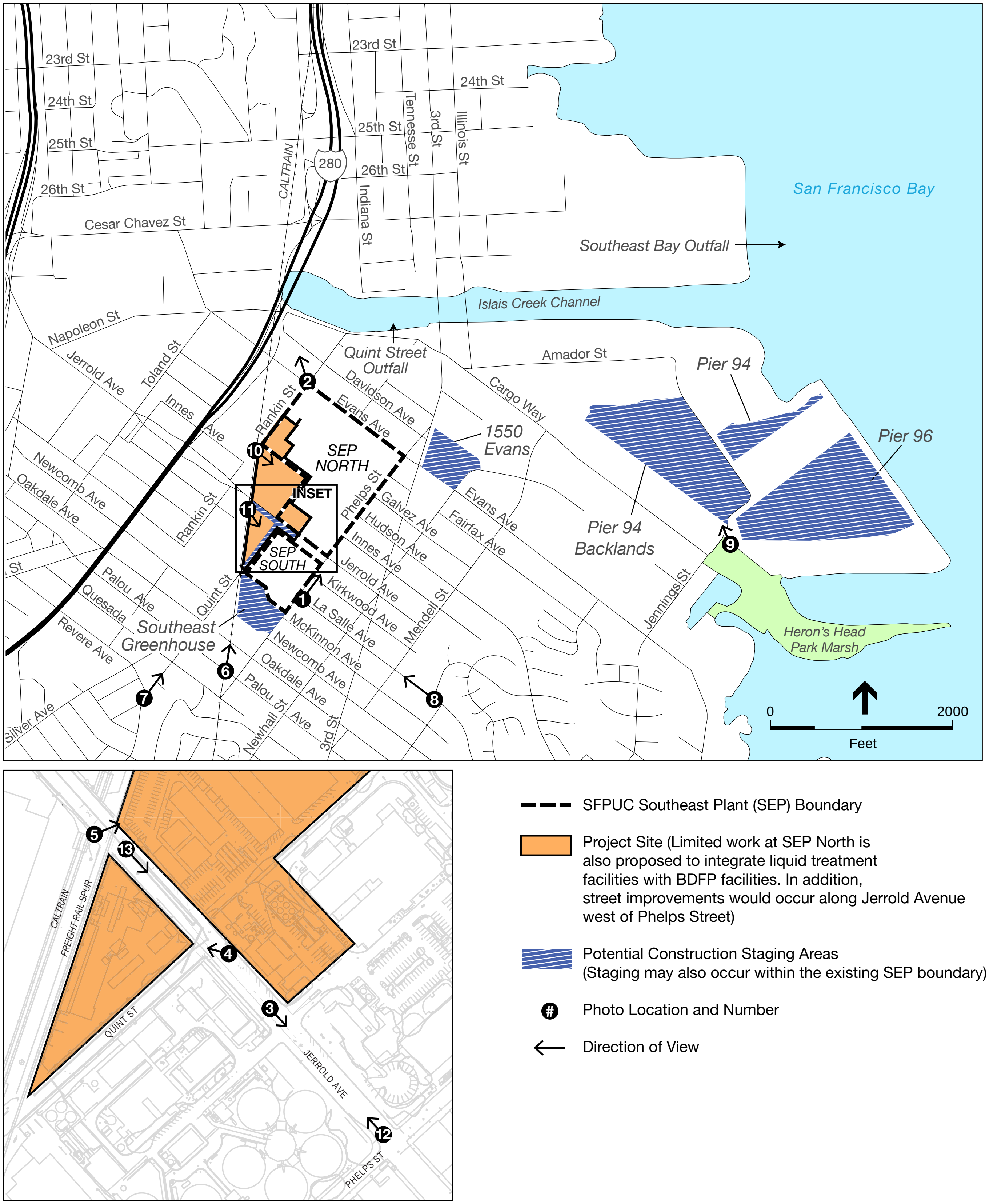
4.3.1.1 Visual Character of Project Site and Surroundings

The visual character of the project site and vicinity reflects the mix of industrial, commercial, and residential land uses located in the area. The area north and west of the Southeast Water Pollution Control Plant (Southeast Plant or SEP) is generally industrial, while commercial and industrial areas lie to the east in the area, north of Jerrold Avenue, and residential areas lie to the south and southeast, south of Jerrold Avenue. **Figure 4.3-1** provides a map showing the location and direction of photograph viewpoints presented in this section. **Figures 4.3-2** and **4.3-3** show views of the site and surroundings near the project site, and **Figures 4.3-4** and **4.3-5** show long-range views toward the project site from hillslopes south and southeast of the site.

Topography

Topography is relatively flat at the project site and to the west, north, and northeast, except for the 15-foot-tall Caltrain berm, which separates the project site from other flat industrial lands to the west. The land starts to gradually slope upward near the SEP's southern boundary, and then steepens south of Oakdale Avenue to become Silver Terrace, a hill that overlooks the project site from the south. Another hill (Stony Hill) rises to the southeast of the SEP, east of Mendell Street. Hills to the west are more distant; the western slopes of Bernal Heights lie west of Highway 101, approximately three-quarters of a mile from the project site's western boundary. Because the project site is located in a densely developed and relatively flat, low-lying industrial area, there are no scenic views or vistas[1] in the vicinity, and the SEP is not a prominent or distinct feature within the middle ground of any distant scenic views or vistas from other areas (e.g., from Bernal Heights or Silver Terrace toward the Bay).

[1] A scenic vista is generally considered to be a location from which the public can experience unique and exemplary high-quality views—typically from elevated vantage points that offer panoramic views of great breadth and depth.



SOURCE: San Francisco Public Works 2005 GIS data; ESA+Orion, data developed in 2016 for BDFP

SFPUC Biosolids Digester Facilities

Figure 4.3-1
Photo Location Map

Photo 1 - Phelps Street near LaSalle Avenue facing northeast

Photo 2 - Rankin Street at Evans Avenue facing northwest

SOURCE: ESA+Orion

SFPUC Biosolids Digester Facilities

Figure 4.3-2
Views of SEP and Surrounding Area
from Phelps and Rankin Streets

Visual Character

Project Site

SEP

The SEP site on both sides of Jerrold Avenue (SEP North and SEP South) is densely developed with industrial buildings, tanks, pump stations, piping, and other associated facilities. Figure 2-3 in Chapter 2, *Project Description*, indicates the location of existing facilities at the SEP.

The project site includes portions of SEP North near Rankin Street and Jerrold Avenue. Except for a 200-foot-tall chimney within SEP South near Quint Street (visible in Photos 6 and 7 on Figure 4.3-4 and in Photo 8 on Figure 4.3-5), the tallest structures are up to 65 feet in height; these include the Oxygen Generation Air Separators, which resemble two square towers at the oxygen generation building in SEP North, and waste gas burners and bin hoppers in SEP South. One of the existing headworks buildings extends for about 400 feet along Evans Avenue between Rankin Street and Phelps Street and is 62 feet tall. The other existing headworks building is on Rankin Street, just southwest of Evans Avenue, and is 60 feet tall. The digesters, located in the eastern half of SEP South adjacent to Phelps Street and Jerrold Avenue, are each approximately 100 feet in diameter and 30 feet in height. A 12-foot-tall wall surrounds most of the site, except at the offices and maintenance building on Phelps Street and the existing Headworks building, which abuts the sidewalk on Evans Avenue. The wall is constructed of concrete with a red brick veneer and topped with security bars painted black (see Photos 1, 3, and 4 on Figures 4.3-2 and 4.3-3).

As described in Section 4.5, Cultural Resources, most of the buildings and tanks at the SEP are constructed in the modern Streamline Moderne and Brutalist architectural styles. A total of 26 buildings and tanks in the Streamline Moderne style are part of the Southeast Treatment Plant Streamline Moderne Industrial Historic District (shown on Figure 4.5-2 in Section 4.5, Cultural Resources), which is eligible for listing on the National Register of Historic Places. Defining features of the Streamline Moderne style seen in SEP structures include board-formed concrete wall surfaces, glass block windows, cast concrete double moldings around windows and doors, and flat roofs with tile coping at the roofline.[2] Buildings in the Brutalist style (the name of which derives from the French term for raw concrete) are typically constructed of poured concrete with a rough blocky appearance, repetitive angular geometries, recessed windows, and geometric patterns including vertical and horizontal scoring.[3] The office and maintenance building on Phelps Street and the existing headworks building on Evans Avenue are the most visible SEP structures in the Brutalist style. The site also includes buildings that were added more recently and designed in utilitarian versions of Post Modern and Modern/Industrial architectural styles. The overall visual character of the SEP is represented by the perimeter brick-veneer wall surrounding interior structures of generally similar architectural styles that are mostly painted pale yellow or a similar color (ranging from buff to terra cotta) or have unpainted concrete surfaces. The existing headworks building on

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[2] Brewster, Brad (ESA), California Department of Recreation Primary Record for 750 Phelps Street (San Francisco Public Utilities Commission [SFPUC] Southeast Water Pollution Control Plant), June 2015.

[3] Ibid.

Photo 3 - Jerrold Avenue at Quint Street facing southeast

Photo 4 - Jerrold Avenue near Quint Street facing west toward asphalt plant

Photo 5 - Jerrold Avenue facing northeast toward Central Shops site

SOURCE: ESA+Orion

SFPUC Biosolids Digester Facilities

Figure 4.3-3
Views of BDFP Project Site, SEP from Jerrold Avenue

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Photo 6 - Palou Phelps Mini Park facing north (chimney at SEP at center of photo)

Photo 7 - Quint Street at Maddux Avenue facing northeast (chimney at SEP at center of photo)

SOURCE: ESA+Orion

SFPUC Biosolids Digester Facilities

Figure 4.3-4
Views Toward BDFP Project Site from South

Photo 8 - LaSalle Avenue at Cashmere Street facing northwest

SFPUC Biosolids Digester Facilities
Figure 4.3-5
View Toward BDFP Project Site from Southeast

Evans Avenue and SEP offices and maintenance building on Phelps Street are beige concrete; green ductwork near the existing headworks buildings provides some visual contrast. The perimeter brick-veneer wall and similar architectural styles and coherent color scheme of structures within the site lend visual cohesion to the SEP facility.

Central Shops Site

The Central Shops site includes two fully enclosed permanent buildings, Buildings A and B (one and two stories, respectively), constructed in the Industrial Modern architectural style (as discussed in more detail in Section 4.5, Cultural Resources, Section 4.5.1); a smaller open-sided building, Building C (one story); several portable buildings; and a parking area currently used for City and County of San Francisco (CCSF or City) vehicles (see Photo 5 on Figure 4.3-3). The site is surrounded by a chain-link fence topped by razor wire. Buildings A and B have small-paned steel sash windows, which have been whitewashed or coated with translucent film, covering the upper two-thirds of the building façade. Building B is about 50,000 square feet in area and about 30 feet tall, Building A is about 16,200 square feet in area, and Building C is about 13,000 square feet.[4] The portable buildings are each one story with white walls and together occupy about one-half acre.

[4] JRP Historical Consulting, LLC, Department of Parks and Recreation (DPR) form, 1800 Jerrold Avenue Prepared for the San Francisco Public Utilities Commission, November 2014. On file with the San Francisco Planning Department.; reference case number 2015.000644, Biosolids Digester Facilities Project.

Asphalt Plant Site

The Asphalt Plant site (shown in Photo 4 on Figure 4.3-3) includes several prominent decommissioned pieces of equipment—a steel asphalt-mixing structure that is about 65 feet long and 40 feet tall, two asphalt silos that are about 10 feet in diameter and 30 feet tall, and aggregate storage bins that are about 25 feet tall and have a combined length of about 100 feet—as well as a 220-foot-long, single-story storage shed along the back of the site, parallel to the Caltrain tracks; and other associated industrial buildings and equipment that contribute to the industrial character of the site. A chain-link fence topped by razor wire surrounds the site.

Surrounding Areas

The residential neighborhood adjacent to the SEP (shown in Photo 1 on Figure 4.3-2) extends south from Jerrold Avenue and east from the east side of Phelps Street. It consists primarily of closely spaced one- to three-story residences and includes single-family and multi-family units with some interspersed commercial uses. The units reflect a mix of housing styles and are painted primarily in subdued neutral and pale pastel colors.

Commercial land uses bordering the SEP on the east side of Phelps Street north of Jerrold Avenue and on the north side of Evans Avenue are housed in utilitarian one- and two-story buildings set close to the sidewalk. Most of the buildings are corrugated metal interspersed with a few stucco and brick buildings. Rooflines vary from flat to low- and medium-pitched. Near the northwestern corner of the SEP, a gray corrugated metal fence that until recently enclosed an auto salvage yard lines most of the block opposite the SEP on the north side of Evans Avenue between Quint and Rankin Streets, and an industrial scrap iron and metal dealer is located opposite the SEP on the west side of Rankin Street. Interstate 280 (I-280), an elevated, divided six-lane freeway west of the scrap metal dealer, is a prominent visual feature in this area. A view of this area, facing northwest from the SEP, is shown in Photo 2 on Figure 4.3-2. The scrap metal business includes several long windowless, two-story warehouses and fenced-in scrap yards on the west side of Rankin Street south of Evans Avenue. This block of Rankin Street dead-ends at the Caltrain berm near the back of the Central Shops site, has no sidewalks, includes the rail spur tracks, provides parking for heavy-duty haul vehicles and equipment, and has several bins and barrels holding scrap metal and scrapped equipment on the side of the street. It appears that structures on this block of Rankin Street are often subject to graffiti, probably due to the low level of public use of this area.

Numerous food and beverage distribution warehouses, including the San Francisco Wholesale Produce Market, are located west of the Caltrain berm to the west of the project site. Buildings in this area consist primarily of large one- and two-story, mostly windowless warehouses made of corrugated metal with flat or low-pitched roofs. Streets in the area are wide, and the warehouses include loading bays and substantial paved areas to accommodate large trucks. Chain-link fences surround many of the properties. Aboveground utility poles and lines contribute an element of visual clutter to the streetscapes in the project area.

Street-facing trees, which constitute a visual resource in this urbanized setting, line the south side of Evans Avenue and both sides of Phelps Street and Jerrold Avenue in the project site vicinity. Many of the trees on Evans Avenue are young and currently provide minimal screening or shade, but can be expected to grow and enhance the visual environment over time. Most of the trees on Phelps Street and Jerrold Avenue are more mature and contribute more to the visual setting.

4.3.1.2 Visual Character of Potential Off-Site Staging Areas[5]

Piers 94 and 96

The Piers 94 and 96 staging areas are located in a mostly flat, expansive, highly industrialized port area. The elevation of the Pier 94 Backlands area is slightly higher than that of the piers, and the area is currently used for storage of large piles of dredged sand and other materials (see Photo 9, **Figure 4.3-6**). (As part of the Pier 90-94 Backlands Improvements project described in Section 4.1, the Port of San Francisco intends to remove these materials and make other site improvements.) The Piers 94 and 96 staging areas east of Amador Street include expanses of paved surface area interspersed with few structures and buildings. Container cranes are located on the east end of Pier 96. Recology's recycling facility, housed in a large corrugated metal building, is located on the south side of Pier 96, and a rail transfer facility operated by San Francisco Bay Railroad Company is located between Cargo Way and the Pier 94 Backlands.[6] Numerous heavy industrial uses are located between the Islais Creek Channel and Amador Street north of the Pier 94 and Pier 94 Backlands staging areas. There is also a paved portion of the Bay Trail that extends along Cargo Way from Heron's Head Park to Amador Street.[7]

Photo 9 - Heron's Head Park facing northwest

SFPUC Biosolids Digester Facilities

Figure 4.3-6
View Toward Pier 94 Backlands Staging Area from Heron's Head Park

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5 The visual character of the staging areas on Quint Street and Jerrold Avenue is the same as described above for the project site, which they border.
6 San Francisco Bay Railroad. Available online at http://www.sfbayrail.com/. Accessed on August 22, 2016.
7 San Francisco Bay Trail Project, San Francisco Bay Trail Navigational Map. Available online at http://www.baytrail.org/baytrailmap.html. Accessed on April 5, 2017.

Just south of Pier 96, Heron's Head Park is a small peninsula with low-growing vegetation and restored wetlands that extends about one-half mile into the Bay parallel to the south side of Pier 96. Heron's Head Park contains an entrance to a portion of the Bay Trail that extends through the park via a dirt/gravel path. Except for a knoll near the park entrance, on which a small one-story building (the park's education center) is located, the park and its surroundings are relatively flat. The low-growing vegetation and generally flat topography afford views in many directions from the single wide path that extends the length of the park. While the relatively natural landscape within the park is visually different from surrounding areas, the park is narrow, has a paved parking area near the entrance, and as seen from nearby roadways does not substantially influence the overall visual character of the area. The visual character of the park vicinity is primarily industrial due to the surrounding land uses, which include port facilities and activities at Piers 96 and 94 to the north and northwest, an electrical substation to the south, and warehouses and related industrial structures to the west.

Southeast Greenhouses

This staging area is located at 1150 Phelps Street, between the existing digesters and Southeast Community Facility. Most of the Southeast Greenhouses are low, nondescript, one-story structures with whitewashed windows, set back from the street. The most prominent features of the greenhouses are four tall, narrow structures near the edge of the property on Phelps Street. As a separate action from the BDFP, the San Francisco Public Utilities Commission (SFPUC) plans to demolish the existing structures at the Southeast Greenhouses site (refer to Table 4.1-1 in Section 4.1). The site would be used for construction staging for the project if it becomes available prior to BDFP construction.

1550 Evans Avenue

This staging area is located at the corner of Evans Avenue and Third Street, a major arterial in this part of San Francisco. Existing buildings and fencing are set back from both Evans Avenue and Third Street, separated from the sidewalk by a grass berm and trees next to perimeter fencing. There are also trees between the sidewalk and street, although these are younger and smaller than the trees along the berm. The fencing and two-story buildings that can be seen from the street are painted brick red, which provides visual cohesion to the site. The berm and trees on Third Street continue to the north and south of the site, providing visual continuity with these adjacent areas. The site is across Evans Avenue from the Bayview Plaza shopping center, consisting of two-story retail and office buildings surrounding a central paved parking area, across Newhall Street from City College of San Francisco Evans Campus, and across Third Street from two gas stations. Other light industrial and commercial businesses in the area are housed in utilitarian two or three-story buildings interspersed with parking areas.

4.3.1.3 Views

The project site and nearby staging areas (i.e., Southeast Greenhouses site, 1550 Evans Avenue) are located in a densely developed and generally flat, low-lying area of the city. Views of the sites are typically very short-range, primarily from adjacent areas (as shown in Photo 1 on Figure 4.3-2 and on Figure 4.3-3), due to the intervening structures (and, to some extent, trees) between the sites and an observer located at greater distances. The clearest view corridors toward the project site and nearby staging areas are provided by adjacent streets, and these views are nevertheless limited by nearby structures and trees or, in the case of views of the project site from higher elevations, by distance (as shown on Figures 4.3-4 and 4.3-5). The views of the project site and staging areas from street corridors are necessarily brief as the viewer (motorist, bicyclist, or pedestrian) moves through the area.

From the higher-elevation vantage points, the project site appears below the horizon line (except for the existing 200-foot-tall chimney located within SEP South). Therefore, structures at and near the SEP are less noticeable from these vantage points than if more of the site's structures could be seen against the sky or Bay.

In addition, fleeting views of the project site and the SEP are available to passengers traveling on Caltrain between the 22nd Street and Bayshore stations, since the train tracks lie directly adjacent to the project site. This route carries large numbers of people commuting between San Francisco and various locations on the Peninsula, and close-up views of the project site dominate the foreground of views of this part of the city. **Figure 4.3-7** shows fleeting views from the southbound Caltrain local route, train #190; Photo 10 shows the Central Shops site and Photo 11 shows the Asphalt Plant site.

Views of the Piers 94/96 staging areas are substantially limited by intervening structures and landscaping. Existing views toward the Piers 94 and 96 staging areas from Cargo Way and from industrial areas located south of Cargo Way are largely blocked by materials stored in the Backlands area and to a lesser extent by the small street trees along Cargo Way. Similarly, views north and west toward the Pier 94 Backlands area from the entrance of Heron's Head Park are largely blocked by nearby structures on Jennings Street and the stored materials, as shown on Figure 4.3-6.

Farther into Heron's Head Park, the recycling building and cranes at Pier 96 are visible to the north. Wider streets along Cargo Way near the Piers 94 and 96 staging areas and near the 1550 Evans Avenue staging area provide somewhat longer views toward these staging areas. However, wider streets also may involve higher speed limits (making views more transitory) and intervening structures and landscaping limit views from street corridors in these areas as well.

Photo 10 - Southbound Caltrain Local Route Train #190 facing southeast toward Central Shops site

Photo 11 - Southbound Caltrain Local Route Train #190 facing southeast toward Asphalt Plant site

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SOURCE: ESA+Orion

Figure 4.3-7
View (Fleeting) Toward BDFP Project Site from
Southbound Caltrain Local Route, Train #190

4.3.2 Regulatory Framework

4.3.2.1 Federal Regulations

No federal regulations related to aesthetics apply to the project.

4.3.2.2 State Regulations

Scenic Highway Program

In 1963, the state legislature established the California Scenic Highway Program, a provision of the Streets and Highways Code, to preserve and enhance the natural beauty of California. The State Highway System includes highways that either are eligible for designation as Scenic Highways or have been designated as such. There are no officially designated Scenic Highways in San Francisco County, although I-280 is identified as an Eligible State Scenic Highway along its length in the county.[8]

California Green Building Code

The California Green Building Code includes mandatory requirements for exterior light sources to reduce the amount of light and glare that extends beyond a property. Non-residential mandatory measures contained in Section 5.106.8, Light Pollution Reduction, require that exterior lights be shielded or meet “cutoff” lighting standards and meet specified backlight, uplight, and glare ratings designed to limit the amount of light that escapes beyond a site’s boundary.

4.3.2.3 Local Regulations

Several local plans and policies, including the *Bayview Hunters Point Area Plan* and the Accountable Planning Initiative (described in Chapter 3, *Plans and Policies*), and the Arts Commission Civic Design Review guide elements of project design in the BDFP vicinity and relate to aesthetics but do not otherwise inform the California Environmental Quality Act (CEQA) analysis of aesthetic impacts. Thus, they are not discussed below.

San Francisco General Plan

The Urban Design Element of the *San Francisco General Plan* concerns the physical character and order of the city, and the relationship between people and their environment. It includes a “Quality of Street Views” map that rates city streets as “excellent,” “good,” or “average” for the quality of their views. In the project area, Jerrold Avenue between Phelps Street and Quint Street is identified as having good-quality street views. The remainder of Jerrold Avenue in the project area (northwest of Quint Street and southeast of Phelps Street) is rated as having average-quality street views. Rankin Street and Quint Street northeast of the SEP (from Evans Avenue to where the streets end near the

[8] California Department of Transportation (Caltrans), California Scenic Highway Mapping System, San Francisco County. Available online at http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/lists/2016-02_OD_and_E.xlsx. Accessed on July 19, 2016.

Islais Creek Channel) are rated as having good-quality street views. Rankin Street south of the SEP and Phelps Street along the SEP boundary northeast of Jerrold Avenue are also rated as having average-quality street views. Oakdale Avenue between Phelps Street and I-280 is rated as having good-quality street views, and a block of Quint Street between Oakdale and Newcomb Avenues is rated as having excellent-quality views.

General Plan policies relevant to the analysis of the project's aesthetic effects include the following:

- **Transportation Element Policy TRA.PED.24.2***:* Maintain and expand the planting of street trees and the infrastructure to support them.

San Francisco Better Streets Plan

The *San Francisco Better Streets Plan* (*Better Streets Plan*)[9] was adopted in 2010. As discussed in Chapter 2, *Project Description*, Section 2.4.2.3, proposed architecture and landscaping associated with the BDFP would be designed consistent with the *Better Streets Plan*. *Better Streets Plan* policies related to enhancing the attractiveness of the streetscape and addressing light and glare effects include maximizing opportunities for street trees and other plantings, ensuring adequate light levels and quality for pedestrians and other sidewalk users, and minimizing light trespass and glare to adjacent buildings.

Better Streets Policy

San Francisco's Better Streets Policy was adopted and added to the City's Administrative Code as Chapter 98 in 2006. It includes the following provisions of particular relevance to visual character and quality:

- **Section 98.1(c):** The Better Streets Policy also is intended to ensure that the City's public rights-of-way become:
  - (1) Attractive, safe, and useable public open spaces corridors with generous landscaping, lighting, and greenery
  - (3) Providers of access to properties, public view corridors, light, and air
- **Section 98.1(d):** As part of an approval or decision concerning any public and private project that impacts or is adjacent to a publicly accessible right-of-way, all City departments shall coordinate their various determinations regarding the planning, design, and use of public rights-of-way in accordance with the Better Streets Policy and the following supporting principles:
  - (7) The design of the right-of-way and adjacent development, including the maintenance and removal of street trees and other landscaping, allowance of curb cuts, and placement of utilities, have significant impact on the street environment. Decisions regarding street design must consider and prioritize pedestrian safety, enjoyment, and comfort.

9 City and County of San Francisco, *San Francisco Better Streets Plan*, adopted by the San Francisco Board of Supervisors on December 7, 2010. Available online at http://www.sf-planning.org/ftp/BetterStreets/proposals.htm#leg. Accessed April 5, 2017.

Urban Forestry Ordinance

San Francisco's Urban Forestry Ordinance, Article 16 of the San Francisco Public Works Code, was enacted to ensure the protection of several categories of trees. "Street Trees" is the category that is particularly relevant to the visual character of the project site vicinity. Section 806, Planting and Removal of Trees, provides guidance regarding planting and removal of trees, including by City agencies, commissions, and departments.

San Francisco Green Building Code

The San Francisco Green Building Code was adopted in 2008 and became part of the San Francisco Building Inspection Commission Code; its requirements are intended to reduce energy and water use, divert waste from landfill, encourage alternative modes of transportation, and support the health and comfort of building occupants in San Francisco. The requirements were updated in 2010 to combine the mandatory elements of the 2010 California Green Building Standards Code with stricter local requirements, and updated again in 2013 to incorporate changes to California's Green Building Standards and Energy Efficiency Standards (California Building Code Title 24 Part 6 - 2013).[10] The San Francisco Green Building Code incorporates California Green Building Code requirements to reduce light pollution (described in Section 4.3.2.2, State Regulations, above).

Industrial Area Design Guidelines

The City's Industrial Area Design Guidelines (IADG) support the San Francisco General Plan and Planning Code and act as a tool to implement their objectives, policies and requirements. The IADG are primarily concerned with whether a design respects established context, contributes to the visual quality of surroundings, and maintains or creates appropriate streetscapes. The IADG identify the context of the area where the project site is located as "a primarily industrial context." The IADG's main objective for primarily industrial context is to "maintain and enhance the unique architectural character of predominantly industrial districts while still allowing for an appropriate integration of new development."[11]

Reflective Glass (Planning Commission Resolution 9212)

Planning Commission Resolution No. 9212 (1981) established a pair of guidelines for reviewing and acting on proposed building projects. The first guideline states that clear, untinted glass should be used at and near the street level. The second guideline states that mirrored, highly reflective, or densely tinted glass should not be used except as an architectural or decorative element. By prohibiting mirrored or reflective glass, this resolution serves to limit glare.

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[10] San Francisco Department of the Environment, San Francisco Green Building Code. Available online at http://sfenvironment.org/article/new-construction-and-major-renovations/green-building-ordinance-san-francisco-building-code. Accessed on March 21, 2016.

[11] City and County of San Francisco, San Francisco Planning Department, Industrial Area Design Guidelines, August 2001.

Local Roadway Designations

San Francisco's Downtown Association created the 49-Mile Scenic Drive in 1938 to highlight San Francisco's beauty and to promote the city as a tourist destination. The scenic roadway nearest to the SEP and off-site staging areas is Cesar Chavez Street between I-280 and Dolores Street. This roadway is recognized for its aesthetic value. At its nearest point (Cesar Chavez Street at I-280), this scenic roadway is about one-third mile from the SEP and three-quarters of a mile from the Piers 94 and 96 staging areas. From this scenic roadway, the freeway and numerous intervening structures block views toward the project site and staging areas.

SFPUC Standard Construction Measure 8

The SFPUC would implement standard construction measures for the BDFP (described in **Appendix SCM**), including the following measure applicable to aesthetic resources:

- All project sites will be maintained in a clean and orderly state. Construction staging areas will be sited away from public view where possible. Nighttime lighting will be directed away from residential areas and have shields to prevent light spillover effects. Upon project completion, project sites on SFPUC-owned lands will be returned to their general pre-project condition, including re-grading of the site and re-vegetation or re-paving of disturbed areas to the extent this is consistent with SFPUC's Integrated Vegetation Management Policy. However, where encroachment has occurred on SFPUC-owned lands, the encroaching features may not be restored if inconsistent with the SFPUC policies applicable to management of its property. Project sites on non-SFPUC land will be restored to their general pre-project condition so that the owner may return them to their prior use, unless otherwise arranged with the property owner.

4.3.3 Impacts and Mitigation Measures

4.3.3.1 Significance Criteria

The project would have a significant impact related to aesthetics if the project were to:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built environment or natural environment which contribute to a scenic public setting;
- Substantially degrade the existing visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area, or which would substantially impact other people or properties.

Due to the nature of the proposed project, there would be no impact related to the following topic for the reasons described below:

- ***Have a substantial adverse effect on a scenic vista.*** There are no scenic vistas in the project vicinity, and no scenic vistas would be affected by the project because the project site and off-site staging areas are located in a low-lying densely developed industrial part of the city. Most views of the site are limited to short-range views from adjacent streets or properties, because intervening development would obstruct longer-range views from similar elevations. As seen from higher elevations, such as hillsides to the south that have views toward the Bay, project facilities would be below the horizon, in the middle-ground of such views, and barely noticeable or indistinguishable from surrounding development. Therefore, this significance criterion is not discussed further in this environmental impact report (EIR).

4.3.3.2 Approach to Analysis

The visual quality impact analysis is based on field observations conducted by ESA in July 2015; review of project maps and drawings; aerial and ground-level photographs; simulations of the project within photographs; and review of a variety of data in the record, including local planning documents. The analysis evaluates potential temporary (short-term) and permanent (long-term) project impacts on visual character and views of the site as seen from nearby and more distant urban locales, and the potential visual impacts of the proposed temporary use of off-site staging areas. The approach to evaluating the effect of the project under each applicable significance criterion is briefly described as follows:

- ***Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings which contribute to a scenic public setting.*** Damage to a scenic resource is substantial when it is reasonably perceptible to affected viewers and when it appreciably degrades one or more of the aesthetic qualities that contributes to a scenic setting. Given the industrial, intensely urbanized setting of the project site and off-site staging areas, the only scenic resources potentially affected are street trees and other landscaping. This analysis considers the presence of and potential damage to scenic resources, along with project-related effects on the existing visual character and quality of a site or surroundings (see next bullet).

- ***Substantially degrade the existing visual character or quality of the site and its surroundings.*** A project is considered to "substantially degrade" the visual character or quality of a site if it would have a strongly negative influence on the public's experience and appreciation of the visual environment. As such, visual changes are considered in the context of the site and locale's visual sensitivity. Visual sensitivity is the overall measure of a site's susceptibility to adverse visual changes based on the combined factors of visual quality, viewer types and volumes, and viewer exposure to the project. Due to the industrial, utilitarian character of the SEP, the Asphalt Plant and Central Shops sites, and the staging area sites, the visual quality of the project site and staging areas is considered moderate to low. Views of the project site from public areas are limited to those available to motorists, bicyclists, and pedestrians passing by on adjacent streets. Views of the project site from public areas within the residential area southeast of the SEP are limited by intervening structures and landscaping. Views of the off-site staging areas are similarly limited by intervening structures and landscaping. Therefore, overall the number of viewers and their exposure to views of the project and staging area sites are limited. Visual changes caused by the project are evaluated in terms of their visual contrast with the area's predominant landscape elements and features, their dominance in views relative to other existing features, and the degree to which they could block or obscure views of aesthetically pleasing landscape elements. Visual changes are also evaluated in terms of potential damage to or removal of features of the natural or built environment that contribute visual appeal to a public setting. The magnitude of visual change that would result in a significant impact (i.e., substantial degradation) is influenced by its degree of permanence, and is inversely related to the visual sensitivity of a site (that is, more visual change could occur at a site with low visual sensitivity without resulting in a significant impact, compared to a site with greater visual sensitivity, which could be substantially degraded by a smaller degree of visual change).

- ***Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area or which would substantially impact other people or properties.*** This criterion is applicable to project components that require nighttime lighting (either during construction or operation), or that involve structures or finishes that could create substantial glare. If there are project components that would create glare, the analysis determines if new sources of glare would adversely affect day or nighttime views in the area or would substantially affect other people or properties.

Construction Impacts

The evaluation of temporary visual impacts considers whether project construction activities could substantially degrade the existing visual character or quality of the site or surrounding area, including potential impacts on scenic resources, or introduce substantial new sources of light and glare during nighttime construction.

Operational Impacts

Permanent visual impacts were assessed based on the project's potential to substantially alter scenic resources (by removing trees and other landscaping), introduce substantial new sources of light and glare, or permanently alter the urban landscape in a manner that would adversely affect the visual character or quality of the area. The visual sensitivity of the project area was also a factor in determining impact potential.

Cumulative Impacts

Section 4.1.3, Approach to Cumulative Impact Analysis and Cumulative Projects, describes the overall approach to the cumulative analysis for those topics using a list-based approach and summarizes probable future projects in the vicinity of the project that could contribute to a cumulative impact; please refer to Table 4.1-1 and Figure 4.1-1 for a description and location of potential cumulative projects in the vicinity of the BDFP. The cumulative analysis for aesthetics uses a list-based approach to analyze the effects of the project in combination with other past, present, and probable future projects in the immediate vicinity. The effects that construction at the project site and construction equipment and activities at the staging areas could have on the visual character of the area would not fundamentally differ from the visual effects of the project during operations (except that the staging areas would no longer be used in connection with the project); therefore, these cumulative impacts of construction and operation are analyzed together; cumulative light and glare impacts of construction and operation are analyzed separately. The cumulative impact analysis assumes that construction and operations of other projects in the geographical area, listed in Table 4.1-1, would be required to comply with the same regulatory requirements as the project, which would serve to avoid and reduce many impacts to less-than-significant levels on a project-by-project basis. The analysis then considers whether or not there would be a significant, adverse cumulative impact associated with project implementation in combination with past, present, and probable future projects in the geographical area, and if so, whether or not the project's incremental contribution to the cumulative impact would be considerable. Both conditions must apply in order for a project's contribution to cumulative effects to be deemed cumulatively considerable (significant). If so, then mitigation measures are identified to reduce the project's contribution to the extent feasible.

The geographic scope of the cumulative analysis includes all projects that would be located within the publicly accessible viewshed of the project. The cumulative project sites do not necessarily need to be visible simultaneously with the BDFP site from one fixed vantage point, but for an impact to occur, the sites must be visible in the same general vicinity as a viewer looks around or travels about. As stated above, the visual setting of the project site and SEP is defined by topography and the density of development in the area. Therefore, the geographic scope of cumulative aesthetic impacts extends about 2,000 feet in every direction from the combined project site and SEP boundaries. This distance is consistent with the most distant of the long-range views presented in Section 4.3.1, Setting (Figure 4.3-5). Due to the density of development in the area and the project's location in a topographically low area, most views of the project site are much shorter-range. The analysis also includes consideration of cumulative projects at and near Piers 94 and 96 due to their proximity to the Piers 94 and 96 staging areas.

4.3.3.3 Impact Evaluation

Construction Impacts

Impact AE-1: Project construction would not substantially degrade the existing visual character of the site or its surroundings or damage scenic resources. (Less than Significant)

Project Site

Equipment associated with project construction would be smaller than or similar in size and height to other equipment and buildings in the area, and much of it would be similar in character to equipment typically used at industrial sites in the area, including equipment used for ongoing repair and replacement activities at the SEP. In addition, over the five-year construction period, much of the project demolition and construction activities and equipment would not be visible from public streets and residential, commercial, and industrial properties in the area because views of the project site would be blocked by other SEP buildings on the north and east of the project site, the 15-foot-tall Caltrain berm on the west, and other surrounding buildings in the area, as discussed in Section 4.3.1.3, Views. Views from adjacent or nearby streets for passing motorists, bicyclists, and pedestrians, including those from Caltrain, would be brief and quickly replaced by succeeding streetscape views as the viewer moves through the area. The potential closure of Jerrold Avenue east of the Caltrain tracks for use as a staging area would further limit views of project construction. Because the project site is situated in a topographically low area, some project construction may be discernable from hills to the south and southeast but is not expected to substantially affect such views due to distance; the project area as seen from these higher elevations would be below the horizon and difficult to distinguish from surrounding land uses (refer to Figures 4.3-4 and 4.3-5, above). The visual effect of the Quint Street and Jerrold Avenue staging areas would be as described above for the project site; staging activities and equipment would be similar in character to activities and equipment used at surrounding industrial sites and would not substantially degrade the visual character of the area.

Piers 94/96

The off-site staging areas are also located in areas that are largely industrial in character, and their use for construction staging would be similar to the existing visual character of the sites and their surroundings. Staging areas would primarily accommodate office trailers, construction materials such as pipe, wiring and formwork, truck parking, and construction workforce parking; a shuttle service would transport workers between the staging area and project site at the beginning and end of each shift.[12] The Piers 94 and 96 staging areas are designated for port and heavy industrial uses and surrounded by industrial land uses. Portions of these areas are currently used for storage of dredged sand and demolition debris (e.g., the former Embarcadero Freeway) which may shield views toward portions of these staging areas from some directions, assuming this use continues. Views toward Piers 94 and 96 from Heron's Head Park (and the Bay Trail) are partially blocked by intervening structures and topographic features (see Figure 4.3-6, above), and the activities and equipment associated with construction staging would be similar in character to current uses of the piers; therefore the equipment and activities associated with project staging would not adversely affect views from the park.

Southeast Greenhouses Site

One side of the Southeast Greenhouses site borders a residential neighborhood and another side borders the Southeast Community Facility. As noted above in Section 4.3.1.2, the SFPUC plans to demolish buildings at the Southeast Greenhouses site as part of a separate project. Use of the site for temporary construction staging, if the site becomes available, would not substantially degrade the visual character of the area given its existing visual character and future appearance following removal of the structures at the site.

1550 Evans Avenue Site

As part of the project, the SFPUC would remove some perimeter trees and other landscaping along Evans Avenue and Newhall Street and within the site to facilitate use of the site for construction staging (parking and materials storage). No trees would be removed within 30 feet of Third Street as the San Francisco Redevelopment Agency holds an easement for the landscaping in this portion of the site.[13] The trees along Evans Avenue that would be removed are those closest to the structures that would be demolished, while trees closer to the street would be retained. Although the mature trees and other landscaping that would be removed provide some visual interest, perimeter trees that would be retained would continue to provide visual interest; in addition, there are few viewing opportunities from the surrounding area, which includes commercial, industrial and institutional uses. In this context, while removal of some trees would lessen the overall visual quality of the site, the net change in visual quality would not be substantial. As described in Chapter 2, Project Description, this site would be used for parking, material staging, and/or office space during construction, which would be similar to and visually compatible with the surrounding land uses.

SFPUC Standard Construction Measures

The SFPUC would implement standard construction measures (described in Appendix SCM) pertaining to visual and aesthetic considerations, which would ensure that the project construction

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[12] SFPUC, *BDFP Conceptual Engineering Report*, 2016. [pdf pp 3913-3918]

[13] San Francisco Public Utilities Commission Water Supply and Treatment Division Survey Section, City and County of San Francisco, 1550 Evans Avenue, A.L.T.A. Survey for San Francisco Public Utilities Commission, provided to ESA by SFPUC July 13, 2016. The San Francisco Office of Community Investment and Infrastructure is the state-authorized local entity serving as the successor to the former San Francisco Redevelopment Agency.

site and staging areas are maintained in a clean and orderly condition and thereby limit the impact of construction-related litter and debris on the visual character of the surrounding neighborhood.

Summary of Impact AE-1

For reasons stated above, the impact of project construction on the visual character and scenic resources of the project site and staging areas would be ***less than significant***.

Mitigation: None required.

Impact AE-2: Project construction would not create a substantial new source of light or glare that could adversely affect nighttime views in the area, or could substantially impact other people or properties. (Less than Significant)

No equipment or activities associated with daytime construction are expected to create a substantial new source of light or glare that could adversely affect daytime views or substantially affect other people or properties in the area. However, as stated in Chapter 2, *Project Description* (Section 2.6.1), for most of the project construction period, construction activities at the project site would occur Monday through Friday from 7:00 a.m. to 3:30 p.m., with some activities extending to 8:00 p.m. as needed. Construction could also occur on Saturdays and Sundays when needed. During the peak of construction (a period of approximately one year), construction would occur in two shifts per day: Monday through Saturday from 7:00 a.m. to 3:30 p.m. and from 2:30 p.m. to 11:00 p.m. The project site and off-site staging areas are expected to have all-night security lighting during construction. Nighttime work would require illumination of construction work areas and, if not adequately shielded, light needed to safely illuminate a construction site could produce substantial light and glare outside the work area that could adversely affect people and properties in the vicinity. Although potentially affected areas outside the SEP would include public streets adjacent to the project site and off-site staging areas used by motorists and pedestrians, Caltrain traveling on the adjacent tracks occupied by operators and passengers, industrial areas west of the Caltrain tracks, and upper floors of nearby residential areas, the potential for residential areas to be affected is limited due to distances from the project site as well as intervening structures. The area affected would be limited, and the duration of nighttime illumination of work areas would be limited as well. In addition, the SFPUC would implement standard construction measures (described in Appendix SCM) pertaining to visual and aesthetic considerations, which require that nighttime lighting be directed away from residential areas and have shields to prevent light spillover effects. For these reasons, the effects of light and glare on people and properties in the vicinity would be ***less than significant***.

Mitigation: None required.

Operational Impacts

Impact AE-3: Project operation would not substantially degrade the existing visual character of the site or its surroundings or damage scenic resources. (Less than Significant)

The proposed BDFP facilities would be located within existing industrial sites that are, or until recently have been, developed with industrial facilities at the SEP, Asphalt Plant, and Central Shops sites. The tallest new facilities (new digesters, biosolids dewatering facility, and solids pretreatment facility) would be 65 feet above grade, similar to several existing SEP facilities, and the digester gas storage tank and energy recovery facility would be about 60 feet above grade. (Some appurtenant features would extend above 65 feet, such as the exhaust stack for the energy recovery facility.) Most of the other new structures would range in height from about 20 feet to about 50 feet above grade. The SFPUC is designing project architectural and landscaping features to meet the project objective to "provide visual improvements that promote a cohesive architectural design and identity at the BDFP site, enhance the overall aesthetics, and improve the public edges in a manner consistent with the surrounding neighborhood and the rest of the SEP." Refer to Figure 2-6 in Chapter 2, *Project Description*, for a preliminary massing diagram of the BDFP. Figures 2-9 through 2-11 present the proposed streetscape for Jerrold Avenue, architectural design concepts, and landscaping improvements for the BDFP.

Visual Character of Project Facilities

The new energy facilities and maintenance shops would incrementally increase the density of development on Jerrold Avenue. However, the new facilities would replace industrial facilities and would be accompanied by street improvements on both sides of Jerrold Avenue. **Figures 4.3-8 and 4.3-9** present existing views on Jerrold Avenue in the project site vicinity and photo simulations showing the same views with proposed project facilities and street improvements as currently envisioned, based on design information regarding building finishes and materials, and landscaping and streetscaping components. It is expected that minor changes in building design and landscaping/streetscape plans would occur as the project design proceeds; however, the overall building mass and scale, and design elements would generally remain similar to that depicted in photo simulations. The new energy recovery facilities would be present briefly in the foreground of views seen by motorists, bicyclists, and pedestrians traveling southeast on Jerrold Avenue, as shown on Figure 4.3-9, and an increase in massing in the foreground and reduced views of the distant hillside southeast could be noticeable. When a viewer reaches the next block of Jerrold Avenue (i.e., between Quint and Phelps Streets) to the southeast (which is identified in the *San Francisco General Plan* as having good-quality street views), the view would be unchanged with BDFP implementation as no structures are proposed in this area. The resulting view of the new energy recovery facilities along with the proposed street improvements (discussed further below) may be perceived as an aesthetic improvement compared to the existing view of the Asphalt Plant.

The largest new structures under the BDFP would be the five anaerobic digesters that would be constructed parallel to the Caltrain right-of-way at the Central Shops site, as shown on Figure 2-6 in Chapter 2, *Project Description*. The digesters would have a cylindrical shape, be up to 70 feet in diameter, extend 65 feet above grade, and be constructed with vertical concrete walls.

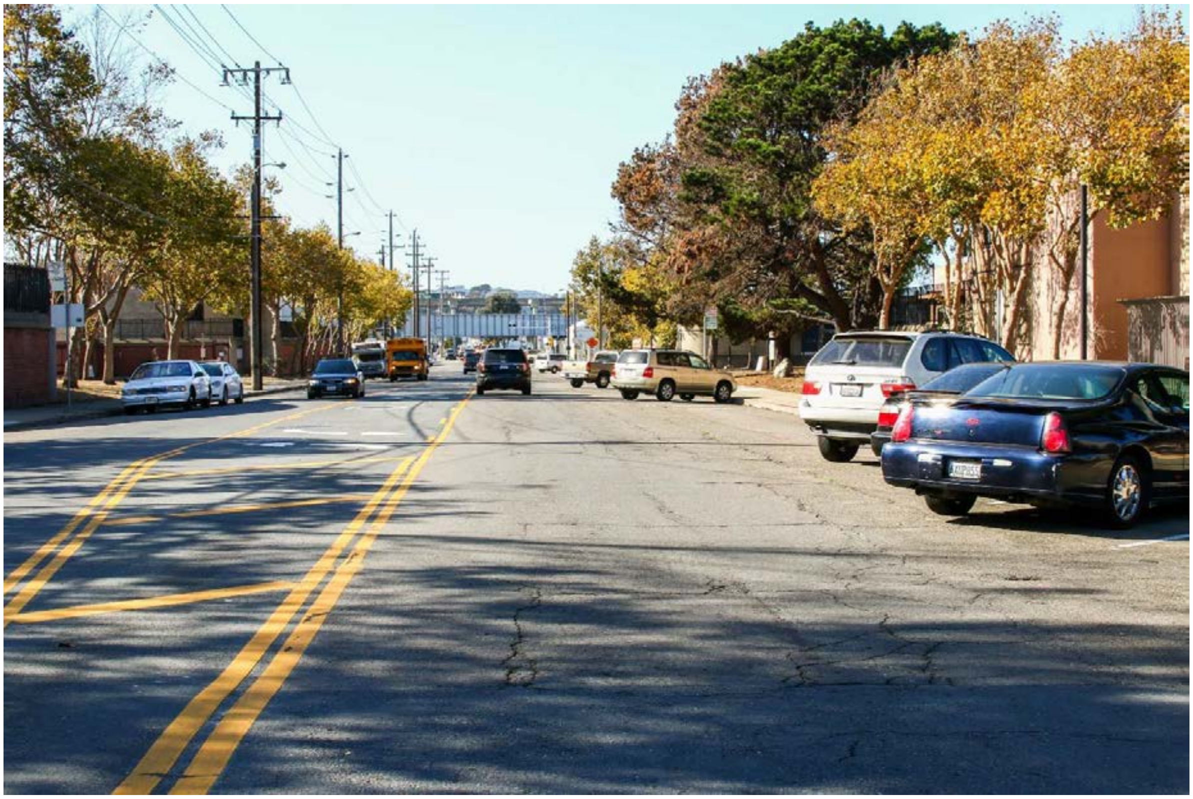

Photo 12 - Existing conditions

Simulation

SOURCE: ESA+Orion

Figure 4.3-8
Simulation of BDFP, Jerrold Avenue at
Phelps Street Facing Northwest

Photo 13 - Existing conditions

Simulation

SOURCE: ESA+Orion

SFPUC Biosolids Digester Facilities

Figure 4.3-9
Simulation of BDFP, Jerrold Avenue at Freight Rail Spur Facing Southeast

Although a final decision on the surface finish for the digesters has not been made, cladding alternatives currently under consideration include stainless steel panels, translucent channel glass, or similar materials. The new digester gas storage tank would be located in line with the digesters, next to Jerrold Avenue. Somewhat smaller than the digesters, the digester gas storage tank would be 50 feet in diameter with a 60-foot diameter outer screen and 60 feet high, and would have the same surface finish as the digesters. **Figure 4.3-10** shows the existing view toward the digester location from under the Caltrain overpass and a simulation of the same view with the proposed digesters and digester gas storage tank. This view approximates the closest and most prominent view a person traveling southeast on Jerrold Avenue is likely to have of the digesters, where the viewer would likely be glancing to the left, away from the travel direction and toward the digesters. While the digesters and digester gas storage tank dominate in this view, the view would be fleeting as the typical motorist or pedestrian continued southeast on Jerrold Avenue. As someone facing the travel direction moves toward the site, views of the site would become peripheral and as travelers move slightly beyond this point, as shown in the simulation on Figure 4.3-9, these facilities would no longer be within view. The digesters would be far less prominent in most other views toward the site, due to intervening structures and landscaping as well as distance, depending on the viewer's location. As shown in the simulation on Figure 4.3-8, from street level the digesters would not be visible from Jerrold Avenue at Phelps Street, facing toward the Caltrain overpass and digester location, due to intervening structures and trees. (Note that the simulation depicts relatively mature trees. New street trees and vegetation are not expected to be fully developed immediately after planting and may take approximately five years to reach the level of maturity depicted.) Of the proposed new facilities, the digesters would be located farthest from the residential area southeast of the SEP, thereby limiting potential effects on views from these residences due to both distance and intervening structures and landscaping. Views of the other tallest structures (the solids pretreatment and biosolids dewatering facilities) would be limited due to intervening structures between these facilities and the through streets in the area. (Although the biosolids dewatering facilities would be located near Rankin Street, this block of Rankin Street ends at the Caltrain tracks and receives no through traffic.)

Views of the project site are limited and/or fleeting, as discussed under Impact AE-1, above. Some of the new facilities would be visible from some areas surrounding the plant, including from portions of industrial areas to the west (from which the digesters and other BDFP facilities would be visible above the Caltrain berm), industrial and commercial areas north and east of the site, and potentially from portions of the residential area southeast of the SEP. However, short-range views of the new facilities would primarily be from adjacent streets, where views would be limited to the time taken to pass the site, or from the Caltrain trains, where views would be extremely fleeting depending on the speed of the train. And, while the BDFP facilities may be visible in longer-range views from surrounding hills, they are not expected to substantially affect views from these areas.

Landscaping and Street Improvements

Some street-facing trees, which can be considered scenic resources that have a positive effect on the visual character of this urban area, would be removed during project construction; this could have a long-term effect on visual quality of the area. However, the project would include new landscaping and street improvements along Jerrold Avenue and new landscaping along the freight rail and

Photo 5 - Existing conditions

Simulation

SOURCE: ESA+Orion

SFPUC Biosolids Digester Facilities

Figure 4.3-10
Simulation of BDFP Digesters, Jerrold Avenue at Caltrain Overpass Facing Northeast

Caltrain tracks (shown on Figure 2-11 in Chapter 2, *Project Description*). As noted above, landscaping improvements are not expected to be as shown in the simulations in Figures 4.3-8 and 4.3-9 immediately, but instead would take some years to develop.

Long-term improvements to Jerrold Avenue could include traffic calming measures, curb extensions (road narrowing), sidewalk improvements, lighting, street trees, vegetated planters, and safer pedestrian and worker crossings consistent with *Better Streets Plan* guidelines. As currently envisioned, the redesign would provide a wider landscaped buffer zone with street trees between the parking lane and the sidewalk. As described in Chapter 2, *Project Description*, architecture and landscaping for the BDFP would be designed consistent with the San Francisco Planning Code, the Stormwater Management Ordinance, the San Francisco Arts Commission Civic Design Review process and the Public Art Program, and the *Better Streets Plan*, which would ensure consistency with the Industrial Area Design Guidelines and visual compatibility with the SEP and surroundings. Such improvements would be designed to meet the project objective related to improved public edges and would enhance the visual quality of the area compared to existing conditions.

Visual Character of Staging Areas

Following construction, the staging areas would be cleared of equipment and debris. Street improvements described above for Jerrold Avenue would be implemented before the Jerrold Avenue staging area is reopened to the public, and following clearing, Piers 94 and 96 and the other staging areas would generally resemble existing conditions with the exception of 1550 Evans Avenue. As noted above under Impact AE-1, while removal of some trees at 1550 Evans Avenue would lessen the overall visual quality of the site, the net change in visual quality would not be substantial.

Summary of Impact AE-3

Overall, the BDFP facilities would consist of new industrial facilities that would be visually compatible with existing industrial facilities at the SEP. Views of the new facilities from outside the project site would be limited by intervening structures and trees or would be fleeting views from cars or the train. While some of the new facilities would be visible from some areas surrounding the plant, the visual character of the SEP as seen from surrounding areas would remain essentially the same as the existing character, that of a major industrial facility. As discussed above, design of the new facilities would be consistent with applicable standards and the project would include landscaping and other street improvements. Such improvements are expected to enhance the overall long term visual quality of the area. Therefore, the project would not substantially degrade the existing visual character or damage scenic resources of the site and its surroundings, and the impact of the project would be ***less than significant***.

Mitigation: None required.

Impact AE-4: Project operation would not create a substantial new source of light or glare that could adversely affect day or nighttime views in the area, or substantially impact other people or properties. (Less than Significant)

During project operation, outdoor lighting would be provided for safe vehicular and staff access to the site at night. Such lighting would be provided along internal site roadways and over doors at building entrances. Localized lighting would be provided as needed for outdoor maintenance activities and would be equipped with localized switches. General area lighting would be kept to a minimum level as deemed necessary for general safety. Compliance with the requirements of California Green Building Code Section 5.106.8, which specifies that exterior lights be shielded or meet performance standards to reduce light pollution, and with the *Better Streets Plan* policy to minimize light trespass and glare to adjacent buildings, would ensure that changes in lighting would not result in substantial new sources of light or glare that affect nighttime views in the area or substantially impact other people or properties.

Windows and building surfaces with highly reflective finishes can be a source of daytime glare. Daytime glare can create hazards for motorists and nuisances for pedestrians and other viewers. Windows in project buildings, especially those near the exterior of the SEP boundary such as the maintenance buildings on Jerrold Avenue, could be potential new sources of daytime glare. However, glazing used in project structures would be consistent with Planning Commission Resolution 9212, which prohibits the use of mirrored or reflective glass; this would ensure that windows in the new BDFP buildings would not produce excessive glare. In addition, street trees that are planned as part of project landscaping would shield portions of some of the new windows, further reducing potential glare. Painted steel or pre-finished metals used for project structures may have a semi-gloss finish but would not be reflective. The solar photovoltaic panels proposed to be located on the maintenance shop roofs would not be visible from nearby public areas given their rooftop location, well above street-level sightlines. The panels may be visible from surrounding hills, but would not create substantial glare as seen from these areas due to distance and intervening structures and because the photovoltaic panels themselves, which are designed to absorb light rather than reflect it, have anti-reflective coatings, are stippled, and would not be highly reflective. The digesters and digester gas storage tank would be the largest new structures and, as noted above, the SFPUC has not yet made a decision on the surface finish. Use of a highly reflective finish on these prominent structures could result in a potentially significant impact from daytime glare. The cladding alternatives currently under consideration include stainless steel panels, translucent channel glass, and similar materials currently in use throughout San Francisco. The finish illustrated in the Figure 4.3-10 simulation is not highly reflective and would not be expected to produce substantial glare. Further, as discussed in Section 2.4, Project Components, in Chapter 2, *Project Description*, the selected cladding material, whether metallic, glass, or other, would be textured, brushed, frosted, or otherwise treated to diffuse light and reflectivity. In addition, it is noted that the movement of the sun relative to the reflective surface would make the incidence of daytime glare on a given area short-term, and it is expected that only areas in proximity to the digesters would potentially be affected. Given that the selected finish of the digester cladding would have low reflectivity and lighting would comply with applicable policies and regulations, project changes in lighting and glare would not be in excess of levels commonly found and accepted in urban areas, and the environmental effects of light and glare due to the project would be ***less than significant***.

Mitigation: None required.

Cumulative Impacts

Impact C-AE-1: Implementation of the BDFP, in combination with past, present, and probable future projects in the vicinity, would not substantially degrade the existing visual character of the site or its surroundings or damage scenic resources. (Less than Significant)

As described in Section 4.3.3.2, Approach to Analysis, above, the geographic scope for the analysis of cumulative aesthetic impacts includes all projects that would be located within the publicly accessible viewshed of the project; that viewshed extends about 2,000 feet in every direction from the combined project site and SEP boundaries and extends eastward to include Piers 94 and 96. Projects that could have a cumulative aesthetic impact in combination with the BDFP include all SFPUC projects at and adjacent to the SEP and the following non-SFPUC projects (refer to Table 4.1-1 and Figure 4.1-1 for descriptions and locations of the following projects):

- Jerrold Bridge North Span Replacement
- Quint Street Bridge Replacement Project
- Quint-Jerrold Connector Road
- San Francisco Wholesale Produce Market Expansion
- 1995 Evans Avenue
- Blue Greenway Project and Heron's Head Park Improvements
- Pier 90-94 Backlands Improvements Project
- Asphalt and Concrete Recycling and Production Plant at Pier 94
- Quint Street Lead Track
- Pier 96 Bulk Export Terminal
- Peninsula Corridor Electrification Project
- India Basin Mixed Use Development
- San Francisco Gateway

While some of these projects involve demolition of existing structures or replacement of existing structures with similar ones, others involve replacement of existing structures with larger ones and new construction. Construction activities and the design of these projects are expected to be visually compatible with existing development in the area based on the existing industrial setting of the area (which is designated for, and largely developed with, light and heavy industrial land uses and includes, for example, ongoing repair and maintenance activities at the SEP) and the consistent nature of these cumulative projects with the surrounding land uses. In fact, most of the cumulative projects in the long term can be expected to have a revitalizing effect and may be perceived as improving the visual quality of the area (e.g., by replacing unused and/or deteriorating structures and providing amenities such as improvements to the Bay Trail in this area). The cumulative projects, in combination with the BDFP, would not substantially interfere with view corridors, which are generally limited in the area by existing development, or with long-range views from surrounding hills, because the area in which these projects and the BDFP are located is at a relatively low elevation. Due to its height (115 feet, taller than the 65-foot height limit in the area), the proposed San Francisco Gateway project would be visible behind the SEP and in front of and behind I-280 as seen from the intersection of La Salle Avenue at Cashmere Street shown in Figure 4.3-5, but would be only marginally visible, if at all, in the views presented in Figure 4.3-4 due to intervening structures. Together the cumulative projects would intensify or replace development in existing industrialized areas north, west, and east of the project site but would not substantially degrade the visual character of the area. The cumulative projects at Piers 94 and 96 (that is, the Pier 90-94 Backlands Improvements Project, Asphalt and Concrete Recycling and Production Plant at Pier 94, and Pier 96 Bulk Export Terminal) and the India Basin Mixed Use Development project to the south, in combination with the project staging area would be visually compatible with existing industrial uses in the vicinity and would not degrade the visual character of this part of the industrial waterfront. Therefore, the cumulative projects in combination with the BDFP would result in a ***less-than-significant*** impact on visual character and scenic resources.

Mitigation: None required.

Impact C-AE-2: Implementation of the BDFP, in combination with past, present, and probable future projects in the vicinity, would not contribute considerably to substantial new sources of light or glare that could adversely affect nighttime views in the area, or could substantially impact other people or properties. (Less than Significant)

Construction Impacts

Similar to the BDFP as described under Impact AE-2, the cumulative projects in the immediate vicinity could have a significant light and glare impact if those cumulative projects require nighttime construction and associated lighting. All projects sponsored by the SFPUC would be required, at a minimum, to comply with the SFPUC's standard construction measures, which include directing nighttime lighting away from residential areas and shielding nighttime lighting to prevent light spillover effects (refer to Appendix SCM). Although the BDFP and future projects in the immediate project vicinity that are not sponsored by the SFPUC (listed above) could result in a significant cumulative light and glare impact during nighttime construction, the SFPUC's implementation of these standard construction measures would ensure that the project's contribution to a potential cumulative impact would not be considerable and the impact would be ***less than significant.***

Operational Impacts

The cumulative projects in the immediate vicinity could result in long-term light and glare effects, depending on the type of building materials selected. However, of the cumulative projects proposed in the project vicinity, only the Southeast Plant Headworks Replacement Project is expected to include substantial new buildings and structures. That project site is located along Evans Avenue, and any light and glare associated with that project would be focused on areas in the immediate vicinity of that project and would not be expected to affect the same land uses that may be subject to light and glare from the proposed digesters and digester gas storage tank. Further, as described above in Impact AE-4, the BDFP would not result in substantial light and glare because glazing used in project structures would be consistent with Planning Commission Resolution 9212 prohibiting use of mirrored or reflective glass, the new solar panels would not be visible from most nearby areas and would have a non-reflective coating, the building material selected would be treated to diffuse light and reflectivity (see Chapter 2, *Project Description*), and street trees that are planned as part of project landscaping would shield portions of some of the new windows. Therefore, changes in lighting and glare in the project vicinity from the cumulative projects in combination with the effects of the BDFP would not be in excess of levels commonly found and accepted in urban areas, and would result in a ***less-than-significant*** cumulative light and glare impact.

Mitigation: None required.

4.4 Population and Housing

This section describes existing population, housing, and employment characteristics and trends in San Francisco and the potential for implementation of the Biosolids Digesters Facilities Project (BDFP or project) to induce substantial unplanned population growth, either directly or indirectly, or displace housing or residents in the project vicinity or citywide. This impact analysis evaluates the potential population and housing impacts of the project and identifies mitigation measures to avoid or reduce adverse impacts, as appropriate.

4.4.1 Setting

4.4.1.1 Regional Setting

Given the project's location, San Francisco is the primary area that would be affected directly by potential project-related population and housing effects, and by employment effects that could result in demand for additional housing. Because project construction could draw on the regional labor pool, this section also describes employment trends in surrounding counties.

Population and Housing

In 2010, there were 805,235 people living in San Francisco, a 4 percent increase in the city's population compared to 2000.[1] The California Department of Finance, which provides population estimates and tracks changes in housing and vacancy rates for years between the decennial census counts, estimates that the city's population in 2015 was 845,600, a 5 percent increase since 2010.[2]

San Francisco experienced marked housing growth between 2000 and 2010. About 29,600 housing units were added over this period, a 9 percent increase, for a total of 376,200 housing units in 2010; the estimated vacancy rate in 2010 was 8.3 percent.[3] The number of households (occupied housing units) increased over this period from 329,700 in 2000 to 345,811 in 2010, a 5 percent increase.[4] The California Department of Finance estimates that about 8,500 housing units were added in San Francisco between 2010 and 2015 (a 2 percent increase during this time period) while about

1 U.S. Census Bureau, American FactFinder, DP-1 Profile of General Population and Housing Characteristics: 2010, 2010 Demographic Profile Data, San Francisco County, California, 2010; U.S. Census Bureau, American FactFinder, DP-1 Profile of General Demographic Characteristics: 2000, San Francisco County, California, 2000.

2 State of California, Department of Finance, *E-5 Population and Housing Estimates for Cities, Counties, and the State, January 1, 2011-2015, with 2010 Benchmark.* Sacramento, California, May 1, 2015. This estimate is slightly lower than the 2015 population projected in 2013 by the regional planning agency, the Association of Bay Area Governments (ABAG); the Department of Finance estimate is used here for consistency with information on vacancy rates, which are tracked by the Department of Finance and also provided here. The difference between the population estimate and population projection (which may be attributable to more current data available for the Department of Finance estimate), is negligible (0.16 percent).

3 U.S. Census Bureau, American FactFinder, DP-1 Profile of General Population and Housing Characteristics: 2010, 2010 Demographic Profile Data, San Francisco County, California, 2010; U.S. Census Bureau, American FactFinder, DP-1 Profile of General Demographic Characteristics: 2000, San Francisco County, California, 2000.

4 *Ibid*.

18,600 households were added (a 5 percent increase), and that the vacancy rate as of January 2015 was 5.3 percent.[5]

Employment

According to the California Employment Development Department data, approximately 639,400 people worked in San Francisco in 2014, an increase of 27,800 jobs since 2013 and the city's peak annual average employment level to date.[6,7] This estimate measures workers by place of work and includes full-time and part-time wage and salary employment; it does not include self-employed people, unpaid family workers, or private household employees.[8] From 2010 to 2014, more than 100,000 jobs were added in San Francisco.[9]

Employment in San Francisco, as in the Bay Area region as whole, has fluctuated substantially since the mid-1990s. Both the San Francisco and Bay Area economies experienced strong growth through 2000, fueled by the "dot-com" boom in the high technology and internet sectors; 84,000 jobs were added between 1994 and 2000 for a total of almost 609,000 workers in San Francisco in 2000.[10] Following the dot-com crash, San Francisco lost 90,000 jobs between 2000 and 2004. The city regained almost 48,000 jobs between 2004 and 2008 and lost about 27,000 jobs between 2008 and 2010 during the global recession.[11]

Construction employment in San Francisco has generally followed the same cycle of job gains and losses, except that there was a much sharper decline in construction jobs in the city between 2008 and 2010 compared to jobs overall, and construction employment continued to decline in 2011, whereas employment as a whole in the city began to increase slowly in 2011. (From 2008 to 2010, 26 percent of construction jobs in the city – roughly 5,000 jobs – were lost, compared to a 5 percent decline in all city jobs, and construction jobs declined by another 3 percent in 2011.) Construction employment began to increase in 2012; in 2014 there were 16,800 construction jobs in San Francisco, a net loss of 2,400 construction jobs since 2008. In the five-county subregion of San Francisco, Alameda, Contra Costa, Marin, and San Mateo Counties, 37,000 construction jobs were lost between 2007 and 2010. Construction employment for the five-county region began to recover in 2011, and more than 20,000

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5 State of California, Department of Finance, *E-5 Population and Housing Estimates for Cities, Counties, and the State, January 1, 2011-2015. with 2010 Benchmark.* Sacramento, California, May 1, 2015. The department's estimates of housing and vacancy rates are based on annual housing unit change data supplied by local jurisdictions and the U.S. Census Bureau.

6 California Employment Development Department, LMI [Labor Market Information] for San Francisco County, California, Industry Employment Data, Annual Average Estimates 1990-2014, July 17, 2015.

7 These estimates of employment by place of work count part-time and full-time jobs equally. People who hold more than one job may be counted more than once.

8 California Employment Development Department (EDD), Labor Market Information Frequently Asked Questions, 2015. Available online at http://www.labormarketinfo.edd.ca.gov/FAQs.html. Accessed on August 7, 2015.

9 California Employment Development Department, LMI [Labor Market Information] for San Francisco County, California, Industry Employment Data, Annual Average Estimates 1990-2014, July 17, 2015.

10 This estimate is about 6 percent less than ABAG's estimate for 2000; ABAG's data include classes of workers that the Employment Development Department does not (self-employed workers, unpaid family workers, or private household employees).

11 California Employment Development Department, LMI [Labor Market Information] for San Francisco County, California, Industry Employment Data, Annual Average Estimates 1990-2014, July 17, 2015.

construction jobs were added in the region between 2010 and 2014; there were 101,400 construction jobs in the five-county region in 2014, a net loss of almost 17,000 construction jobs compared to 2007.[12]

4.4.1.2 Local Setting

Project Site

The project site contains no housing; consequently, there is no on-site population. The existing Southeast Water Pollution Control Plant (Southeast Plant or SEP) property contains no active uses other than wastewater treatment facilities, which has about 280 employees. The former Asphalt Plant has been decommissioned and the site is currently used as a City and County of San Francisco (CCSF or City) vehicle dispatch center and for parking; the site will be demolished prior to project construction as part of the Land Reuse - 1801 Jerrold Avenue project. The Central Shops facility provides vehicle and equipment maintenance services for multiple City agencies. The Central Shops operations will be relocated as part of the Central Shops Relocation and Land Reuse - 1800 Jerrold Avenue project prior to BDFP construction.

Off-Site Staging Areas

The proposed staging areas contain no housing and therefore no population. The Pier 96 staging area includes a pier administration building, which includes about six tenants, a steel fabrication facility beneath a metal canopy, and an unoccupied building that appears to have been part of a former weigh station. These uses are expected to remain during construction. Various tenants lease undeveloped areas for construction staging or equipment storage on both Piers 94 and 96. The Pier 94 Backlands is currently undeveloped and used for soil and aggregate storage. The site currently occupied by the Southeast Greenhouses may be used as a construction staging area, if available. Demolition of existing structures at this site would occur as a separate action prior to BDFP construction. The 1550 Evans Avenue staging area includes two vacant buildings and a parking lot.

4.4.2 Regulatory Framework

4.4.2.1 Federal Regulations

There are no federal regulations on population, housing, or employment that apply to the BDFP.

4.4.2.2 State Regulations

There are no state regulations on population, housing, or employment that apply to the BDFP.

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[12] California EDD, Industry Employment Data for San Francisco County, California July 17, 2015a; California EDD, Industry Employment Data for Alameda County, California, July 17, 2015b; California EDD, Industry Employment Data for Contra Costa County, California, July 17, 2015c; California EDD, Industry Employment Data for Marin County, California, San Rafael Metropolitan Division, July 17, 2015d; and California EDD, Industry Employment Data for San Mateo County, California, July 17, 2015e. Data provided for San Francisco, Alameda, Contra Costa, and San Mateo Counties are for the industry title "Mining, Logging and Construction" and for Marin County data are provided for the industry title "Construction."

4.4.2.3 Local Regulations

The City adopted the 2014 Housing Element of the *San Francisco General Plan* in April 2015. It includes objectives and policies that address the city's growing housing demand while ensuring the integration of planning for housing, jobs, transportation, and infrastructure, among other Housing Element priorities. The Housing Element includes the following implementation programs relevant to the BDFP:

- **IP 91.** Planning shall ensure community plans for growth are accompanied by capital plans and programs to support both the "hard" and "soft" elements of infrastructure needed by new housing.
- **IP 94.** Planning shall update other elements of the City's General Plan, such as the Open Space, Transportation and Community Facilities Element to plan for infrastructure to support projected growth.

4.4.3 Impacts and Mitigation Measures

4.4.3.1 Significance Criteria

The project would have a significant impact related to population and housing if it were to:

- Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure);
- Displace substantial numbers of existing housing units or create demand for additional housing, necessitating the construction of replacement housing; or
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

Due to the nature of the project, there would be no impact related to the following topics for the reasons described below:

- ***Displace substantial numbers of existing housing units, necessitating construction of replacement housing.*** The project would construct new treatment facilities at existing industrial sites; it would not displace any housing and therefore would not necessitate construction of replacement housing. Therefore, this criterion related to housing displacement does not apply and is not addressed further in this section.
- ***Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.*** The project would construct new treatment facilities at existing industrial sites; it would not displace any people and therefore would not necessitate construction of any replacement housing elsewhere. Therefore, this criterion related to displacement of people does not apply and is not addressed further in this section.

4.4.3.2 Approach to Analysis

Construction Impacts

The evaluation of the potential for project construction to induce substantial population growth or create demand for additional housing compares the number of construction jobs that would be generated to the size of the local and regional labor force as a means to assess whether project construction jobs are likely to be filled primarily by the local and regional labor force or to attract substantial numbers of construction workers from outside the region. For purposes of this analysis, the size of the local and regional labor force is based on the number of people working in construction jobs in San Francisco and the four surrounding counties: San Mateo, Marin, Alameda, and Contra Costa Counties. The attraction of a substantial number of construction workers from outside the area would be expected to create demand for additional housing for such workers, whereas workers from within the region would be expected to commute to BDFP construction jobs.

Operational Impacts

The evaluation of the potential for project operations to induce substantial population growth or create demand for additional housing considers the wastewater treatment capacity that would be provided by the BDFP in the context of growth anticipated by local and regional planning agencies. If the BDFP provided substantial wastewater treatment capacity beyond that needed to serve planned growth, the project could indirectly induce growth by removing wastewater treatment capacity as a constraint to unplanned growth – and thereby create demand for housing beyond that projected to occur. The analysis also considers whether jobs associated with project operations would attract workers from outside the area.

Cumulative Impacts

Section 4.1.3, Approach to Cumulative Impact Analysis and Cumulative Projects, describes the overall approach to the cumulative analysis for those topics using a list-based approach and summarizes past, present and reasonably foreseeable future projects in the vicinity of the BDFP that could contribute to a cumulative impact. The geographic scope of cumulative growth inducement impacts during construction includes all of San Francisco; for this reason, the analysis of construction-phase cumulative population and housing impacts also considers concurrent construction projects throughout San Francisco based on the San Francisco Planning Department’s Development Pipeline. [13] The Development Pipeline describes development projects that would add residential units or commerical and other non-residential space, applications for which have been formally submitted to the Planning Department or the Department of Building Inspection. Pipeline projects encompass various stages of proposed development, from applications filed to entitlements secured and from buildng permits issued to projects under construction. The analysis considers whether or not there would be a significant, adverse cumulative impact associated with project implementation in combination with past, present, and probable future projects in the geographical

[13] San Francisco Planning Department, San Francisco Development Pipeline 2016 Quarter 1, 2016. Data set available via SF OpenData: https://data.sfgov.org/Housing-and-Buildings/San-Francisco-Development-Pipeline-2016-Quarter-1/dtz9-jkjt. Accessed on June 9, 2016.

area, and if so, whether or not the project's incremental contribution to the cumulative impact would be considerable. Both conditions must apply in order for a project's contribution to cumulative effects to be deemed cumulatively considerable (significant). If so, then mitigation measures are identified to reduce the project's contribution to the extent feasible. As noted above, the geographic scope for the analysis of cumulative growth inducement impacts during construction is San Francisco.

4.4.3.3 Impact Evaluation

Construction Impacts

Impact PH-1: Construction of the BDFP would not directly or indirectly induce substantial population growth in the area or create demand for additional housing. (Less than Significant)

Project construction would take approximately five years; the average and peak number of construction workers employed daily would be 333 and 550, respectively (refer to Table 2-10 in Chapter 2, *Project Description*). According to the California Employment Development Department, about 16,800 people worked in construction jobs in San Francisco in 2014 and 101,400 people worked in construction jobs in San Francisco and the four surrounding counties (San Mateo, Marin, Alameda and Contra Costa).[14] The project maximum – 550 jobs – would represent 3.3 percent of the construction jobs in San Francisco in 2014 and 0.5 percent of the construction jobs in the five-county region in 2014; in addition, 550 jobs would be substantially fewer than the 7,170 new construction jobs that the Association of Bay Area Governments (ABAG) projects will be added in San Francisco between 2010 and 2020,[15] a projection that is also cited in the *San Francisco General Plan* Housing Element.[16] Given the size of the regional construction work force compared to the number of workers that would be needed for project construction, even during peak construction periods, BDFP construction workers would likely be drawn primarily from the local and regional construction work force. Project construction workers who do not live in the Bayview-Hunters Point neighborhood would likely commute from elsewhere in the city or Bay Area rather than relocate from more distant cities or towns. Consequently, construction of the BDFP would not induce population growth by attracting a substantial number of workers from outside the region to relocate to the area, and therefore would not create demand for additional housing or other facilities and services associated with growth.

The project does not involve any housing construction and therefore would not induce growth directly by constructing housing that would attract people to the area. Project construction would not extend roads or other infrastructure that could indirectly induce growth; the project would be located at existing industrial sites in an area that is already well-served by roads and other infrastructure. Therefore, the growth-inducing impact of BDFP construction would be ***less than significant***.

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[14] California EDD, Industry Employment Data for San Francisco County, California July 17, 2015a; California EDD, Industry Employment Data for Alameda County, California, July 17, 2015b; California EDD Industry Employment Data for Contra Costa County, California, July 17, 2015c; California EDD, Industry Employment Data for Marin County, California, San Rafael Metropolitan Division, July 17, 2015d; California EDD, Industry Employment Data for San Mateo County, California, July 17, 2015e.

[15] Association of Bay Area Governments, *Projections 2013*, December 2013.

[16] City and County of San Francisco, *San Francisco General Plan, 2014 Housing Element*, adopted April 27, 2015.

Mitigation: None required.

Operational Impacts

Impact PH-2: Operation of the BDFP would not directly or indirectly induce substantial population growth in the area or create demand for additional housing. (Less than Significant)

The project does not involve construction of new homes, nor does it involve the extension of roads or other infrastructure into areas lacking such services. Operation of the BDFP would not increase the number of workers employed at the SEP and therefore would not directly induce growth or create demand for additional housing by providing new employment opportunities that could attract new workers to the area.

The BDFP could indirectly induce growth if it resulted in wastewater treatment capacity substantially beyond that needed to support planned growth in the SEP service area over the BDFP planning period. Provision of such capacity would remove wastewater treatment capacity as an obstacle to unplanned growth**.** As indicated in Table 2-1 in Chapter 2, *Project Description*, the SEP currently has the capacity to treat up to 85 million gallons per day (mgd) of average dry weather wastewater flows and up to 250 mgd of wet weather combined wastewater and stormwater flows, which would not change under the project. The Biosolids Digester facilities at the SEP would not increase existing overall SEP wastewater treatment capacity.

As described below, solids treatment capacity that would be provided by the BDFP is based on current growth projections prepared by the regional planning agency (ABAG), consistent with growth anticipated by the San Francisco Planning Department and growth identified in the *San Francisco General Plan*. The growth assumptions underlying the BDFP design capacity and the methodology used to project future flows and loads are presented in the San Francisco Public Utilities Commission's (SFPUC's) 2014 *Wastewater Flow and Load Projections Technical Memorandum*.[17] To project future flows and loads, the SFPUC developed a wastewater projection model that incorporated the most recent source data available at that time, including SEP operating data, projections of household population and employment, and water demand projections. The San Francisco Planning Department provided projections of household population and employment based on July 2013 projections prepared by ABAG. Because ABAG's projections only extend to 2040, the SFPUC extrapolated the 2040 projections to 2045, the project's planning horizon. ABAG is the official regional planning agency of the San Francisco Bay Area, and the San Francisco Planning Department routinely uses ABAG's projections for the department's land use allocations to depict the distribution of projected growth. San Francisco's most recently adopted General Plan element, the 2014 Housing Element, also cites ABAG's *Projections 2013* forecasts.[18] Use of ABAG's *Projections 2013* to develop projections of future flows and loads ensures that treatment capacity provided by the

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[17] SFPUC, *Wastewater Flow and Load Projections Technical Memorandum*, prepared for San Francisco Public Utilities Commission Sewer System Improvement Program, updated February 2014.

[18] City and County of San Francisco, *San Francisco General Plan* 2014 Housing Element, adopted April 27, 2015, pages I.4, I.12, and I.13.

BDFP would be consistent with planned growth and would not provide excess capacity (i.e., beyond that needed to support planned growth) and thus would not remove a potential obstacle to unplanned growth.

Given that the BDFP would not include new homes or increase the number of workers employed at the SEP, operation of the BDFP would not directly induce substantial population growth. Because the BDFP would not extend roads or other infrastructure into areas lacking such services, would not increase existing overall SEP wastewater treatment capacity, and would provide treatment capacity that is consistent with ABAG's growth forecasts, the project would not indirectly induce population growth. Therefore, the impact of BDFP operations on population growth and housing would be ***less than significant*.**

Mitigation: None required.

Cumulative Impacts

Impact C-PH-1: The project, in combination with past, present, and probable future projects, would not directly or indirectly induce substantial population growth or create demand for additional housing. (Less than Significant)

Project Construction

The analysis is based on projects identified in Table 4.1-1 and construction projects throughout the city identified in the San Francisco Planning Department's Development Pipeline. As discussed under Impact PH-1, project construction is expected to generate an average of 333 – and up to as many as 550 – daily construction jobs during the five-year construction period. Project construction could occur concurrent with a considerable amount of other construction activity within San Francisco. Development Pipeline data for the first quarter of 2016 indicates that development proposals for a total of 21,016,300 square feet of non-residential development and residential development totaling 63,440 units have been filed with the City, are under review, or are under construction. Some of these projects would be under construction at the same time as the project. Despite the current robust level of construction activity in the city, however, and considering the size of the regional construction work force and the substantial job losses in the region experienced by the construction industry until the last few years, the construction labor force in San Francisco and the surrounding region is expected to accommodate demand for construction labor. Therefore, the cumulative growth-inducing impact of project construction in combination with other concurrent construction projects within the city would be ***less than significant***.

Project Operation

As described in Impact PH-2, operation of the BDFP would have no impact associated with direct inducement of population growth because the BDFP would not create housing nor increase the number of workers employed at the SEP; therefore, operation of the BDFP would not contribute to a direct cumulative growth inducement impact. Moreover, the BDFP would not indirectly contribute to population growth through the extension of roads or other infrastructure into areas lacking such services. The SFPUC is the only provider of wastewater treatment in the area served by the project. There are no cumulative projects that would combine with the project to create more wastewater treatment capacity than currently planned. Therefore, the cumulative growth-inducing impact of project operation in combination with other cumulative projects would be considered ***less than significant***.

Mitigation: None required.

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4.5 Cultural Resources

Cultural resources include architectural resources, prehistoric and historical archeological resources, and human remains.[1] This section describes the known and suspected cultural resources in the project area and vicinity and the potential for implementation of the Biosolids Digester Facilities Project (BDFP or project) to affect those resources. Mitigation measures are identified to avoid or reduce significant adverse impacts, as appropriate. Regarding noise and vibration effects on cultural resources, refer to Section 4.7, Noise and Vibration. Paleontological resources and the potential for the project to affect those resources are discussed in Section 4.15, Geology, Soils, and Paleontological Resources.

4.5.1 Setting

4.5.1.1 Definitions

Historical Resources

Based on CEQA Guidelines Section 15064.5(a), historical resources include, but are not limited to, any object, building, structure, site, area, place, record, or manuscript that is historically or archeologically significant or that is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. Generally, a resource is considered by a lead agency to be "historically significant" if the resource meets the criteria for listing in the California Register of Historical Resources (California Register) (Public Resources Code Section 5024.1), or qualifies as a "unique archeological resource" (PRC 21083.2). For projects with federal involvement, such as federal loan funding, significant resources (termed "historic properties") are defined as those that meet the eligibility criteria of the National Register of Historic Places (National Register). Historical resources and "historic properties" refer to both significant architectural resources and to significant archeological resources.

Architectural resources include buildings, structures, objects, and historic districts. Residences, cabins, barns, lighthouses, military-related features, industrial buildings, and bridges are examples of historic architectural resources.

[1] Assembly Bill (AB) 52, codified in the Public Resources Code (Sections 21074, 21080.3, 21082.3, 21083 *et seq*) requires lead agencies to analyze the impacts of a project on "tribal cultural resources" separately from archeological resources. AB 52 also requires lead agencies to engage in additional consultation with California Native American tribes, and requires the Office of Planning and Research to update Appendix G of the California Environmental Quality Act (CEQA) Guidelines to specifically address tribal cultural resources. AB 52's provisions only apply to projects that have a notice of preparation (NOP) filed on or after July 1, 2015. As the NOP for the BDFP was released June 24, 2015, the project is not subject to separate tribal cultural resources analyses. Tribal cultural resources are addressed herein under archeological resources.

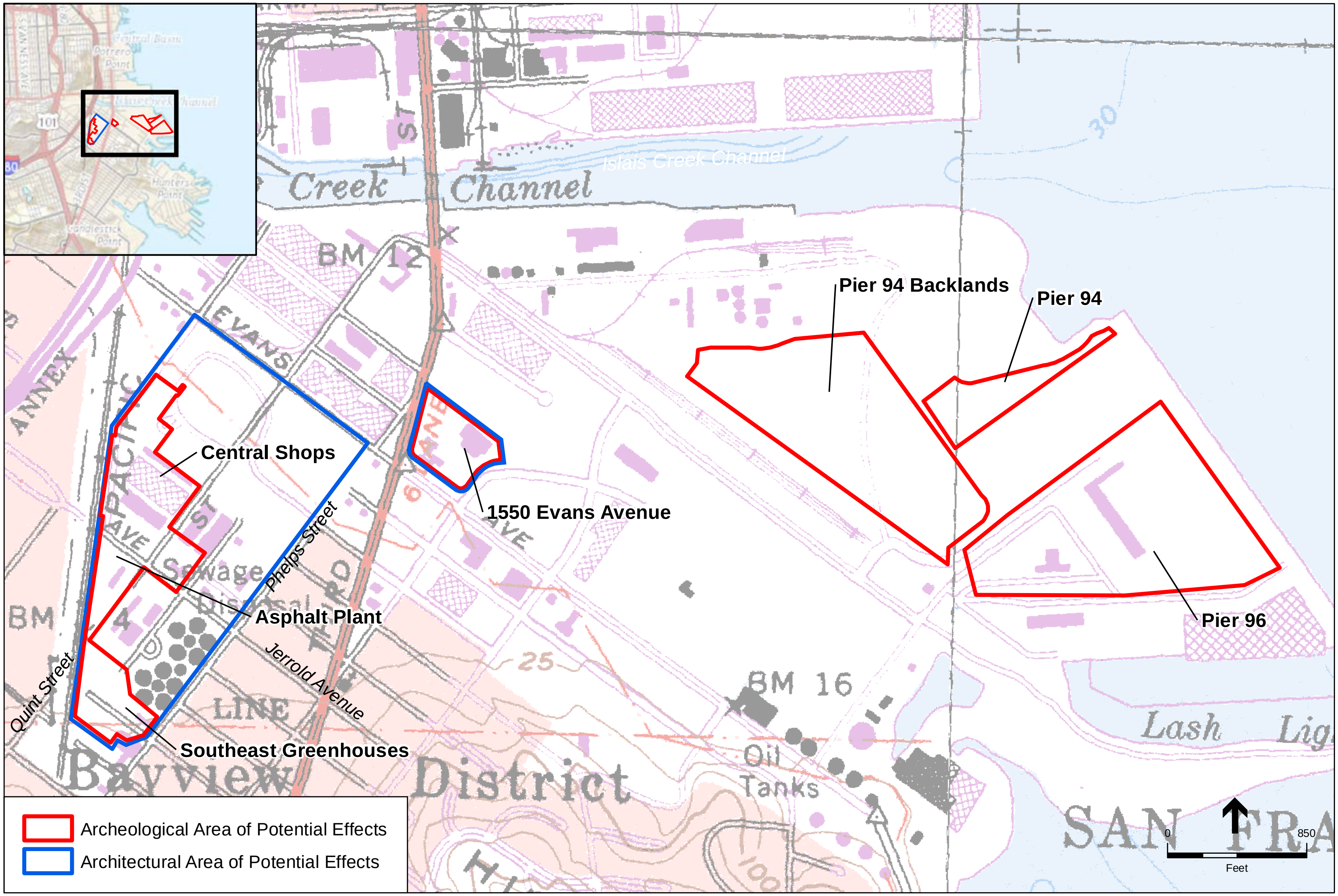
Archeological resources consist of prehistoric and historical archeological deposits and features. Prehistoric archeological resources include village sites, temporary camps, lithic scatters, roasting pits/hearths, milling features, petroglyphs, rock features, and burials. Associated artifacts include flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, dietary remains such as shellfish shell, animal bones and burnt seed shells; stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and other evidence of human activity prior to the advent of written documentation. Historical archeological resources may include deposits, features or structural ruins indicative of human activities during the historic periods. Examples include townsites, privy pits or trash dumps at homesteads, agricultural or ranching features, mining-related features, refuse concentrations, and features or artifacts associated with historic-period military or industrial land uses. Associated artifacts may include structural debris (such as nails and window glass; metal, glass, and/or ceramic refuse such as bottles and bottle fragments, dishware, or buttons. Under CEQA, archeological resources can be significant as either historical resources or as unique archeological resources (defined in detail in Section 4.5.2, Regulatory Framework).

CEQA Area of Potential Effects

The definition of the CEQA Area of Potential Effects (C-APE) is modeled after the federal Area of Potential Effects (APE), as defined in the Code of Federal Regulations (CFR) Title 36, Section 800.16(d). The C-APE is the geographic area or areas within which a project may directly or indirectly cause alterations in the character or use of historical resources (i.e., resources that meet the criteria for listing in the California Register), if any such resources are present. The C-APE is influenced by the scale and nature of an undertaking and may be delineated differently for direct physical effects and for indirect effects (such as changes in the historical setting or introduction of intrusive noise) that may result from the undertaking. For the BDFP, separate archeological and architectural C-APEs have been defined. The archeological APE covers the area in which direct project effects (such as damage to archeological sites from project excavations) may occur, while the historic architectural APE covers the larger area in which significant historic architectural resources could be affected by the introduction of visually intrusive features, vibration from construction, as well as the project footprint, where demolition of historic buildings could occur. **Figure 4.5-1** shows the archeological and architectural C-APEs.

Archeological C-APE

The archeological C-APE comprises 84.8 acres and is inclusive of all proposed construction areas and staging areas. The C-APE includes the Central Shops and Asphalt Plant properties, portions of the Southeast Water Pollution Control Plant (Southeast Plant or SEP), and all construction staging areas. The project site, including areas within the SEP, Central Shops, Asphalt Plant, and staging areas within Quint Street and Jerrold Avenue covers 12.9 acres; the 1550 Evans Avenue staging area covers 4.2 acres, the Pier 94 staging area covers 4.8 acres; the Pier 94 Backlands staging area covers 27.0 acres; the Pier 96 staging area covers 30.9 acres; and the Southeast Greenhouses staging area covers 4.0 acres.



SOURCE: USGS San Francisco South 7.5-minute topographic quadrangle

SFPUC Biosolids Digester Facilities

Figure 4.5-1
CEQA Archeological Area of Potential Effects
and CEQA Architectural Area of Potential Effects

The construction staging areas at Quint Street and Jerrold Avenue (within the main project site), 1550 Evans Avenue, and Piers 94 and 96 would require grading and/or other subsurface ground disturbance. Ground disturbance at the Southeast Greenhouses construction staging area is not planned as part of this project. The aboveground portions of the Southeast Greenhouses would be demolished as part of a separate project, which would have minimal subsurface disturbance (i.e., related to the installation of fencing around the site).

The vertical extent of the archeological C-APE varies by project component, but includes the deepest extent of planned ground disturbance for each project component. The vertical archeological C-APE includes ground disturbance from both excavation for new construction and demolition of existing structures. Construction would require substantial excavation, particularly for the digesters. Excavation would range from 10 feet to up to 41 feet below ground surface depending on the location; for purposes of this analysis, it is assumed that excavation would extend up to 45 feet below ground surface. In addition, pilings at some locations could extend to 75 feet below ground surface. Ground disturbance at Quint Street and Jerrold Avenue may be up to 7 feet below ground surface for tree planting, utilities, and street improvements, in addition to the 32-foot deep pipe chase excavation beneath Jerrold Avenue.

Construction would require temporary use of several construction staging areas that have been included in the archeological C-APE. These include portions of Piers 94 and 96, Quint Street and Jerrold Avenue, 1550 Evans Avenue, and the Southeast Greenhouses site. At Piers 94 and 96 and 1550 Evans Avenue, the vertical archeological C-APE includes ground disturbance associated with preparing the locations for staging, and is limited to 3 feet below ground surface.

Architectural C-APE

The architectural C-APE includes all proposed construction areas on the project site to account for potential direct effects to historic architectural ("built environment") resources, as well as the remainder of the SEP to account for potential indirect effects on built environment resources. The architectural C-APE is bounded by Evans Avenue to the north, Phelps Street to the east, the southern boundary of the Southeast Greenhouses site to the south, and Rankin Street and the rail spur to the west. The parcel at 1550 Evans Avenue is included in the architectural C-APE because the buildings would be demolished as part of the project. The architectural C-APE includes a total area of 58.3 acres.

The proposed construction staging areas at Piers 94 and 96 are included in the archeological C-APE to account for the subsurface construction that may occur at these sites; they are not included in the architectural C-APE because there would be no new aboveground construction at these sites that potentially could result in either direct or indirect effects to built environment resources. In addition, construction staging would only have the potential for temporary and short term changes in the appearance of the staging sites, and would not produce substantial construction vibrations—and thus have no potential for effects, regardless of the historic status of any buildings that could exist nearby.

Another consideration for establishing an appropriate architectural C-APE includes the construction methods and equipment to be used that could potentially affect historical resources. For example, use of certain equipment or construction methods (e.g., impact or vibratory pile drivers, and large truck-mounted vibratory rollers or compactors) have the potential to generate vibration levels of 0.2 inch per second peak particle velocity, which can affect historical resources depending on the distance.[2] Construction-related vibration can damage historical resources if impact or vibratory pile drivers or vibratory rollers or compactors are operated nearby. Thus, the horizontal extent of the C-APE accounts for the potential for significant vibration to adversely affect historical resources.

4.5.1.2 Research Methods

The information in this section was collected from multiple sources, including existing environmental and cultural resources documentation, historic maps and photographs, and site surveys. ESA cultural resources staff completed a records search at the Northwest Information Center of the California Historical Resources Information System on May 27, 2015 (File No. 14-1659). The purpose of the records search was to (1) determine whether known historical or archeological resources have been recorded previously within or near the architectural and archeological C-APE, (2) assess the likelihood for unrecorded historical or archeological resources to be present based on historical sources, geomorphological data, and the distribution of nearby resources, and (3) develop prehistoric and historic background information as context for assessment of historical significance.

For historical archeological resources, ESA prepared a list of primary sources (in particular, historical maps) and secondary source material to prepare historical context and the land use history for the architectural and archeological C-APE. Primary sources of information come from the San Francisco History Center at the San Francisco Public Library and the San Francisco Planning Department. Historical maps were an important source of information used to identify the changing landscape over time, especially Sanborn Fire Insurance maps.[3] Topographical sheets prepared by the U.S. Coast Survey (later the U.S. Coast and Geodetic Survey) and topographic maps from the U.S. Geological Survey were used to plot the changing Islais Creek and San Francisco Bay shorelines over the decades. Sanborn Fire Insurance maps and high-resolution 1938 aerial photographs by Harrison Ryker were critical sources of information for tracing the expansion of the industrial complexes and residential neighborhood at or adjacent to the C-APE. Other relevant references include (but are not limited to) historical photographs and aerial images, city directories, U.S. Census data, municipal reports, and the City and County of San Francisco (City or CCSF) Environmental Planning geographic information system archeological data base, which contains information about known and potential archeological sites and features within the City.

[2] Refer to Section 4.7, Noise and Vibration, Impact NO-2, for a description of construction-related vibration effects.
[3] Sanborn Maps is an American publisher of maps of U.S. cities and towns. The maps were initially created to estimate fire insurance risks, and now present a record of roads and structures extant at the time of map production.

Background research for prehistoric archeological sensitivity included review of several geoarcheological investigations that have recently been conducted within and adjacent to the C-APE. These include Extended Phase I explorations for the Jerrold Avenue and Quint Street Caltrain bridge replacement projects,[4] data recovery excavations at prehistoric site CA-SFR-171 near the Quint Street Caltrain bridge,[5] Extended Phase I investigations for relocation of several chemical storage tanks within the northern SEP,[6] and a similar investigation for the Building 521 replacement project in the northeast corner of the SEP.[7] Lastly, during the summer of 2015 widespread coring was conducted throughout the SEP, Asphalt Plant, and Central Shops for Phase I of the San Francisco Public Utilities Commission's (SFPUC's) Sewer System Improvement Program.[8]

On behalf of the San Francisco Planning Department, Far Western Anthropological Research Group (Far Western) contacted the Native American Heritage Commission (NAHC) on November 25, 2015, and requested a search of their Sacred Lands File to determine if there were known cultural sites within or near the C-APE. Far Western also requested a list of Native American groups and individuals for the project area. On December 14, 2015, the NAHC responded stating that no Native American cultural resources were reported from the Sacred Lands file records search. Far Western sent letters to the eight contacts on the NAHC list on December 14, 2015, requesting input on the project. No responses were received. Follow-up phone calls were completed in February and March 2016, and two responses were received. Ramona Garibay and Ann Marie Sayers both expressed their concern regarding the known prehistoric archeological site in the C-APE (CA-SFR-171, described below in Section 4.5.1.9), and stated that a Native American monitor should be present during ground disturbance.

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4 Kaijankoski, Philip, Brian F. Byrd, and Jack Meyer, *Extended Phase I Archaeological Investigations for the Jerrold Avenue Bridge Replacement Project, Caltrain Peninsular Corridor, San Francisco, California.* Far Western Anthropological Research Group, Inc., Davis, California. Prepared for the Federal Transit Administration and the Peninsula Corridor Joint Powers Board, 2009a; *Extended Phase I Archaeological Investigations for the Quint Street Bridge Replacement Project, Caltrain Peninsular Corridor, San Francisco, California.* Far Western Anthropological Research Group, Inc., Davis, California. Prepared for the Federal Transit Administration and the Peninsula Corridor Joint Powers Board, 2009b.

5 Byrd, Brian F., and Philip Kaijankoski, *Archaeological Excavations of the Late Period Site CA-SFR-171, San Francisco County, California.* Far Western Anthropological Research Group, Inc., Davis, California. Prepared for Parsons on behalf of FTW and Peninsula Corridor Joint Powers Board, 2011.

6 Kaijankoski, Philip, and Jack Meyer, *Extended Phase I Geoarchaeological Investigation for the Southeast Water Pollution Control Plant, Chemical Plant Relocation Project, San Francisco, California.* Far Western Anthropological Research Group, Inc., Davis, California. Prepared for the San Francisco Public Utilities Commission, March 2014.

7 Kaijankoski, Philip, Brian F. Byrd, and Naomi Scher, *Extended Phase I Geoarchaeological Investigations for the Southeast Water Pollution Control Plant Building 521 Replacement and Disinfectants Upgrades Project, San Francisco, California.* Far Western Anthropological Research Group, Inc., Davis, California. Prepared for the San Francisco Public Utilities Commission, 2015.

8 Kaijankoski, Philip, Brian F. Byrd, and Jack Meyer, *DRAFT Preliminary Prehistoric Archaeological Testing Report for the Southeast Water Pollution Control Plant, San Francisco, California.* Far Western Anthropological Research Group, Inc., Davis, California. Prepared for the San Francisco Public Utilities Commission, 2016.

4.5.1.3 Regional Setting[9]

The project site is within the San Francisco Bay region; specifically, it is located along the Bay's edge at the northern end of the San Francisco peninsula. The surface geology of this area is highly varied; sand dunes historically were widespread in the northernmost portion of the San Francisco peninsula. Even today, there are extensive dunes along the City's western ocean shoreline. They narrow to the east as they skirt the San Miguel Hills. These hills reach a maximum elevation of 925 feet above mean sea level at Mount Davidson and dominate the central portion of the northern peninsula. Alluvial deposits are widespread east and south of the San Miguel Hills, interspersed with bedrock outcrops, and freshwater marshes along major drainages. The modern urban landscape within San Francisco, including the alignment of the Bay shoreline, bears almost no similarity to its pre-1850 natural setting due to urban development and, significantly, to extensive bay fill from the 1850s through the 1960s.

San Francisco Bay is part of a large estuary that includes San Pablo and Suisun Bays and the Carquinez Strait. The area's climate is typically Mediterranean, with cool, wet winters and warm, dry summers. Annual precipitation within the region varies widely from fewer than 15 inches to more than 70 inches per year. In the project vicinity, rainfall is relatively low, averaging less than 21 inches annually. The region has warmer temperatures than more northern coastal regions and is relatively frost-free. The majority of rainfall occurs December through March, decreasing from north to south. Along the immediate coast, the climate is cool and without extreme fluctuations.

The project area's pre-1850 natural setting was typified by estuaries, coastal marsh lands, coastal prairie, and willow groves. Various-sized water courses drained into the Bay, and on the northeast San Francisco peninsula these included Yosemite, Islais, and Mission Creeks. The area contained varied animal resources such as fish, shellfish, and terrestrial and marine mammals, and a range of plant resources. Historically, the project vicinity was the interface of the northern seashore communities (typical of sandy dunes) and the coastal prairie-scrub mosaic to the north.

4.5.1.4 Geological Context

The Bay Area has undergone a series of significant large-scale environmental changes since the end of the Late Pleistocene (11,500 years ago), when Native Americans may have first inhabited the region.[10] These changes included rising sea levels resulting in the rapid growth of San Francisco Bay and the inundation of old shorelines causing widespread sediment deposition, and corresponding fluctuations in the distribution and availability of important natural resources. As a result, the archeological record — and the potential for archeological deposits in the project vicinity and environs — is better understood when viewed within the history of Bay Area environmental and landscape changes.

9 The regional setting, geological context, prehistoric context, ethnohistorical context, and historic period setting below have been adapted from Byrd, Brian F., Philip Kaijankoski, Rebecca Allen, and Matthew Russell, Archaeological Research Design and Treatment Plan for the Biosolids Digester Facility Project, Southeast Water Pollution Control Plant, San Francisco, California. Prepared for San Francisco Public Utilities Commission, October, 2016.

10 Meyer, Jack, and Jeffrey Rosenthal, *Geoarcheological Overview of the Nine Bay Area Counties in Caltrans District 4*. Prepared for Caltrans District 4, 2007.

Several studies confirm that many of the Late Pleistocene and Early Holocene land surfaces around the Bay are overlain by deposits of younger alluvium that are generally fewer than 6,000 years old.[11] Stratigraphic and radiocarbon evidence indicates that the Holocene-age alluvial deposits average 6 to 10 feet in thickness, with deposits exceeding 33 feet in a few areas. These older land surfaces usually exhibit well-developed buried soils (paleosols) that represent a significant stratigraphic boundary in the region where archeological deposits might have formed as humans began to inhabit the region. Based on the geomorphological history of the bay shore, the earliest evidences of human occupation in the project area and other near-bay vicinities around the Bay likely were submerged and/or buried by sediment deposition as the bay formed and the shoreline changed over time.

The majority of the archeological C-APE is within what was historically (ca. 1850) a large estuary at the mouth of Islais Creek. This estuary was characterized by the wide sinuous channel of Islais Creek, in addition to numerous distributary channels, tidal sloughs, and small creeks flowing from the surrounding foothills. This appears to have been a dynamic estuarine environment subjected to daily tidal fluctuations and likely occasional relocations of the primary Islais Creek channel during flood events. When flooding occurred, estuarine sediments were reworked and minor channels repositioned. The estuary shorelines, including formerly terrestrial areas offshore that were submerged by rising sea levels as the Bay grew, would have provided immediate access to freshwater and wetland resources. Such environments would have been attractive for prehistoric human occupation as demonstrated by the presence of several known prehistoric archeological deposits along the former margins of this estuary. While large portions of the archeological C-APE are within areas that historically would have been under the waters of the estuary and Bay, a few thousand years ago (prior to inundation from rising sea levels) the entire archeological C-APE would have been a terrestrial setting adjacent to San Francisco Bay and estuary.

Historically, and likely for at least 8,000 years previously, Piers 94 and 96 were fully within the waters of San Francisco Bay. The land areas at these locations were formed by deep landfill in the bay in the 1960s. The majority of the remaining archeological C-APE historically was at the interface of tidal flats and, at slightly higher elevations, tidal marshes. Tidal flats are areas devoid of vegetation that are repeatedly submerged and exposed by the daily tides. They are conventionally defined on their bayward margin by the line of Mean Lower Low Water (the average of the lower of the two daily low tides) and on their landward margin by the lower limit of tidal marsh vegetation. The locations of SEP South and the Southeast Greenhouses were situated on terrestrial areas overlooking the estuary, above what were historically the tidal flats.

[11] Helley, Edward J., Kenneth R. LaJoie, W. E. Spangle, and Lynda M. Bair, *Flatland Deposits of the San Francisco Bay Region, California – Their Geology and Engineering Properties, Their Importance to Comprehensive Planning.* Professional Paper No. 943., 1979; McIlroy, Jack, Jack Meyer, and Adrian Praetzellis, *Geoarchaeological and Archaeological Investigations for the Central Freeway Seismic Retrofit Project.* Submitted to the California Department of Transportation, District 4, Oakland, California, 2001; Meyer, Jack, *A Geoarchaeological Study of the Guadalupe Parkway Corridor, State Route 87, San Jose, Santa Clara County, California.* Submitted to the California Department of Transportation, District 4, Oakland, and KEA Environmental, Inc., San Diego, California, 2000; Stewart, Suzanne, Jack Meyer, and Mike Newland, *Phase One Investigations for the Fort Baker Archaeological Survey, Golden Gate National Recreation Area, Marin County, California.* Prepared for Golden Gate National Recreation Area, National Park Service, San Francisco, 2002.

An ambitious plan to fill the Islais Creek estuary was undertaken in the early 1920s. Mapping of surface deposits indicates that the uppermost soils of the archeological C-APE consist entirely of fill associated with the infilling of the Islais Creek estuary.

4.5.1.5 Prehistoric Context

The following discussion outlines the prehistoric context of the project area, including the most recent chronology for prehistoric archeological sites on the San Francisco peninsula and the San Francisco Bay Area. This section has been adapted from the *Archeological Technical Memorandum for the San Francisco General Plan Housing Element EIR*.[12]

Since the late Pleistocene, when indigenous peoples may have first arrived in the Bay Area, the region has undergone significant environmental changes. The oldest evidence of human occupation in San Francisco includes two isolated human skeletons discovered 45 years apart deep below city streets in marine deposits. In October 1969, fragmentary human bones were encountered during construction of the Bay Area Rapid Transit Civic Center Station in downtown San Francisco. Those remains belonged to a female individual aged 24–26 years. Radiocarbon dating of associated organic material indicated the remains were nearly 5,000 years old. The skeleton was discovered 75 feet below ground surface (bgs) within a 40-foot-thick clayey silt stratum (bay deposits), approximately 26 feet below mean sea level (CA-SFR-28).[13] More recently, an intact human skeleton was found during construction of the Transbay Transit Center in February 2014. The human remains were encountered at a depth of 58 feet bgs with Bay mud deposits, and are estimated to be between 5,000 to 7,000 years old.[14]

These two finds are exceptional, as the majority of known prehistoric-era sites in San Francisco date to no more than 2,000 years before present (B.P.) and are found buried at depths of approximately 10 to 20 feet bgs. They were originally deposited within the dune sands that were blown eastward from the Pacific coast, across the peninsula over the last 6,000 years.

Prehistoric resources and sites that have survived to the present represent only a portion of the past. The early growth of San Francisco was characterized by filling the shallow Bay waters and other low-lying lands, removal of hills of sand and rock, and the obscuring of original ground surfaces by fill, roadways, buildings, and structures. Nels C. Nelson conducted a systematic survey around the perimeter of the entire San Francisco Bay between 1906 and 1909, focusing on shellmounds partially submerged by or adjacent to the Bay waters. Although Nelson recorded 425 shellmounds around the San Francisco Bay Area, his survey occurred well after San Francisco and other areas were heavily developed and covered by the built environment, potentially obscuring other sites that may have been present.[15]

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12 William Self Associates and Randall Dean, *Archeological Technical Memorandum for the San Francisco General Plan Housing Element EIR*, prepared for San Francisco Planning Department, 2009. Available online at: http://www.sf-planning.org/ftp/files/MEA/2007.1275E_SFHE_DEIR_AppxC.pdf, Accessed January 11, 2017.

13 Henn, Winfield, Tom Jackson, and Julius Schlocker, Buried Human Bones at the 'BART' Site San Francisco, California Geology, Vol. 25, No. 9, 208-209. 1972.

14 Jack Meyer, personal communication with ESA archaeologist Matthew Russell, Ph.D., April 2014.

15 Nelson, Nels C., Shellmounds of the San Francisco Bay Area. *University of California Publications in American Archaeology and Ethnology* 7 (4):310-356. Berkeley, 1909.

Periods of prehistory and discovered sites dating from these periods are discussed below.

Terminal Pleistocene (13,450–11,550 B.P.)

No prehistoric archeological sites dating from this period have yet been discovered in the San Francisco Bay Area. The nearest Terminal Pleistocene site is the Borax Lake site (CA-LAK-36), in Lake County. Populations at this time were small and highly mobile. The archeological signature of highly mobile hunter-gatherers would be faint and geographically sparse, and would be easily disturbed by geological processes such as erosion, rising sea level, and alluvial burial.

Early Holocene (11,550–7,650 B.P.)

Early Holocene human populations are known from several Bay Area sites, such as those at the Los Vaqueros Reservoir (CA-CCO-696) and the Santa Clara Valley (CA-SCL-178). Communities from this period were semi-mobile hunter-gatherers who used flaked stone tools and ground stone implement such as manos and milling slabs. Human burials from this period have also been investigated. There are no recorded Early Holocene sites in San Francisco.

Middle Holocene (7,650–3,750 B.P.)

Middle Holocene sites are more widespread in the San Francisco Bay Area and are evidenced by substantial settlements, isolated burials, distinct cemeteries, milling slabs, mortars and pestles, and the fabrication and use of shell beads and other ornaments. Differences in burial treatment such as differential distribution of shell beads and ornaments are interpreted as evidence of possible social stratification. The expansion of San Francisco Bay's estuaries and tidal wetlands seems to have resulted in a shift toward coastal and maritime resource exploitation. Two Middle Holocene sites have been recorded in San Francisco: the two sets of deeply buried human remains discussed above.

Late Holocene (3,750–170 B.P.)

The Late Holocene has left the most comprehensive archeological record of prehistoric populations in San Francisco. This period is marked by the establishment of large shellmounds. Artifact assemblages are characterized by bone awls (indicating appearance of coiled basketry); net sinkers; mortars (probably indicating greater consumption of acorns and other plant resources); *Olivella* shell beads; the appearance of the bow and arrow; and diverse beads and ornaments, such as incised bird bone tubes. There is some indication of a greater exploitation of deer, sea otter, mussels, and clams. There is growing indication of shellmounds as planned, constructed landscapes on sites of ancestral, or at least mortuary, importance.[16]

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[16] Lightfoot, Kent G., Cultural Construction of Coastal Landscapes: A Middle Holocene Perspective from San Francisco Bay. In *Archaeology of the California Coast during the Middle Holocene*, Jon M. Erlandson and Michael A. Glassow, editors, pp.129-141. Perspectives in California Archaeology Vol. 6, Cotsen Institute of Archaeology, University of California, Los Angeles, 1997; Lightfoot, Kent G. and Edward M. Luby, Late Holocene in the Greater San Francisco Bay Area: Temporal Trends in the Use and Abandonment of Shell Mounds in the East Bay. In *Catalysts to Complexity: The Late Holocene on the California Coast*. Jon M. Erlandson and Terry Jones, editors, pp. 263-281. Cotsen Institute of Archaeology, University of California, Los Angeles, 2002.

4.5.1.6 Prehistoric Archeological Investigations in San Francisco

Systematic investigation of prehistoric sites on the northern San Francisco peninsula began with Nelson's shellmound survey conducted between 1906 and 1909.[17] Nelson pursued his interest in San Francisco prehistory with excavations at CA-SFR-7 (the Crocker Mound) on the Bay's southeastern shoreline,[18] among other investigations. Nelson found that CA-SFR-7 contained a variety of flaked stone, worked bone, faunal remains, and 23 human burials. The constituents of this mound indicated long-term residential occupation. Two years later, L. L. Loud excavated another shellmound (CA-SFR-6), approximately 3 feet thick, near the Palace of Fine Arts.[19] While interest in the prehistory of the northern San Francisco peninsula began in the early 1900s, the area generally received little attention until more recent times. This was partially a result of the destruction and/or burial of sites due to historic settlement and development.

Within the past 30 years, the body of work focusing on the prehistoric archeology of the northern San Francisco peninsula has expanded, as archeological sites have been uncovered during construction or development activities within the City. Approximately 50 prehistoric archeological sites have been documented within the northern San Francisco peninsula and Yerba Buena Island; the majority of these were within one-half mile or less from the historic margins of San Francisco Bay. Most of the prehistoric sites are shell midden sites, which have their greatest concentrations in the South of Market neighborhood and the Hunters Point-Bayview-Candlestick Point-Visitacion Valley area. Although midden sites in the latter area have been known since the 1870s and include some of the largest shellmound sites in San Francisco, they have not been thoroughly investigated and their dating is not well understood. The South of Market sites have, on the other hand, largely only come to light since the 1980s and have been subject to various analyses and absolute dating techniques. These shell midden sites are also remarkable within Bay Area shellmound studies because many of them possess good physical integrity as a result of having been buried beneath natural sand dune deposits for hundreds of years following their abandonment.

The Anthropological Studies Center at Sonoma State University defined a National Register of Historic Places (National Register)-eligible district that incorporates several prehistoric sites within sand dunes formed along the north side of Mission Bay in the South of Market neighborhood.[20] These sites are considered to represent elements of a large multi-village community. The State Historic Preservation Officer (SHPO) has recently determined that at least seven previously recorded prehistoric habitation sites are part of this district. The district is eligible under National Register Criterion A and California Register Criterion 1, association with events that made a significant contribution to the broad patterns of our history, as well as Criteria D/4, for its ability to yield important new insights into regional prehistory in the vicinity of Mission Bay.

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[17] Nelson, Nels C., Shellmounds of the San Francisco Bay Area. *University of California Publications in American Archaeology and Ethnology* 7 (4):310-356. Berkeley, 1909.
[18] Moratto, M. J., *California Archaeology*. Academic Press, Orlando, FL, 1984.
[19] Ziesing, Grace H., Replacement of the West Approach to the San Francisco-Oakland Bay Bridge: Archaeological Research Design and Treatment Plan. Prepared for the Office of Environmental Planning, District 4, California Department of Transportation, Oakland, CA, 2000.
[20] Anthropological Studies Center, Site Specific Archaeological Research Design, Evaluation, and Data Recovery and Treatment Plan for Prehistoric Midden Deposits at Fourth and Howard Streets, San Francisco. Prepared for the San Francisco Municipal Transportation Agency, September 15, 2010.

In addition to the South of Market neighborhood and the Hunters Point-Bayview-Candlestick Point-Visitacion Valley area, a third area of intense prehistoric occupation was on the terraces of the former Islais and Precita Creeks, just above their broad tidal estuary. Several notable sites have been investigated in this area, including CA-SFR-17, which was originally designated as Nelson 430, then CA-SFR-3, and now subsumes both CA-SFR-16 and CA-SFR-18. The site was a shellmound or series of shellmounds on the south bank of the upstream portion of Islais Creek. Material recovered from the site includes ground stone artifacts and a number of burials that date over a broad time span from the Late Holocene (approximately 2500 B.P.) into the ethnographic period.

4.5.1.7 Ethnohistorical Context

Based on a compilation of ethnographic, historic, and archeological data, Milliken describes a group known as the Ohlone, who occupied the general vicinity of the project.[21] While traditional anthropological literature portrayed the Ohlone peoples as having a static culture, today it is better understood that many variations of culture and ideology existed within and between villages. While these "static" descriptions of separations between native cultures of California make it an easier task for ethnographers to describe past behaviors, this masks Native adaptability and self-identity. California's Native Americans never saw themselves as members of larger "cultural groups," as described by anthropologists. Instead, they saw themselves as members of specific villages, perhaps related to others by marriage or kinship ties, but viewing the village as the primary identifier of their origins.

Levy describes the language group spoken by the Ohlone, also known as "Costanoan."[22] This term is originally derived from a Spanish word designating the coastal peoples of Central California. Today Costanoan is used as a linguistic term that references a larger language family that included at least eight distinct languages (as different as Spanish is from French) of the same Penutian language group. The Ohlone once occupied a large territory from San Francisco Bay in the north to the Big Sur and Salinas Rivers in the south. The C-APE is within the *Ramaytush Ohlone* linguistic territory, in the areas of present-day San Francisco and San Mateo Counties. The northern portion of the San Francisco peninsula (including San Francisco) was the tribal/regional community area of the *Yelamu*, one of seven tribal areas on the San Francisco peninsula (north of San Francisquito Creek). The *Yelamu* are estimated to have had a population of 160 and population density of one person per square kilometer (2.7 per square mile) at the time of Euroamerican contact.[23]

Economically, Ohlone engaged in hunting and gathering. Their territory encompassed both coastal and open valley environments that contained a wide variety of resources, including grass seeds, acorns, bulbs and tubers, bear, deer, elk, antelope, a variety of bird species, and rabbit and other

[21] Milliken, Randall T., *A Time of Little Choice: The Disintegration of Tribal Culture in the San Francisco Bay Area, 1769-1810.* Ballena Press, Menlo Park, 1995.

[22] Levy, Richard, Costanoan In *California*, edited by Robert F. Heizer, pp. 485–495. Handbook of North American Indians, vol. 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C., 1978.

[23] Milliken, Randall, Laurence H. Shoup, and Beverley R. Ortiz, *Ohlone/Costanoan Indians of the San Francisco Peninsula and their Neighbors, Yesterday and Today.* Prepared for National Park Service, Golden Gate National Recreation Area. June 2009.

small mammals. The Ohlone acknowledged private ownership of goods and songs, and village ownership of rights to land and/or natural resources; they appear to have aggressively protected their village territories, requiring monetary payment for access rights in the form of clamshell beads. After European contact, Ohlone society was severely disrupted by missionization, disease, and displacement. Today, people of Ohlone descent still have a strong presence in the San Francisco Bay Area and many are highly interested in their historic and prehistoric past.

4.5.1.8 Historic Period Setting

This section provides a general historical overview of the southeastern part of San Francisco, focusing on the region south of Islais Creek in the Bayview-Hunters Point district. It also highlights specific land use history for the project area, detailing information found in documents, maps, and aerial photographs.

Spanish, Mexican, and Early American Periods

Initial European exploration of the San Francisco area began in 1769. During this period, a number of Spanish expeditions penetrated the territory occupied by the Ohlone peoples. Between 1769 and 1776, forays led by Portola, Ortega, Fages, Fages and Crespi, Anza (two expeditions), Rivera, and Moraga were carried out. Favorable reports led to the founding of seven missions in the region between 1770 and 1797.

In the spring of 1776, the site of San Francisco was chosen by Juan Batista Anza for the establishment of a mission and military post. Later that same year, the Mission San Francisco de Asís (also known as Mission Dolores) and Presidio de San Francisco were officially dedicated and Jose Joaquin Moraga (Anza's lieutenant) took formal possession in the name of King Carlos III.

The Spanish colonization of Alta California, as manifested in the religious-military mission system, produced profound changes in the cultures of the indigenous population. The missions resettled and concentrated the aboriginal hunter-gatherer population into agricultural communities. The concentration of population, coupled with the indigenous people's lack of immunity to European diseases, caused the tribes to be decimated by common diseases that were generally not fatal to Europeans. It has been estimated that the Ohlone population overall declined from 10,000 or more in 1770 to fewer than 2,000 in 1832.

After gaining independence from Spain, Mexico established jurisdiction over Alta California in April 1822. During the Mexican Period (1822–1848), control over this remote area by the central and local Mexican authorities was never strong. The project vicinity was part of Rancho Rincon de las Salinas y Potrero Viejo, which occupied much of southeastern San Francisco. Don José Cornelio Bernal submitted a petition for Rancho Ríncon Salinas y Potrero Viejo in 1834, although Mexican Governor Figueroa rejected the claim, indicating the area was part of the common lands of the Pueblo of Yerba Buena. By October 10, 1839, Governor Figueroa reversed his earlier decision and granted the tract to Bernal, who may have been running cattle on the land since at least the mid-1830s. The rancho included most of southeastern San Francisco, including the Islais Creek watershed and all of what is presently the Bayview-Hunters Point district, including the project area.[24] California became part of the United States as a consequence of the U.S. victory over Mexico in the Mexican War. The territory was formally ceded in the treaty of Guadalupe Hidalgo in 1848 and was admitted as a state in 1850.

Prior to the discovery of gold at Sutter's Mill on January 24, 1848, development in San Francisco consisted of the Spanish/Mexican facilities (i.e., the Presidio and Mission) and a small settlement known as Yerba Buena situated on the shores of the cove by the same name. The inhabitants of Yerba Buena were predominantly non-Spanish, English-speaking immigrants (e.g., U.S. or British citizens). Sometime before the Gold Rush, the inhabitants of Yerba Buena officially changed the name of their settlement to San Francisco. Following the discovery of gold, San Francisco transformed quickly from an isolated hamlet into a bustling center of commerce. After the discovery of gold, the population of San Francisco grew from 375 people in 1847 to 2,000 by February 1849, and by the end of 1849, there may have been as many as 20,000 people living in the City.[25] However, the immediate project area remained essentially undeveloped for several more decades.

Late 19th Century (1860–1906)

The growing City downtown had increasing conflicts with malodorous industrial uses, which pushed them further and further south along the bay shore. In 1862, the South San Francisco Homestead & Railroad Association attempted to subdivide and market a portion of the neighborhood north of the C-APE. The impetus was construction of a Long Bridge completed in 1867 that spanned Mission Bay and Islais Creek and connected downtown San Francisco to the southern part of the city at Hunters Point. The Long Bridge, which aligned with Railroad Avenue (Third Street), eased transportation to this developing area and made industrial development and transport feasible for this area, with extensive development of piers and elevated structures both to elevate them above the wetlands and to allow disposal of refuse that could be flushed by the tides.[26]

Ordinances in the early 1850s pushed slaughterhouses from South of Market to the Bayview-Hunters Point district in the vicinity of the project, and by the late 1860s the area was part of an 80-acre Butchers' Reservation known as "Butchertown."[27]

Developers began to promote the area south of Islais Creek but the immediate project area still did not see much use. By 1869, the southern part of the C-APE was an open, flat area above the southern margin of the Islais Estuary, with a network of roads and numerous structures dotting the area. The location of the staging area at the Southeast Greenhouses site was bisected by two dirt tracks, possibly including structures at the southern end, but with no streets or additional indications of development.[28] The northern portions of the C-APE were still within the Islais Estuary, and the

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[24] Kelley, Tim, and Christopher VerPlanck, *Bayview-Hunters Point Area B Survey, San Francisco, California, Historic Context Statement*. Prepared for the San Francisco Redevelopment Agency, 2010:15.
[25] Hupman, J.M., and D. Chavez, *Archaeological Resources Investigations for the Waterfront Plan EIR, San Francisco.* On file (S-16882), Northwest Information Center, Sonoma State University, 1995.
[26] Kelley, Tim, and Christopher VerPlanck, *Bayview-Hunters Point Area B Survey, San Francisco, California, Historic Context Statement.* Prepared for the San Francisco Redevelopment Agency, 2010:31–33.
[27] Ibid:42–44.
[28] U.S. Coast Survey, San Francisco Peninsula, 1869.

1550 Evans Avenue and Pier 94 and 96 staging areas were still within San Francisco Bay, although the Long Bridge ran adjacent to what was to become 1550 Evans Avenue.[29]

U.S. Coast and Geodetic Survey charts from 1884 show the same limited development in the C-APE as in 1869, indicating the slow rate of urban development in the vicinity throughout the late 19th century. Exceptions included a pier extending west from the Long Bridge (Railroad Avenue/Third Street) immediately north of the C-APE along the future alignment of Fairfax Avenue,[30] which supported the Legallet-Hellwig Tanning Company and associated industries; and a series of wooden piers that extended northward into the Bay adjacent to the Long Bridge within the 1550 Evans Avenue staging area.[31]

Among the industries affiliated with the slaughterhouses was a tannery operated by A.B. Patrick and Co., established on the north side of 6th (Fairfax) Avenue between Q (Quint) and R (Rankin) Streets, between 1888 and 1889. The northern end of the C-APE terminates just south of the location of this tannery. A core group of Butchertown workers were Overseas Chinese laborers, who likely occupied lodging at or in the vicinity of the livestock yards, slaughterhouses, and tanning mills. Olmsted et al. note that the Overseas Chinese workers may have lived on the tannery premises, as they did at laundry facilities in San Francisco.[32] The 1900 Sanborn map indicates the facility included "sleeping rooms," which seems to support the idea that workers lived at the tannery. Historical maps and 1880 census data indicate that Chinese laundry sites in San Francisco served as both living quarters and work places for Chinese laundry workers, indicating there is precedent for industrial work places to house Overseas Chinese workers. That was certainly the case with European (primarily French and German) workers at the Legallet-Hellwig Tannery nearby, many of whom lived on site, as noted on the Sanborn map.

By the close of the 19th century, additional development had been completed in the southern portion and along the eastern margin of the C-APE, but the majority of the project area was still within the Islais Estuary. As shown on the 1900 Sanborn Fire Insurance map for the location of the Southeast Greenhouses staging area, city streets had been established and several buildings were present at the Southeast Greenhouses location, including residences on 12th Avenue South, 13th Avenue South, and 14th Avenue South (later La Salle, McKinnon, and Newcomb Avenues, respectively), as well as P Street South (later Phelps Street). The remainder of the Southeast Greenhouses location was dominated by corrals and feeding sheds operated by Miller & Lux, a long-standing San Francisco livestock dealer and butcher.[33] The 1900 Sanborn map also indicates that Railroad Avenue (the former Long Bridge and later Third Street) ran adjacent to the west side of the 1550 Evans Avenue staging area, and a number of wooden piers extended northward over San Francisco Bay and the

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29 Ibid.

30 Fairfax Avenue, also previously known as 6th Avenue, ran immediately north of the archaeological C-APE parallel to Evans Avenue.

31 U.S. Coast and Geodetic Survey (USCGS), San Francisco Entrance, 1884.

32 Olmsted, Roger R., Nancy L. Olmsted, Allen Pastron, and Jack Prichett, *Rincon de las Salinas Y Potrero Viejo – The Vanished Corner, Historical Archaeological Program, Southeast Treatment Plan, 1978–1979*. Prepared for the San Francisco Clean Water Management Program, 1981.

33 Langley, Henry G. The San Francisco Directory for the Year Commencing March, 1900. Henry G. Langley, San Francisco, California. Available online at http://www.archive.org. Accessed October 2015; Sanborn Map Company (Sanborn), Insurance Maps of San Francisco, California, 1900.

mudflats form the Long Bridge. The piers housed numerous structures associated with slaughterhouses and other related industries.[34]

Early 20th Century (1906–1950)

Historical maps indicate that little changed in the C-APE during the first decades of the 20th century.[35] Maps show the area remained low and poorly drained, a condition that likely explains its continued lack of development. Railroad tracks of the Atchison, Topeka and Santa Fe Railroad ran up the middle of Quint Street, and spur lines extended into portions of the northern part of the C-APE. Other than these few industrial improvements between Quint Street and the rail spur, the only development in the area remained in the current location of the Southeast Greenhouses. The same residences shown in 1900 were still present, with the exception of the dwelling at 1200 P Street South (later Phelps Street) that had been replaced by a stable. The dwelling at 1804-1806 Newcomb Avenue is labeled as “old and dilapidated” on the 1914 Sanborn map,[36] suggesting it may no longer have been inhabited.

The 1550 Evans Avenue staging area was also largely the same in 1914 as it was in 1900.[37] Additional fill had been placed around the piers, but mud flats still remained between some of the piers, as well as to the east.

Although few details are evident on the 1926 U.S. Coast Survey chart, it documents in general that little changed in the C-APE through the 1920s. The project to fill the Islais Estuary, which had stalled in the early part of the century, started moving again in 1930 and work to reclaim much of the estuary began. Although reclamation of the Islais Estuary was officially completed in 1936, the reclamation project stopped west of the Southern Pacific railroad tracks (Caltrain tracks) on the western edge of the project site and did not include the C-APE. As reclamation opened the way for development nearby, the project vicinity remained swampy and sparsely developed with a few scattered buildings.[38]

The 1938 Ryker aerial photographs show only minimal changes had taken place in the C-APE by the end of the 1930s. Industrial uses continued, but the majority of the C-APE was still undeveloped, and standing water was still evident. At the location of the Southeast Greenhouses, the residential neighborhood remained largely the same as it had been in 1914. At the 1550 Evans Avenue staging area, structures built on piles or posts over mud flats were still present, with areas of undeveloped mud flats between and around them. The northern part of the potential construction staging area includes a series of hog pens and corrals associated with the slaughterhouses.

After World War II, the future locations of Piers 94 and 96 were still within San Francisco Bay. By 1950, almost the entire C-APE had been cleared of buildings, including the residences that had formerly been between La Salle and McKinnon Avenues in the vicinity of the Southeast Greenhouses

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[34] Sanborn, 1900.
[35] Sanborn, Insurance Maps of San Francisco, California, 1914; USCGS, San Francisco Entrance, 1915.
[36] Sanborn, 1914.
[37] Ibid.
[38] Kelley and VerPlanck, 2010:83, 110.

site. The only residence left remaining in the C-APE was at 1811 McKinnon Avenue.[39] This final residence was demolished and removed by 1956.[40] By 1950, little had changed at the 1550 Evans Avenue staging area. Slaughterhouses and associated industries still dominated the area, although by 1950 most of the land had been filled around the structures. By 1968, Piers 94 and 96 had been constructed of reclaimed earthen fill, and the terminal structures at the ends of the earthen piers were completed between 1973 and 1975. At 1550 Evans Avenue, a school building and parking lot was constructed in 1978.

Brief History of the Southeast Water Pollution Control Plant[41]

City Sewer System Plans

Rapid development as a result of the California Gold Rush transformed San Francisco into the largest city on the West Coast by the late 19th century. To support the growing population, the original sewer system was designed to carry combined wastewater and stormwater flows to the shoreline. By 1899, over 300 miles of combined sewers had been completed. In that year, the City's first coordinated sewerage plan—the 1899 Sewer System Master Plan— was developed. The main accomplishments of the 1899 plan were (1) development of a standardized, coordinated sewer design to provide effective drainage, (2) construction of four pump stations, (3) consolidation to eliminate on-land discharges, and (4) construction of 700 miles of combined sewers.

Although many improvements to the City's sewer system occurred as a result of the 1899 plan, untreated sewage was still discharged directly into the Bay and Pacific Ocean, eventually resulting in unsanitary conditions along the coastlines. These conditions were recognized by the public early on, but could not be sufficiently addressed due to lack of financial resources. A sewer bond in 1933 made funds available for a board of consulting sanitary engineers to prepare studies and recommendations to remedy this situation, resulting in the 1935 Sewer System Master Plan. The plan proposed the following major improvements to the City's sewer system: (1) sewage generated in the North Point and Marina districts to be treated at a plant at North Point; (2) sewage generated in the Baker's Beach or East Richmond district, West Richmond, and Sunset districts to be treated at the Richmond-Sunset Sewage Treatment Plant; and (3) sewage generated in the southeast quadrant of the city be treated at a treatment plant at Bayview-Hunters Point.

The priority was given to improve sewerage in the areas along San Francisco's north shore and Great Highway, the main recreational areas of the city, as the completion of all three plants under this one bond issue was not possible. The Marina Pumping Plant and discharge sewer, as well as the Richmond-Sunset Plant in Golden Gate Park with its connecting tunnel and sewers, were built in 1939. The Seacliff Pump Station No. 2, completed in 1940, was built to pump effluent from the Seacliff neighborhood to the Richmond-Sunset Plant. The Richmond-Sunset Plant was enlarged and

[39] Sanborn, Insurance Maps of San Francisco, California, 1950.
[40] Historic aerials. Available online at www.historicaerials.com. Accessed on October 2015.
[41] Adapted from Brewster, Brad, Department of Parks and Recreation (DPR) form, Southeast Treatment Plant. Prepared for San Francisco Public Utilities Commission, May 2016. On file with the San Francisco Planning Department.

improved from 1948 to 1950. The North Point Facility in the North Beach neighborhood was constructed in 1951, and the SEP in the Bayview neighborhood was constructed in 1952.

Planning for the SEP

Although the purpose and need for the SEP was articulated in the 1935 Sewer System Master Plan, described above, the bond funding available for its construction was delayed until after World War II. As a result, the start of construction was delayed until 1950. Construction of the SEP began on March 13, 1950, and was completed by mid-1952, with 18 buildings and 10 digester tanks, in two groupings of five.

The SEP was designed by the San Francisco Bureau of Engineering, Department of Public Works, with the advice of Clyde C. Kennedy, Consulting Sanitary Engineer, and the assistance of Ambrose and Spencer, Consulting Architects, and Harold B. Hamill, Consulting Structural Engineer. The construction contract for the SEP was awarded to Walsh Construction Co., Bates & Rogers Construction Corp., and J. H. Pomeroy & Co. Inc., Joint Ventures. The original contract award for the plant was $2,132,118; however, construction delays put the final costs closer to $4,500,000.

Architectural Style

The original 18 buildings at the SEP were designed in the Streamline Moderne architectural style, which was an expression of the speed and sleekness of the Machine Age. The style referenced the aerodynamic forms of airplanes, ships, and automobiles of the period with sleek, streamline rounded corners and curves, and evoked a machine-made quality. It evolved from the Art Deco movement and incorporated design elements associated with the International Style. In San Francisco, construction in this style began in the mid-1930s and continued through the early 1950s.

The 18 buildings at the SEP completed in 1952 reflected a later and more rectilinear iteration of the Streamline Moderne style. The buildings are horizontally oriented and have character-defining features of the Streamline Moderne style including glass block windows, cast concrete double moldings around all windows and doors, flat roofs with tile coping at the roofline with a speedline motif, and smooth, board-formed concrete wall surfaces. The ten digester tanks, also completed in 1952, are utilitarian industrial facilities that cannot be ascribed to this particular style, but were designed and built as functional units directly associated with buildings that are representative of this style.

Site Layout

The SEP was constructed on both sides of Jerrold Avenue, and original layout plans indicate that the plant was designed to be expanded on both the north and south sides of this street. The plant could be expanded to the south to accommodate ten additional digester tanks (in two groupings of five), and the north side could be expanded to accommodate two additional sedimentation buildings, immediately east of existing Buildings 040 and 041. None of these expansions occurred as planned; however, greenhouses currently exist where the additional digester tanks would have been constructed, and internal parking lots currently exist where the additional sedimentation buildings would have been constructed. The existing Southeast Greenhouses were constructed in the early 1980s to address social and economic effects of expansion of the SEP (discussed below).[42]

The physical layout of the SEP remained essentially unchanged from 1952 to 1979. During this time, however, the passage of the 1972 Federal Water Pollution Control Amendments, later known as the Clean Water Act, prompted the City to create the 1974 Sewer System Master Plan. That plan led to numerous construction projects that were implemented over an approximately 25-year period.

Modernization and Expansion

Compliance with the Clean Water Act necessitated a modernization and expansion program at the SEP primarily to provide secondary treatment for dry weather flows. This program resulted in the construction of many new buildings on the north side of the plant related to secondary treatment, as well as many new buildings on the south side of the plant related primarily to solids treatment.

Plant modernization and expansion projects at the SEP from 1952 to 2005 eliminated six of the original 18 buildings constructed in 1952. Buildings removed from SEP North included a headworks building, a chlorination building, and an electrical substation that existed to the north of Buildings 040 and 041, as well as a sludge control building that existed to the south of these buildings. Buildings removed from SEP South included a receiving and thickening building north of Building 750, and a gas holding tank between the two digester tank groups.

During this same period, 21 new buildings or groupings of identical structures were constructed throughout SEP North and South. Fifteen of the new buildings at the SEP were designed in 1977 by the San Francisco Bureau of Engineering, Department of Public Works to address the Clean Water Act requirements and reflected the Brutalist style of Modern architecture.[43] The modernization and expansion effort at the SEP began in 1979 and was largely completed by 1981. Six other buildings that were added to the SEP between the late 1980s and the mid-2000s were also designed by the San Francisco Bureau of Engineering, Department of Public Works, reflecting the Post Modern and Modern/Industrial styles of architecture. These later buildings were primarily related to enhanced biosolids production and storage, as well as energy generation through digester gas recapture.

Brief History of the Central Shops[44]

The CCSF Central Shops facility at 1800 Jerrold Avenue is immediately south and west of the SEP and within the C-APE. The Central Shops is a City bureau responsible for the maintenance of City-owned vehicles as well as mechanical apparatus, fire apparatus, and a variety of other mechanical

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[42] State Water Resources Control Board (SWRCB), Order No. WQG 81-1, January 22, 1981. Available online at http://www.swrcb.ca.gov/board_decisions/adopted_orders/water_quality/1981/wq1981_01.pdf, January 22, 1981.

[43] The Brutalist architectural style derives its meaning from the French béton brut, or raw concrete. The style is characterized by exposed concrete construction and expressionistic massing, whereby the interior disposition of spaces is articulated on the exterior facade. Brutalist structures tend to be geometric in massing and are usually constructed of large amounts of poured concrete with a rough, blocky appearance. This style was prevalent in San Francisco between 1960 and 1980 and is often found within civic, institutional, or industrial settings.

[44] Adapted from JRP Historical Consulting, LLC, Department of Parks and Recreation (DPR) form, 1800 Jerrold Avenue. Prepared for San Francisco Public Utilities Commission, November, 2014. On file with the San Francisco Planning Department.

and machines works and equipment. In the 1950s, the Bureau of Central Shops operated under the CCSF Purchasing Department and was responsible for approximately 1,200 City vehicles at three major shops and 11 subshops and garages. By the mid-1950s, these multiple facilities had become inadequate and inefficient. In 1956, planning began for a new facility that would consolidate all three major shops together at the 1800 Jerrold Avenue site, which at the time was undeveloped surplus land that had been previously acquired by the City for construction of the SEP. Construction of the new Central Shops facility began in 1958 at an estimated cost of $1 million and was completed in 1959. The Jerrold Avenue facility contained two fully enclosed shop buildings, and a smaller shed structure. These are referred to in the historic resources documentation of the Central Shops as Building A, Building B, and Building C. The facility was divided into three main areas— automobile, truck, and fire apparatus—as well as several auxiliary shops such as machine shop, blacksmith shop, upholstery shop, paint shop, fire hose shop, ladder shop, tire shop, and wood working shop. The facility also housed Central Shops administration offices.

Buildings A and B at the Central Shops were designed in the Industrial Modern style of architecture, which combines a 20th-century Modern architectural aesthetic with the design qualities of engineering, manufacturing, and industrial facilities that were built for utility and functionality. The Central Shops' straight-forward design shared qualities with industrial design and Modern architecture of its period, including the simple cubic forms, walls of glass on steel frames, open interior floor plans, and lack of applied ornamentation. The design included highly functional expansive glazing that brought extensive natural light into the facility and wide clear spans to maximize flexibility in which to maneuver vehicles and operations. Assimilation of the Modern architectural aesthetic into industrial facilities such as the Central Shops marks an integration of design objectives that merged utilitarian construction with refined architectural concepts of International Style Modernism.

The function of the Central Shops Jerrold Avenue facility continued virtually unchanged in the following decades. The Central Shops continued in its primary function as the main repair and maintenance facility for the City's vehicle fleet, as well as maintaining other City equipment and machines. The number of vehicles in the City fleet maintained by Central Shops steadily grew in subsequent years to over 4,000 vehicles by 1985. The Central Shops is now under the General Services Administration and has five maintenance and repair facilities that provide fleet services to over 6,000 vehicles from 70 City departments. Currently, the Central Shops facilities are in active use, but the City plans to relocate the Central Shops operations to a site at Galvez Avenue and Selby Street and to transfer jurisdiction of the current site to the SFPUC for SEP use.[45]

Brief History of the Asphalt Plant[46]

Also located south and west of the SEP, and within the C-APE, is the Asphalt Plant at 1801 Jerrold Avenue. The first bituminous mixtures of sand, gravel, and tar produced in the United States were used for sidewalks and roads starting in the late 1860s, and a City-owned asphalt plant had been

45 San Francisco Planning Department, CEQA Categorical Exemption for Central Shops Relocation and Land Transfer Project. Case Number 2015-004781ENV, October 28, 2015.
46 Adapted from Brewster, Brad, Department of Parks and Recreation (DPR) form, San Francisco Department of Public Works Asphalt Plant. Prepared for San Francisco Public Utilities Commission, May 2015. On file with the San Francisco Planning Department.

operating in San Francisco since 1909. However, the asphalt plant on the project site was built in 1954 on previously undeveloped surplus land that had been acquired by the City for construction of the SEP. The plant site was also adjacent to other City-run industrial operations (e.g., the SEP and Central Shops) and located along a railroad right-of-way.

Operated and maintained by San Francisco Public Works (SFPW's) Bureau of Street and Sewer Repair, the plant produced a hot-mix asphalt provided in batches[47] for SFPW crews to pave, patch, and repair potholes in City streets from 1954 to 2009. The plant also provided asphalt for private contractors that pave City streets. In 1954, the plant consisted of industrial asphalt mixing machinery, an electrical power room, a dispatch office and bathroom/locker room building, a separate restroom and locker room, and a storage shed, all of which were designed in a simplified and utilitarian industrial style.

In 1989, the San Francisco Board of Supervisors approved a major rehabilitation of the plant using $1.5 million of the 1987 Proposition B road improvement bond funds. The approval came in the aftermath of the Loma Prieta earthquake, which demonstrated the value of the plant's ability to supply asphalt on demand. The plant was closed from 1990 to 1993 to accomplish the seismic rehabilitation work. All of the asphalt mixing machinery was replaced or installed in 1992, and a control room building was added to the site. In 2004, SFPW installed two hot asphalt storage silos with the intent of allowing the plant to operate continuously to produce all of the asphalt required for a day's paving operations in addition to storing excess asphalt material for private sale, or emergency and weekend work without the need to activate the entire plant.

In 2006, it was determined that the plant was no longer financially feasible, as private producers could supply asphalt to the City more inexpensively. In 2009, the plant ceased producing asphalt, and since this time the property has been used for the dispatch of asphalt resurfacing crews, for crew offices, and as a corporation yard for street maintenance vehicles and other equipment. As part of a separate project, SFPUC acquired jurisdiction over the asphalt site and will remove aboveground structures prior to implementation of the BDFP.[48]

4.5.1.9 Local Research Results

Prehistoric Archeological Resources

One previously recorded National Register-eligible prehistoric archeological site, CA-SFR-171, is situated within the eastern portion of the project C-APE. Based on previous and current investigations, CA-SFR-171 includes four main elements: a thin Late Period (685 to 180 years ago) midden in the southern portion of the SEP; a thick Middle Period (2,150 to 685 years ago) midden in the central portion of the SEP; probable naturally reworked midden material in the northern portion of the SEP; and artificially redeposited midden material in the historic/modern fill that is widely

[47] There are two types of asphalt plants: batch plants and continuous drum plants. The SFDPW Asphalt Plant is a batch plant type, which has the advantage of flexibility over continuous drum plants, because the operator could individually select each load that came out of the hopper and customers could receive the mix they required on demand. However, batch plants are not as productive as drum plants because they do not operate continuously. Each load must go through its own cycle, after which the pugmill is reloaded for another round.

[48] Refer to Land Reuse – 1801 Jerrold Avenue (SFPUC and DPW) in Table 4.1-1, Section 4.1, for a description of this project.

dispersed across the SEP. Archeological coring has documented that artificially redeposited site material and potential naturally reworked site material is present within the C-APE.[49]

Additionally, geoarcheological coring conducted at 50-meter intervals in much of the western portion of the project C-APE revealed the presence of a well-preserved, Holocene-age submerged soil underlying the thick bay mud and estuary deposits. The presence of a deep, well-preserved pre-bay stable landform makes this area sensitive in regard to the potential for Early Period (4,200 to 2,150 years ago) or older archeological material to be present.[50]

CA-SFR-171

Intact Shell Midden deposit

A thin Late Period component of the CA-SFR-171 shell midden was identified at the southern end of the SEP. This site component occurred at variable depths ranging from 7.5 to 12.5 feet below surface. However, farther to the east, the study identified the truncated Pleistocene Colma formation at shallow depth below the artificial fill that comprises the modern ground surface in this area, and therefore this site deposit is unlikely to extend to the southeast. No cores have been drilled immediately northwest of the thin Late Period deposit or where the midden is absent, so the extent of the midden to the northwest of the recorded site boundary is uncertain. As a result, the Late Period component of the CA-SFR-171 shell midden has the potential to extend into the C-APE within or adjacent to Quint Street.

In contrast, the thick, mainly Middle Period intact midden deposit from CA-SFR-171 was identified in the central portion of the C-APE, and south of Jerrold Avenue. This midden (varying in thickness from 50 to 67 inches) was initially encountered at depths from 10.0 to 11.2 feet below surface. Given that thick midden was present in a core only 785 feet from the C-APE margin, there is the potential that this thick archeological midden could extend northward into the C-APE.

Potential Naturally Reworked Shell Midden

A shellfish concentration potentially indicative of a naturally reworked shell midden was identified within the C-APE north of Jerrold Avenue. This may represent an “off shore” signature of the large newly discovered Middle Period shell midden identified to the southeast; that is, material carried downslope away from the deposit and into the bay by erosion from wind and water. This concentration was situated within the lower portion of the bay and estuary deposits at a depth of 20 to 23 feet below surface. Potential project activity in this portion of the C-APE may include excavation to 45 feet and pile installation to greater depths for building construction. As such, project activity has the potential to encounter this potential cultural deposit.

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[49] Kaijankoski, Philip, Brian F. Byrd, and Jack Meyer, *DRAFT Preliminary Prehistoric Archaeological Testing Report for the Southeast Water Pollution Control Plant, San Francisco, California.* Far Western Anthropological Research Group, Inc., Davis, California. Prepared for the San Francisco Public Utilities Commission, 2016.

[50] Ibid.

Redeposited Shell Midden

Shell midden, exclusively within a redeposited historic/modern context, was documented in the C-APE, or adjacent to the C-APE at depths of two to eight feet below surface. These cores correspond with the proposed locations of the Maintenance Shops 1 and 2 and the No. 2 water pump station. It is assumed that construction of each of these buildings and structures would require excavation extending to depths deep enough to encounter this redeposited material if it is present.

The upper portion of several cores drilled at the Central Shops parcel could not be recovered as unknown materials blocked sediment from entering the core liners. For this reason, the outer barrel of eight cores drilled in this area was plugged and pushed to 20 feet below surface, after which standard sampling began. Furthermore, sampling at one core was not successful in retrieving material until 8 feet below surface. Because these cores could not provide adequate samples of the material at the relevant depth within the Central Shops parcel, the northwestern extent of redeposited midden in the C-APE is poorly defined, and it cannot be determined, based on coring results, whether the redeposited midden extends into this area.

Potential for Previously Undocumented, Submerged Prehistoric Deposits

As discussed in the Geological Context and Prehistoric Context (Sections 4.5.1.4 and 4.5.1.5, above), during the time period when human occupation may have been occurring in the project vicinity, the majority of the C-APE was in the process of being submerged by the rising waters of San Francisco Bay. Large portions of the C-APE within the SEP are underlain by a “pre-bay” former terrestrial surface that could potentially contain archeological remains that were submerged and buried in sediments associated with the rising bay. While in some areas of the SEP the pre-bay landform is marked by an erosional unconformity[51] (indicating that any cultural deposits that might have been present were destroyed by natural forces), throughout virtually the entire C-APE the upper surface of the pre-bay landform is well-preserved under a layer of peat. This represents wetland habitat at the bay margin which would have been attractive to human occupation. This deeply buried surface has an elevated potential to harbor such materials and preserve archeological deposits associated with early occupation of the bay shore.

While not part of CA-SFR-171 and situated almost 100 meters north of the C-APE, an isolated submerged flake (P-38-005445) was recovered from a beach deposit in a core at a depth of 48 to 52 feet below surface. The elevation of this beach deposit indicates that it was at the shoreline of the rising waters of San Francisco Bay approximately 7,000 years ago. Beaches are dynamic, high-energy, landforms that are reworked and/or migrate on a regular basis, and therefore unlikely to harbor an intact archeological site. They may, however, contain isolated artifacts in either primary or secondary context. Based on the fact that other samples of this beach deposit from several cores in the immediate vicinity were wet screened with negative results, this flake (P-38-005445) is likely an isolated find. However, overall, the results of coring attest to Middle Holocene prehistoric use of the Islais Creek Valley and the potential for additional prehistoric archeological materials to be present on the pre-bay landform underlying the project C-APE.

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[51] An erosional unconformity is a gap in the geologic record representing a time when sediment deposition stopped.

The depth to this pre-bay surface increases from south to north and ranges from roughly 10 feet below surface in the south to about 50 feet in the north. The depth of project excavation within the C-APE ranges from 3 to 45 feet below surface; piles would be installed at depths up to 75 feet below surface. As such, if a submerged archeological site is present within the C-APE, it would likely be encountered during project construction.

Historical Archeological Resources

The portions of the current project site and off-site staging areas with sensitivity for the presence of historical archeological resources are locations that: (1) have historically documented use and occupation; and (2) did not experience deep excavation or fill during twentieth-century construction of the SEP as described above, and therefore may contain subsurface archeological deposits associated with the historically documented use. The only areas in the immediate project vicinity that meet these criteria are in the former location of Fairfax Avenue and the potential construction staging area at 1550 Evans Avenue.

The former alignment of Fairfax Avenue and the block on the north side that was the location of the A.B. Patrick and Co, tannery from the 1880s to 1930s are immediately north of the current C-APE. Based on historical research summarized above, as well as results of archeological testing and monitoring conducted in 1978–1979 during construction of the SEP,[52] this area would have a moderate to high sensitivity for containing buried historical archeological resources associated with both the early development of 6th (Fairfax) Avenue and the operation of the A.B. Patrick and Co, tannery. The latter resources may include remains associated with the industrial operation of the tannery itself, as well as potential deposits associated with workers (including Overseas Chinese) that may have been housed at the facility. This area is outside the BDFP C-APE.[53]

The 1550 Evans Avenue parcel may contain subsurface remains of the pile-supported industrial structures associated with the meat packing industry that were present on the parcel from the late-nineteenth century until the late-1970s. Archeological studies undertaken near the northern extent of the C-APE in the late-1970s, which investigated the remains of the Legallet and Patrick tanneries between Fairfax and Evans Avenues, west of Phelps Street, as described above, investigated pile-supported tannery structures in a similar environment as 1550 Evans Avenue. Researchers found that remains associated with the tanneries were generally encountered 5 to 6 feet below street level.[54] They also observed that all remains associated with the tanneries had been disturbed by subsequent construction, and no significant deposits remained.[55] The researchers observed that only scant deposits associated with the industrial activities remained below the ground surface: "[t]he most significant archeological finding, indeed, was that a tannery site in such a location is not apt to be

52 Olmstead et al., 1981.
53 The C-APE as shown in the ARDTP extends into the location of these historic facilities, but was subsequently amended as described in this EIR because there would be no ground disturbance in this area.
54 Olmsted et al., 1981.
55 Ibid.

associated with the existence of significant or revealing artifacts. The scouring actions of the tide that the butchers had counted on to carry away the offal was indeed effective."[56]

Historical maps and aerial images described above indicate that the C-APE in the current location of SEP south of Fairfax Avenue remained sparsely developed throughout the first half of the twentieth century until construction of the SEP in the early 1950s. The historical maps and especially the 1938 Ryker aerial image indicate there are no historically-documented residences in the C-APE; the area was mostly occupied by undeveloped swampland and stock pens. Historical maps and aerial images indicate a few isolated structures were present in this portion of the C-APE, and there may have been undocumented residences not depicted on historical maps.

As described above, the potential staging areas at Piers 94 and 96 are on artificial fill from land reclaimed during the 1960s. There is the potential that historical structures, such as shipwrecks or wharf remains that were present within San Francisco Bay when land reclamation began, could still be extant on the original bay floor. Remains of these historical structures could be preserved beneath the artificial fill on or beneath the original San Francisco Bay floor.

Architectural Resources

Built environmental structures and buildings more than 45 years old are present in the C-APE at the Asphalt Plant, Central Shops and the SEP. Brad Brewster, ESA architectural historian and preservation planner, completed an intensive-level survey of the SEP and Asphalt Plant in May 2015 and March 2016 to document these facilities and to assess their California Register and National Register eligibility.[57] JRP Historical Consulting, LLC (JRP architectural historians) surveyed and evaluated the Central Shops facility within the C-APE in 2014 for the same purposes.[58] The results of the records search and survey efforts are provided below. Historical information regarding the built environment at Piers 94 and 96 and 1550 Evans Avenue is also provided below.

Southeast Water Pollution Control Plant

The records search indicated that the southern block of the SEP was previously evaluated in 2002 as part of a survey and evaluation under Section 106 of the National Historic Preservation Act for the proposed installation of a cellular telephone antenna at the plant.[59] This evaluation recommended that the surveyed part of the plant was eligible for listing in the National Register under Criteria A and C; however, the SEP was not determined to be eligible at that time. (See Section 4.5.2., Regulatory Framework, below for a full definition of the California Register and National Register criteria.) The prior evaluation did not indicate which particular buildings or structures at the SEP contributed to the significance of the historic district, nor did it evaluate the district under CEQA. Therefore, all

56 Ibid., 144.
57 Brewster, *Department of Parks and Recreation (DPR) form*, Southeast Treatment Plant Streamline Moderne Industrial Historic District, Prepared for San Francisco Public Utilities Commission, April, 2016 and Brewster, *Department of Parks and Recreation (DPR) form*, San Francisco Department of Public Works Asphalt Plant, Prepared for San Francisco Public Utilities Commission, May, 2015.
58 JRP, *Department of Parks and Recreation (DPR) form, 1800 Jerrold Avenue*, Prepared for San Francisco Public Utilities Commission, November, 2014.
59 Kelley, T.J. *Department of Parks and Recreation (DPR) form for the Southeast Treatment Plant (P-43-004274)*. Prepared for San Francisco Public Utilities Commission, June 2002.

buildings and structures throughout the SEP were re-evaluated by ESA in 2015 and 2016 under both National Register and California Register criteria.[60]

All aboveground buildings and structures at the SEP were surveyed and evaluated for eligibility to the National Register and California Register. A portion of the SEP, including 26 buildings and structures (or combinations of buildings and structures) that comprise most of the southernmost block of the SEP and a portion of the block adjacent to the north, qualifies as a California Register- and National Register-eligible historic district, named the *Southeast Treatment Plant Streamline Moderne Industrial Historic District* (district). The SHPO concurred with this recommendation in a letter dated October 6, 2016.[61] This district was determined to be eligible for the National Register under criteria A/1 for its historical associations with the implementation of the 1935 Sewer System Master Plan; and under criteria C/3 as representative of the use of Streamline Moderne architecture. As a result of this formal determination of eligibility for the National Register, the district is listed in the California Register. **Figure 4.5-2** shows the boundary of the district, along with the contributing and non-contributing elements of the district. **Figure 4.5-3** shows a selection of contributors to the district.

The district includes 22 buildings and structures assessed as contributors to its significance, listed in **Table 4.5-1**, and four buildings and structures (Buildings 043, 965, 810, and Building 820/821) assessed to be non-contributing to its significance because they are less than 45 years old and because they do not share in the district's architectural style.[62] The majority of the contributors to the district are within the south side of the SEP, while a few are within the north side of the SEP.

All of the buildings and structures within the district were completed in 1952 during the initial phase of construction of the plant, which represented the final phase of the implementation of the 1935 Sewer System Master Plan. As was common for public and institutional buildings of the Streamline Moderne style, the majority of the contributory buildings represent a more rectilinear interpretation of the style, and they feature horizontal orientation, glass block windows, tile coping at the roofline with a speedline motif, and cast concrete double moldings at the windows and doors, all of which are their character-defining features. The district contains 10 digester tank structures (in two groupings of five) completed in 1952 (Buildings 630–730 [Digester Tanks 1–10]). Although these are utilitarian concrete tanks of no particular architectural style, they are historically, spatially and directly functionally associated with their two central control buildings (Buildings 620 and 680), which are important examples of the Streamline Moderne style. As such, the digester tanks are identified as contributors to the significance of the historic district. None of the buildings or structures within the eligible historic district were identified as individually significant because no single building appears to meet any of the criteria for individual listing in the National and California Registers.

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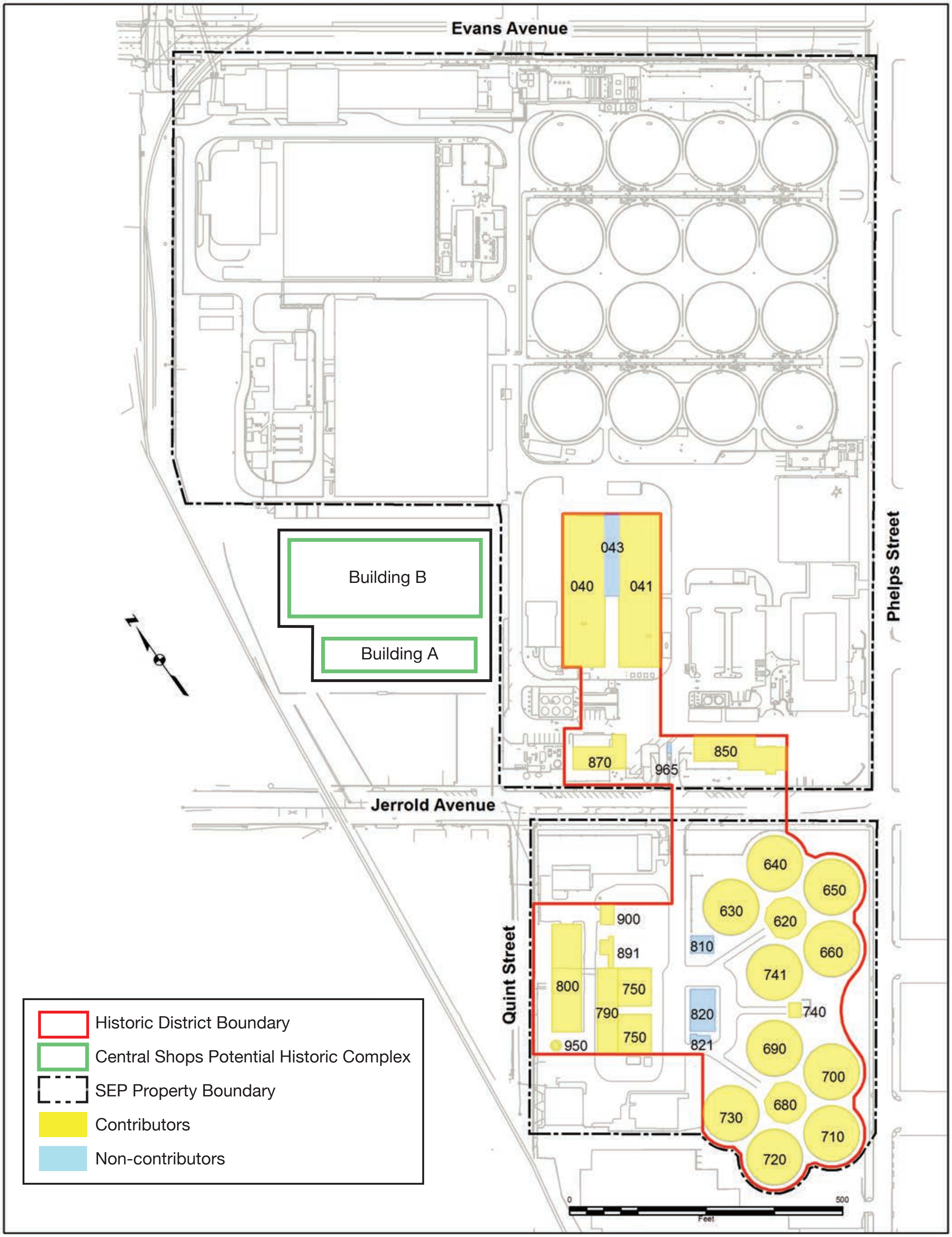
60 Brewster, *Department of Parks and Recreation (DPR) form*, Southeast Treatment Plant Streamline Moderne Industrial Historic District, Prepared for San Francisco Public Utilities Commission, April, 2016.
61 Julianne Polanco, Determination of Eligibility for Southeast Treatment Plant Streamline Moderne Industrial Historic District, 750 Phelps Street, San Francisco. October 6, 2016.
62 Ibid.



SOURCE: Brewster, B., Department of Parks and Recreation (DPR) form, Southeast Treatment Plant Streamline Moderne Industrial Historic District, Prepared for San Francisco Public Utilities Commission, April 2016

SFPUC Biosolids Digester Facilities

Figure 4.5-2
Southeast Treatment Plant Streamline Moderne Industrial Historic District

TABLE 4.5-1
CONTRIBUTORS TO A NATIONAL REGISTER/
CALIFORNIA REGISTER HISTORIC DISTRICT AT THE SEP

Building Number[a]	Building Name	Date of Construction	Location (SEP North or South)
040	Sedimentation Building No. 1	1952	North
041	Sedimentation Building No. 2	1952	North
620	Digestion Control Building No.1	1952	South
630	Anaerobic Digester Tank No. 1	1952	South
640	Anaerobic Digester Tanks No. 2	1952	South
650	Anaerobic Digester Tanks No. 3	1952	South
660	Anaerobic Digester Tanks No. 4	1952	South
680	Digestion Control Building No. 2	1952	South
690	Anaerobic Digester Tank No. 6	1952	South
700	Anaerobic Digester Tanks No. 7	1952	South
710	Anaerobic Digester Tanks No. 8	1952	South
720	Anaerobic Digester Tanks No. 9	1952	South
730	Anaerobic Digester Tanks No. 10	1952	South
740	Gas Booster Station	1952	South
741	Gas Storage Facility (formerly Tank No. 5)	1952	South
750	Digested Sludge Thickening (formerly Filtration Building)	1952	South
790	Sludge Filtration Building (formerly Filtration Building)	1952	South
800/950	Dryer Building/Chimney	1952	South
850	Operator’s Building (formerly Administration)/North Side/192	1952	North
870	Service Building (formerly Machine Shop & Garage)	1952	North
891	Southside Substation	1952	South
900	Maintenance Shop (formerly Cake Receiver Bin)	1952	South

NOTE:
[a] Location of buildings shown on Figure 4.5-2; contributors are highlighted in yellow.

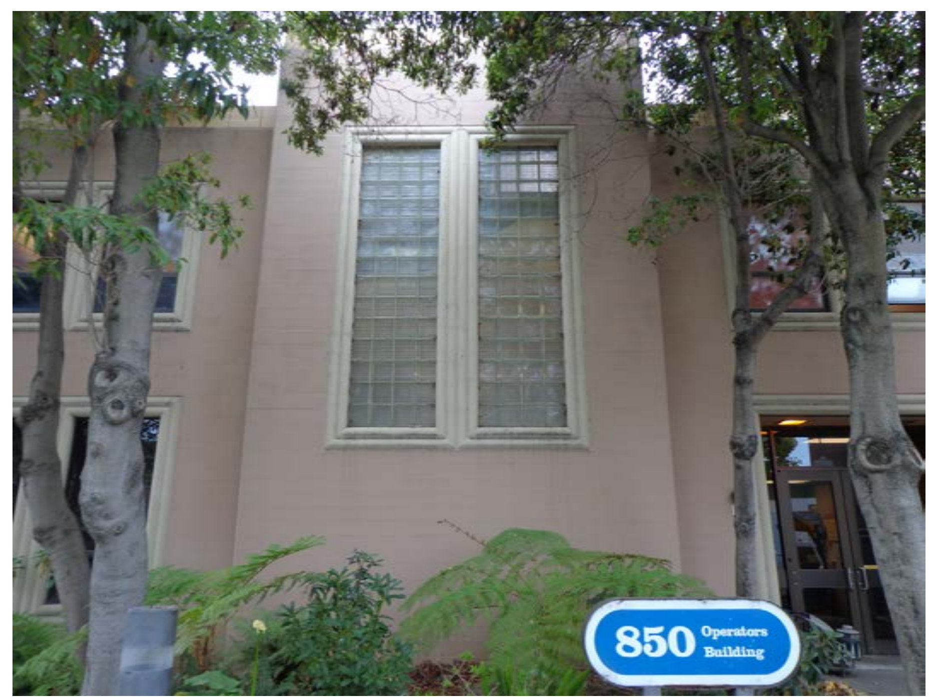
SOURCE: Brewster, B., Department of Parks and Recreation (DPR) form, *Southeast Treatment Plant Streamline Moderne Industrial Historic District*, Prepared for San Francisco Public Utilities Commission, April, 2016.

Building 41

Digester Tanks

Building 790

Building 800



Building 850

Building 870

SOURCE: Brewster, B., Department of Parks and Recreation (DPR) form, Southeast Treatment Plant Streamline Moderne Industrial Historic District, Prepared for San Francisco Public Utilities Commission, April 2016

SFPUC Biosolids Digester Facilities

Figure 4.5-3
Selection of Contributors to the SEP Historic District

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While nearly all of these contributing buildings and structures in the district have had varying degrees of physical alterations over the years, both the individual buildings and the historic district retain sufficient historic integrity to convey their association with the implementation of the 1935 Sewer System Master Plan, as well as the Streamline Moderne architectural style. For these reasons, the *Southeast Treatment Plant Streamline Moderne Industrial Historic District* with its 22 contributory buildings and structures and four non-contributors is considered a historical resource as defined by CEQA Guidelines Section 15064.5 and a historic property for purposes of Section 106 under Title 36 CFR Part 800.

The remaining 21 buildings and structures at the SEP were constructed between 1981 and 2005, which is less than 45 years ago, and as such they would not meet the age threshold for eligibility generally considered for listing in the California Register; nor do any of the buildings, designed in utilitarian versions of the Brutalist, Post Modern, and Modern-Industrial architectural styles, possess exceptional characteristics or associations that would warrant consideration of eligibility for a property that is less than 50 years old. These later buildings and structures also do not have association with the 1935 Sewer System Master Plan.[63]

Central Shops

JRP surveyed and evaluated the Central Shops complex in 2014. The Central Shops complex was evaluated against National Register and California Register criteria. Building C was found to not exhibit the architectural qualities of Buildings A and B; therefore, it was identified as not significant under Criterion C/3. However, the two fully enclosed shop buildings at the facility—Buildings A and B—were found to be significant as a single resource under Criterion C/3, at the local level, for distinctive characteristics of a type, period, and method of construction as an important example of Industrial Modern architecture in San Francisco.[64] This is illustrated in the two fully enclosed shop buildings at the facility, Buildings A and B. **Figure 4.5-4** presents photos of Central Shops Buildings A and B**.** The property's period of significance is 1959, when the buildings were constructed. As an important example of Industrial Modern architecture for their type, period, and method of construction, the Central Shops Buildings A and B have the distinctive characteristics of International Style Modernism, as articulated in industrial-type buildings. They are a full expression of the pattern of features of this style and have an individuality of this property type not present in other vehicle repair/maintenance facilities in San Francisco. The property also illustrates the evolution of architectural design for support facilities in the City, presenting the contemporary style of its period when it was constructed, just as the International Style (and other iterations of Modern architecture) was coming into full prominence in San Francisco. Despite some minor physical alterations over the years, these buildings retain sufficient historic integrity to convey their associations with the Industrial Modern architectural style. For these reasons, the Central Shops (Buildings A and B) is considered a historical resource as defined by CEQA Guidelines Section 15064.5 and an historic property under Section 106 of the National Historic Preservation Act.

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[63] Brewster, *Department of Parks and Recreation (DPR) form*, Southeast Treatment Plant Streamline Moderne Industrial Historic District, Prepared for San Francisco Public Utilities Commission, April, 2016.

[64] JRP, *Department of Parks and Recreation (DPR) form, 1800 Jerrold Avenue*, Prepared for San Francisco Public Utilities Commission, November, 2014.

The character-defining features of Central Shops Buildings A and B are their original design and materials, including their exposed steel frame structures on concrete apron walls with steel sash exterior glazing, flat metal deck roofs supported on trusses exposed to the interior, wide interior open spaces that are divided into bays of varying function, and the various glazed metal doors (personnel doors, top-hung sliding doors, and large hinged doors). The design also includes recessed personnel entrances to the office and locker room. While they are located on a six-acre portion of the City-owned parcel, the boundary of these historical resources is limited to the immediate surroundings of Buildings A and B that are used for vehicle parking and maneuvering, roughly 40 to 100 feet around the buildings, including the space between the buildings.[65]

The Central Shops do not meet National Register/California Register criteria A/1, B/2, or D/4 due to a lack of associations with important historic events, important persons, and information potential. In addition, Building C, the open sided shed roof building on the north end of the facility, does not exhibit the architectural qualities of the other buildings and is not significant under any California Register or National Register criteria.[66]

Non-Historic Resources within the Architectural C-APE

Asphalt Plant

The records search indicated that the Asphalt Plant had not been previously surveyed or evaluated as a potential historical resource. In 2015, ESA surveyed and evaluated the Asphalt Plant against National Register and the California Register eligibility criteria, and found it to be ineligible for listing under all of the criteria due to a lack of significant associations with important historical events, important persons, architectural significance, and information potential.[67] In addition, the majority of plant facilities, replaced in between 1990 and 2004, are substantially less than 45 years old. For these reasons, the property is not considered a historical resource for the purposes of CEQA or a historic property under the National Historic Preservation Act.

1550 Evans Avenue

The existing office building and warehouse building at 1550 Evans Avenue would be demolished to make the area available for project construction staging. According to information provided on the San Francisco's Property Information System Map, the two-story, 45,000-square-foot building at 1550 Evans Avenue was constructed in 1978, and thus is less than 45 years old. The building was purchased by the SFPUC in 2012. This building has not been evaluated for its potential historical significance; however, given the relatively recent construction date of this building (1978), it would not meet the minimum age threshold generally used for consideration for listing in the California Register or National Register. For these reasons, the property at 1550 Evans Avenue is not considered a historical resource for the purposes of CEQA.

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65 Ibid.

66 JRP, *Department of Parks and Recreation (DPR) form, 1800 Jerrold Avenue*. Prepared for San Francisco Public Utilities Commission, November, 2014. On file with the San Francisco Planning Department.

67 Brewster, Department of Parks and Recreation (DPR) form, San Francisco Department of Public Works Asphalt Plant, Prepared for San Francisco Public Utilities Commission, May, 2015.

Building A facing southeast

Building A facing west

Building A facing southwest

Building B facing northeast

Building B facing southeast

Building B facing northeast with car port

SOURCE: JRP, Department of Parks and Recreation (DPR) form, 1800 Jerrold Avenue,
Prepared for San Francisco Public Utilities Commission, November 2014

Figure 4.5-4
Central Shops Buildings A and B

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Both the Asphalt Plant (subsurface components only) and the buildings at 1550 Evans Avenue are included in the Architectural APE because they are within the vicinity of historic resources and could be removed or altered for the project. Neither property is considered a historical resource nor are they included in the historic district boundary.

Piers 94 and 96 are not included in the Architectural APE because they are a distance away from historic resources and no structures would be affected. Piers 94 and 96 are included in the archeological C-APE to account for the subsurface construction that may occur at these sites.

4.5.2 Regulatory Framework

4.5.2.1 Federal Regulations

Historical and archeological resources are considered through the National Historic Preservation Act (NHPA) of 1966, as amended (54 U.S.C. 306108), and its implementing regulations. Before an "undertaking" (e.g., federal funding or issuance of a federal permit) is implemented, Section 106 of the NHPA requires federal agencies to consider the effects of the undertaking on historic properties (i.e., properties listed in or eligible for listing in the National Register) and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on any undertaking that would adversely affect properties eligible for listing in the National Register. Under the NHPA, a property is considered significant if it meets the National Register listing criteria A through D, at 36 CFR 60.4, as follows:

> The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and that:
>
> a) Are associated with events that have made a significant contribution to the broad patterns of our history, or
>
> b) Are associated with the lives of persons significant in our past, or
>
> c) Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction, or
>
> d) Have yielded, or may be likely to yield, information important in prehistory or history

For a resource to be eligible for the National Register, it must also retain enough integrity to be recognizable as a historical resource and to convey its significance. Resources that are less than 50 years old are generally not considered eligible for the National Register.

Federal review of the effects of undertakings on significant cultural resources is carried out under Section 106 of the NHPA and is often referred to as "Section 106 review". This process is the responsibility of the federal lead agency. The Section 106 review typically involves a five-step procedure, which is described in detail in the implementing regulations of the NHPA (36 CFR 800):

- Define the Area of Potential Effects in which an undertaking could directly or indirectly affect historic properties.
- Identify historic properties in consultation with the SHPO and interested parties;
- Assess the significance of effects of the undertaking on historic properties;
- Consult with the SHPO, other agencies, and interested parties to develop an agreement that addresses the treatment of historic properties and notify the Advisory Council on Historic Preservation; and
- Proceed with the project according to the conditions of the agreement.

As indicated in Section 2.7 of Chapter 2, *Project Description*, the SFPUC intends to seek State Revolving Fund (SRF) funding and the project needs to comply with the California State Water Resources Control Board (SWRCB) CEQA Plus requirements. The SRF Program is partially funded by the U.S. Environmental Protection Agency and administered by the SWRCB. Consultation with the SHPO and other consulting parties required under Section 106 of the NHPA will be completed through the SRF process.

4.5.2.2 State Regulations

The State of California implements the NHPA of 1966, as amended, through its statewide comprehensive cultural resource surveys and preservation programs. The California Office of Historic Preservation (OHP), as an office of the California Department of Parks and Recreation (DPR), implements the policies of the NHPA on a statewide level. The OHP also maintains the California Historical Resources Inventory. The SHPO is an appointed official who implements historic preservation programs within the state's jurisdictions.

California Register of Historical Resources

The California Register is "an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change" (Public Resources Code Section 5024.1[a]). Certain resources are determined by the statute to be automatically included in the California Register, including those formally determined eligible for or listed in the National Register (Public Resources Code 5024.1[d][1]).

Based on Section 15064.5(a) of the California Environmental Quality Act (CEQA) Guidelines, historical resources include, but are not limited to, any object, building, structure, site, area, place, record, or manuscript that is historically or archeologically significant or that is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. Generally, a resource is considered by a lead agency to be "historically significant" if the resource meets the criteria for listing in the California Register (Public Resources Code [PRC] Section 5024.1), or qualifies as a "unique historical resource" (PRC 21083.2).

To be eligible for the California Register, a cultural resource must meet one or more of the following criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. Is associated with the lives of persons important in our past;
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
4. Has yielded, or may be likely to yield, information important in prehistory or history.

For a resource to be eligible for the California Register, it must also retain enough integrity of location, design, setting, materials, workmanship, feeling, and association to be recognizable as a historical resource and to convey its significance. Resources that are less than 45 years old are generally not considered eligible for the California Register.

Impact assessment under CEQA considers only historically significant cultural resources; that is, resources that meet CEQA criteria for eligibility to the California Register (historical resources) or as unique archeological resources, as detailed below. Impacts to resources that do not meet these criteria are not considered in impact assessment under CEQA. Similarly, for projects with federal involvement, only resources that meet the criteria of eligibility for the National Register receive further consideration in impact analysis.

Archeological Resources and the California Environmental Quality Act

CEQA considers archeological resources as an intrinsic part of the physical environment and thus requires that, for any project, the potential of the project to adversely affect archeological resources be analyzed (CEQA Section 21083.2). For a project that may have an adverse effect on a significant archeological resource, CEQA requires preparation of an environmental impact report (CEQA Section 21083.2 and CEQA Guidelines Section 15065). CEQA recognizes two different categories of significant archeological resources: "unique" archeological resource (CEQA Section 21083.2) and an archeological resource that qualifies as a "historical resource" under CEQA (CEQA Section 21084.1 and CEQA Guidelines Section 15064.5).

Significance of Archeological Resources

An archeological resource can be significant as both or either a "unique" archeological resource and/or a "historical resource," but the process by which the resource is identified, under CEQA, as either one or the other is distinct (CEQA Section 21083.2[g] and CEQA Guidelines Section 15064.5[a][2]).

An archeological resource is a "historical resource" under CEQA if the resource is:

- Listed on or determined eligible for listing on the California Register (CEQA Guidelines Section 15064.5). This includes National Register-listed or -eligible archeological properties.

- Listed in a "local register of historical resources."[68]
- Listed in a "historical resource survey" (CEQA Guidelines Section 15064.5[a][2]).

Generally, an archeological resource is determined to be an "historical resource" due to its eligibility for listing on the California Register because of the potential scientific value of the resource; that is, it "has yielded, or may be likely to yield, information important in prehistory or history" (CEQA Guidelines Section 15064.5 [a][3]). An archeological resource may be California Register-eligible under other evaluation criteria, such as Criterion 1, association with events that have made a significant contribution to the broad patterns of history; Criterion 2, association with the lives of historically important persons; or Criterion 3, association with the distinctive characteristics of a type, period, region, or method of construction. Appropriate treatment for archeological properties that are California Register-eligible under criteria other than Criterion 4 may be different from that for a resource that is significant exclusively for its scientific value.

Failure of an archeological resource to be listed in any of these historical inventories is not sufficient to conclude that the archeological resource is not a "historical resource." When the lead agency believes there may be grounds for a determination that an archeological resource is a "historical resource," then the lead agency should evaluate the resource for eligibility for listing to the California Register (CEQA Guidelines Section 15064.5[a][4]).

A "unique archeological resource" is a category of archeological resources created by the CEQA statutes (CEQA Guidelines Section 21083.2[g]). An archeological resource is a unique archeological resource if it meets any of one of three criteria:

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

Under CEQA, evaluation of an archeological resource as a "historical resource" is privileged over the evaluation of the resource as a "unique archeological resource," in that CEQA requires that "when a project will impact an archeological site, a lead agency shall first determine whether the site is an historical resource" (CEQA Guidelines Section 15064.5 [c][1]).

Evaluation of an Archeological Resource as Scientifically Significant

In requiring that a potentially affected archeological resource be evaluated as a historical resource, that is as an archeological site of sufficient scientific value to be California Register-eligible, CEQA presupposes that the published guidance of the OHP for CEQA providers is to serve as the methodological standard by which the scientific value, and thus, the California Register eligibility, of

[68] A "local register of historical resources" is a list of historical or archeological properties officially adopted by ordinance or resolution by a local government. (Public Resources Code 5020.1 [k]).

an archeological resource is to be evaluated. As guidance for the evaluation of the scientific value of an archeological resource, the OHP has issued two guidelines: *Archeological Resource Management Reports* (1989) and the *Guidelines for Archeological Research Designs* (1991).

Integrity of Archeological Resource

Integrity is an essential criterion in determining if a potential resource, including an archeological resource, is a historical resource. For CEQA purposes, "integrity" can in part be expressed in the requirement that a historical resource must retain "the physical characteristics that convey its historical significance" (CEQA Guidelines Section 15064.5 [b]).

For an archeological resource that is evaluated for California Register eligibility under Criterion 4 ("has yielded or may be likely to yield information important to prehistory or history"), the definition of integrity is conceptually different from the definition usually applied to the built environment. For a historic building, possessing integrity means that the building retains the defining characteristics from the period of significance of the building. In archeology, an archeological deposit or feature may have undergone substantial physical change from the time of its deposition but it may yet have sufficient integrity to qualify as a historical resource. The integrity test for an archeological resource is whether the resource can yield sufficient data (in type, quantity, quality, or diagnosticity) to address significant research questions. Thus, in archeology "integrity" is often closely associated with the development of a research design that identifies the types of physical characteristics ("data needs") that must be present in the archeological resource and its physical context to adequately address research questions appropriate to the archeological resource.

Other Provisions of California Public Resources Code

Section 7050.5 of the Health and Safety Code protects human remains by prohibiting the disinterring, disturbing, or removing of human remains from any location other than a dedicated cemetery. Section 5097.98 of the Public Resources Code (and reiterated in CEQA Guidelines Section 15064.59 [e]) also identifies steps to follow in the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery.

4.5.2.3 Local Regulations

San Francisco General Plan

The *San Francisco General Plan* contains policies governing the preservation of historic architectural resources that are considered to be locally significant. In the Introduction of the *San Francisco General Plan*, Priority Policy 7 states that landmarks and historic buildings should be preserved. In addition, the General Plan Urban Design Element addresses (1) preservation of landmarks designated by the City, (2) enhancement of the original character of older buildings when remodeling, and (3) respecting the character of older nearby development in the design of new buildings.

San Francisco Historic Preservation Commission and Planning Code Articles 10 and 11

Created in 2008, the Historic Preservation Commission is a seven-member body that makes recommendations to the Board of Supervisors on the designation of landmark buildings, historic districts, and significant buildings. The Historic Preservation Commission reviews and approves Certificates of Appropriateness for building permit applications that involve construction, alteration, or demolition of landmark sites and resources within historic districts. The Historic Preservation Commission may also review and comment on projects affecting historical resources that are subject to environmental review under the CEQA.

Article 10 of the Planning Code describes procedures regarding the preservation of sites and areas of special character or special historic, architectural, or aesthetic interest or value, such as officially designated city landmarks and buildings included within locally designated historic districts. Article 11 of the Planning Code designated six downtown conservation districts. There are no landmark buildings or historic districts listed under either Article 10 or 11 in the SEP.

4.5.3 Impacts and Mitigation Measures

4.5.3.1 Significance Criteria

The project would have a significant effect on cultural resources if it were to:

- Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5, including those resources listed in Article 10 or Article 11 of the San Francisco Planning Code;
- Cause a substantial adverse change in the significance of an archeological resource pursuant to Section 15064.5; or
- Disturb any human remains, including those interred outside of formal cemeteries.

4.5.3.2 Approach to Analysis

Construction and Operational Impacts

Because most impacts to cultural resources occur during the construction activities of a project, while there is less potential for project operations to affect such resources, consideration of construction and operational impacts are combined in this analysis.

Architectural Resources

Potential impacts on architectural resources are assessed by identifying any activities (either during construction or operations) that could affect resources that have been identified as historical resources for the purposes of CEQA.

Once a resource has been identified as a CEQA historical resource, it then must be determined whether the impacts of the project would "cause a substantial adverse change in the significance" of the resource (CEQA Guidelines Section 15064.5[b]). A substantial adverse change in the significance of a historical resource means "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the historic resource would be materially impaired" (CEQA Guidelines Section 15064[b][1]). A historical resource is materially impaired through the demolition or alteration of the resource's physical characteristics that convey its historical significance and that justify its inclusion in the California Register (CEQA Guidelines Section 15064.5[b][2][A]).

Archeological Resources

Archeological resources can include historical resources according to Section 15064.5 as well as unique archeological resources as defined in Section 21083.2(g). The significance of most prehistoric and historical archeological sites is usually assessed under National Register and California Register Criterion D/4. This criterion stresses the importance of the information potential contained within the site, rather than its significance as a surviving example of a type or its association with an important person or event. Although it is less common, archeological resources may also be assessed under California Register Criteria 1, 2, and/or 3. Archeological resources may also be assessed under CEQA as unique archeological resources, defined as archeological artifacts, objects, or sites that contain information needed to answer important scientific research questions.

Impacts to unique archeological resources or archeological resources that qualify as historical resources are assessed pursuant to Section 21083.2 which states that the lead agency shall determine whether the project may have a significant effect on archeological resources. As with historical resources above, whether the impacts of the project would "cause a substantial adverse change in the significance" of the resource must be determined (CEQA Guidelines Section 15064.5[b]).

Human Remains

Human remains, including those buried outside of formal cemeteries, are protected under several state laws, including Public Resources Code Section 5097.98 and Health and Safety Code Section 7050.5. These laws are identified above in Section 4.5.2, Regulatory Framework. This analysis considers impacts on human remains including intentional disturbance, mutilation, or removal of interred human remains.

Cumulative Impacts

Section 4.1.3, Approach to Cumulative Impact Analysis and Cumulative Projects, describes the overall approach to the cumulative analysis for those topics using a list-based approach and summarizes reasonably foreseeable future projects in the vicinity of the project that could contribute to a cumulative impact; please refer to Table 4.1-1 and Figure 4.1-1 for a description and location of potential cumulative projects in the vicinity of the BDFP. The cumulative analysis for cultural resources uses a list-based approach to analyze the effects of the project on historical resources and unique archeological resources in combination with other past, present, and probable future projects. The analysis then considers whether or not there would be a significant, adverse cumulative impact associated with project implementation in combination with past, present, and probable future projects in the geographical area, and if so, whether or not the project's incremental contribution to the cumulative impact would be considerable. Both conditions must apply in order for a project's contribution to cumulative effects to be deemed cumulatively considerable (significant). If so, then mitigation measures are identified to reduce the project's contribution to the cumulative impact.

4.5.3.3 Impact Evaluation

Construction and Operational Impacts

Impact CR-1: The project would cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5, including those resources listed in Article 10 or Article 11 of the San Francisco Planning Code. (Significant and Unavoidable with Mitigation)

CEQA Guidelines Section 15064.5 requires the lead agency to consider the effects of a project on historical resources. A historical resource is defined as a building, structure, site, object, or district (including landscapes) listed in or determined to be eligible for listing in the California Register, or determined by a lead agency to be significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, or cultural annals of California. This impact analysis focuses on built environment historical resources. Archeological resources, including archeological resources that are potentially historical resources according to Section 15064.5, are addressed under Impact CR-2 below.

Impacts on SEP Southeast Treatment Plant Streamline Moderne Industrial Historic District

The project would result in the demolition of Building 870 to accommodate a new Maintenance Shop. Completed in 1952, Building 870 is a contributor to the *Southeast Treatment Plant Streamline Moderne Industrial Historic District* (district), as listed in Table 4.5-1 above. The district is eligible for listing in the National Register, and listed in the California Register, as described in Section 4.5.1.9, Local Research Results, and is considered a historical resource as defined by CEQA.

The project's removal of Building 870, however, would have a less-than-significant impact on the overall significance and historic integrity of the district for multiple reasons. Building 870 is a single contributor to the significance of the district, but is not individually eligible for listing in the California and National Registers. The remaining buildings and structures that contribute to the district (refer to Table 4.5-1, above) would be unaffected by the project and would retain their ability to convey their associations with implementation of the 1935 Sewer System Master Plan and continue to provide a good representation of the Streamline Moderne architectural style that characterized the SFPUC’s original wastewater facilities. The loss of Building 870 would represent a reduction of approximately 4.5 percent of the district contributors, while 95.5 percent of the district contributors would remain intact. In addition, Building 870 is in the north side of the district and is separated from the majority of the other contributing facilities by a public street (Jerrold Avenue) and the southside perimeter wall. Building 870 is a smaller facility that provided support to the wastewater treatment process and was not central to the overall treatment process. Finally, among the buildings within the historic district, Building 870 is a relatively modest and utilitarian example of Streamline Moderne architecture, with much better examples represented in the remaining SEP South facilities. As such, the loss of Building 870 would have a less-than-significant impact on the integrity of the district.

In place of Building 870, the project would introduce two new non-contributing buildings within the boundaries of the district; the proposed Maintenance Shops 1 and the No. 2 Water Pump Station. Construction of these new facilities would have a less-than-significant impact on the district, as the vast majority of the district would remain intact. Although the number of non-contributors to the district would increase from four to six after completion of the project, the district would retain a relatively high ratio of 21 contributors to six non-contributors, or approximately 71 percent. In addition, introduction of these new elements to the district would be a less-than-significant impact because, after 1952, the original master plan was abandoned and buildings of different architectural types were introduced over time and were sited based on individual project objectives, rather than on the original master plan. Further, the new building would be of similar scale to the existing buildings, would be inside the wall on the north side of Jerrold Avenue away from and minimally visible from the main SEP South complex where the majority of the contributory buildings are located, and would be constructed on the northwestern edge of the district boundary as opposed to its center. Therefore, the historic integrity of the district would not be significantly affected by new construction. No mitigation measures would be required.

Other new construction associated with the project would occur outside of the district, and at least 50 feet from the other district contributors. This distance would provide a sufficient physical and visual buffer between the new buildings and the historical resource to ensure that no other significant, indirect impacts would occur.

Impacts on Individual Historic Resources

The project would also result in the removal of the Central Shops (including Buildings A and B), which comprise a complex that is eligible for listing in the California and National Registers. The removal of Buildings A and B at the Central Shops would cause a substantial adverse change in the significance of the historical resource because the project would demolish the physical characteristics that convey the resource's historical significance and that justify its individual eligibility for inclusion in the California and National Registers, resulting in a significant impact under CEQA Guidelines Section 15064.5. Implementing **Mitigation Measure M-CR-1** (**Documentation of Historic Resources and Interpretive Display)** would reduce the severity of the impact. However, implementation of Mitigation Measure M-CR-1 would not reduce the severity of the impact to a less-than-significant level, and the impact would be ***significant and unavoidable with mitigation.***

Impacts of Other Project Components

The project would also result in the removal of other buildings and structures, including Buildings 855 and 925 on the north side of the SEP (not within the historic district boundary), Building C at the Central Shops site, subsurface structures at the Asphalt Plant site, and the two structures at 1550 Evans Avenue. As none of these buildings or structures has been identified as an historical resource as defined by CEQA, either individually or as a contributor to a district, their proposed removal would have no effect on historical resources.

The project would also use portions of Piers 94 and 96 for construction staging purposes. No buildings or structures are within these areas, and as such, construction staging activities would have no effect on historical resources.

Summary

The project would require demolition and removal of numerous structures, including Building 870 and Buildings A and B of the Central Shops (historical resources under CEQA), as well as new construction in the vicinity of a historic district.

Building 870 is a contributor to a historic district, which is a historical resource under CEQA, but does not individually qualify as an historical resource. Removal of Building 870 would have a less-than-significant impact on the overall significance and historic integrity of the district, because it is not individually eligible for listing; remaining buildings and structures that contribute to the district would be unaffected by the project, and the removal of this one building would not substantially degrade the historic integrity of the district; it represents a small percentage of the district contributors; its location is separated from the majority of the other contributing facilities; and it is a modest and utilitarian example of architectural style for which the district is significant.

The removal of Buildings A and B at the Central Shops would cause a substantial adverse change in the significance of the historical resource because the project would demolish the resource's physical characteristics that convey its historical significance and that justify its individual eligibility for inclusion in the California and National Registers. Implementation of Mitigation Measure M-CR-1 (Documentation of Historic Resources and Interpretive Display), including photographic recordation, would reduce the severity of this impact, but not to a less-than-significant level. This impact would be significant and unavoidable even with implementation of feasible mitigation measures.

The proposed removal of other buildings and structures outside the historic district would have no impact on historical resources, and proposed construction of new buildings and structures in the vicinity of a historic district would be at a sufficient distance that this impact would be less than significant.

Overall, the project would cause a substantial adverse change in the significance of a historical resource, and this impact would be ***significant and unavoidable with mitigation.***

Mitigation Measure M-CR-1. Documentation of Historic Resources and Interpretive Display

Prior to demolition, the SFPUC shall retain a professional who meets the Secretary of the Interior's Professional Qualifications Standards for Architectural History to prepare written and photographic documentation of the Central Shops. The documentation effort shall be based on the National Park Service (NPS) Historic American Building Survey (HABS)/ Historic American Engineering Record (HAER) Historical Report Level II Guidelines, and NPS's policy for photographic documentation as outlined in the National Register of Historic Places and National Historic Landmarks Survey Photo Policy Expansion.

The written historical data for this documentation shall follow HABS/HAER standards. Efforts shall be made to locate original construction drawings or plans of the Central Shops. If located, these drawings shall be reproduced and included in the dataset. Historical information, as well as copies of building plans gathered from the prior evaluations of the SEP and Central Shops, can be reused and reformatted for this effort.

Digital photography shall be used. The ink and paper combinations for printing photographs shall be in compliance with National Register-National Historic Landmark (NR-NHL) Photo Policy Expansion[69] and have a permanency rating of approximately 115 years. Digital photographs shall be taken as uncompressed, Tagged Image File Format (TIFF) files. Each image shall be 1,600 by 1,200 pixels at 330 pixels per inch (ppi) or larger in size, color format, and printed in black and white. The file name for each electronic image shall correspond with the index of photographs and photograph label. Photograph views for the dataset shall include (a) contextual views; (b) views of each side of each building and interior views, where possible; (c) oblique views of buildings; and (d) detail views of character-defining features. All views shall be referenced on a photographic key. This photographic key shall be on a map of the property and shall show the photograph number with an arrow to indicate the direction of the view. Historic photographs shall also be collected, reproduced, and included in the dataset.

The SFPUC shall transmit the datasets as hardcopies on archival paper and in electronic PDF format to the History Room of the San Francisco Public Library, the San Francisco Planning Department, the archives of the San Francisco Public Utilities Commission, and to the Northwest Information Center of the California Historical Information Resource System. The SFPUC shall scope the documentation measures with San Francisco Planning Department Preservation staff. Preservation staff shall also review and approve the submitted documentation for adequacy.

In addition, the SFPUC shall provide a permanent display of interpretive materials (which may include, but are not limited to, a display of photographs, a brochure, educational website, or an exhibitive display) concerning the history and architectural features of the Central Shops. Development of the interpretive materials shall be supervised by an architectural historian or historian who meets the Secretary of the Interior’s Professional Qualification Standards. The interpretative materials shall be placed in a prominent, public setting. A proposal describing the general parameters of the interpretive materials shall be approved by Planning Department Preservation staff prior to construction completion. The substance, media and other elements of such interpretive display shall be approved by Planning Department Preservation staff prior to completion of the project.

Impact CR-2: The project could cause a substantial adverse change in the significance of an archeological resource. (Less than Significant with Mitigation)

This impact discusses whether the project could cause a substantial adverse change to the significance of a legally, or potentially legally-significant, archeological resource. Archeological resources can be considered both as historical resources according to CEQA Guidelines Section 15064.5 as well as unique archeological resources as defined in CEQA Section 21083.2(g). Both prehistoric and historical archeological resources are addressed.

[69] National Park Service, *National Register Photo Policy Factsheet*, Updated May 15, 2013.

Impacts on Prehistoric Archeological Resources

Archeological investigations[70] have identified a National Register-eligible prehistoric archeological site, CA-SFR-171, in the C-APE. Based on previous and current investigations, CA-SFR-171 includes four main elements: a thin Late Period midden; a thick Middle Period midden; probable naturally reworked midden material; and artificially redeposited midden material in the historic/modern fill. Coring has documented that artificially redeposited site material and potential naturally reworked site material extend into the C-APE.[71] There is also the potential for intact shell midden to extend into the C-APE within/adjacent to Quint Street, while redeposited midden may extend into the Central Shops parcel of the C-APE. Artificially redeposited midden material in the historic/modern fill associated with CA-SFR-171 were identified from 2 to 8 feet below ground surface in the C-APE, while naturally re-worked midden materials were identified from 20 to 23 feet below ground surface. Intact midden (both Middle and Late Period) were identified outside the C-APE from 7.5 to 12.5 feet below ground surface. Mass excavation for project components varies from 10 to 45 feet below ground surface, and most project components would be supported by piles driven to a depth of 75 feet below ground surface. Material associated with CA-SFR-171 could be affected by mass excavation activities, and/or by pile installation to support project components.

Resources potentially associated with the pre-bay surface similarly could be affected by mass excavation and/or the installation of piles. Geoarcheological coring conducted in much of the western portion of the project C-APE revealed the presence of a well-preserved, Holocene-age submerged soil underlying the thick bay mud and estuary deposits. The depth to this pre-bay surface increases from south to north, and ranges from roughly 10 feet below ground surface in the south to 50 feet below ground surface in the north. The presence of a deep, well-preserved pre-bay stable landform makes this area sensitive in regard to the potential for Late Holocene Early Period or older archeological material to be present.[72]

Given the presence of a documented archeological site in the eastern portion of the C-APE and the potential for older archeological material to be preserved elsewhere within project C-APE, additional archeological coring at a tighter sampling interval is warranted and would be carried out (see **Mitigation Measure M-CR-2a. Archeological Testing, Monitoring, and/or Data Recovery**, below). This additional coring will have two objectives: (1) refining our understanding of contexts in which CA-SFR-171 site deposits are present within the C-APE and which contexts contribute to the site's eligibility and which if any do not; and (2) assessing if a deeply buried, submerged site is present elsewhere in the C-APE.

The coring would be conducted in two parts. Part 1 would involve coring at approximately 50-foot intervals within/adjacent to the boundary of CA-SFR-171 in the project C-APE using large three-inch diameter core liners to recover samples for site constituent analysis. Part 2 would involve coring at

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70 Kaijankoski, Philip, Brian F. Byrd, and Jack Meyer, *DRAFT Preliminary Prehistoric Archaeological Testing Report for the Southeast Water Pollution Control Plant, San Francisco, California.* Far Western Anthropological Research Group, Inc., Davis, California. Prepared for the San Francisco Public Utilities Commission, 2016.

71 Kaijankoski, Philip, Brian F. Byrd, and Jack Meyer, *DRAFT Preliminary Prehistoric Archaeological Testing Report for the Southeast Water Pollution Control Plant, San Francisco, California.* Far Western Anthropological Research Group, Inc., Davis, California. Prepared for the San Francisco Public Utilities Commission, 2016.

72 Ibid.

82-foot intervals utilizing 2-inch-diameter core liners, and two backhoe trenches in the remainder of the project C-APE to assess whether additional materials are present. A total of 73 cores (28 within/adjacent to the CA-SFR-171) and two backhoe trenches are recommended based on presence/absence information provided by prior coring in and immediately adjacent to the C-APE, and on remaining information gaps—that is, remaining areas where information from prior coring is insufficient to determine the potential for additional prehistoric material to be encountered. Methods for completing the necessary archeological identification for each identified or potential prehistoric deposit would be outlined and, where prehistoric material is recovered, to determine if that material contributes to the eligibility of the site as a whole.

Impacts on Historical Archeological Resources

Based on a review of the historical land use and archeological sensitivity analysis presented above, there is a moderate to high potential to encounter historical archeological remains in the area just north of the archeological C-APE within the SEP. The C-APE does not extend into the former Fairfax Avenue alignment or former location of the A.B. Patrick and Co. tannery. Resources in that area could include features associated with both the early development of the original plank road that comprised 6th (Fairfax) Avenue and the operation of the A.B. Patrick and Co. tannery, including the industrial operation of the tannery itself, as well as potential deposits associated with workers (including Overseas Chinese) that may have been housed at the facility. No ground disturbance in the areas that are sensitive for historical archeological remains is proposed as part of the BDFP Project. However, if future design refinement should entail ground disturbance in this archeologically sensitive area, then pre-construction archeological testing would be required to assess whether potential historical resources are present there (see Mitigation Measure M-CR-2a. Archeological Testing, Monitoring, and/or Data Recovery, below). Archeological testing would occur before construction begins, although the exact timing would depend on whether the testing would affect SEP operations. Proposed locations of test trenches would be based on specific historic facility locations depicted on the 1900 and 1914 Sanborn maps.

Overall, the archeological sensitivity of the C-APE within the 1550 Evans Avenue staging area is considered low because ground disturbance associated with construction staging there would not exceed 3 feet in depth, and intact archeological deposits are not likely to be present within the 3-foot vertical C-APE, which consists entirely of modern bay fill. Because the 1550 Evans Avenue C-APE is shallow, such that excavations would not penetrate the fill and encounter the historic bay bottom, there is also a low potential for encountering intact historical archeological resources. Ground disturbance associated with the Piers 94 and 96 staging areas also would not exceed 3 feet in depth, and it is unlikely that intact archeological deposits would be present within the 3-foot vertical C-APE. Therefore, there is a low sensitivity for encountering historical archeological resources during project implementation in the Piers 94 and 96 staging areas.

Summary

A significant impact could result if ground-disturbing activities during project construction were to affect previously-identified significant prehistoric archeological resources (i.e., CA-SFR-171), unidentified deeply submerged/buried prehistoric deposits, or historical archeological resources. The significant impact could be an adverse effect to the scientific significance of the resource and/or an adverse effect to its significance to associated Native American tribal groups. Implementation of Mitigation Measure M-CR-2a (Archeological Testing, Monitoring, and/or Data Recovery) and **Mitigation Measure M-CR-2b (Procedures for Accidental Discovery of Archeological Resources)** would reduce this impact to a less-than-significant level. Mitigation Measure M-CR-2a would formalize the SFPUC's commitment to conduct archeological testing and monitoring (as well as data recovery, if warranted) consistent with the project's Archeological Research Design and Treatment Program, amended as appropriate, in consultation with the City's Environmental Review Officer, to reflect both the findings of archeological testing previously approved, planned and/or currently underway, and future project design changes. The measure also would require that the archeological testing and monitoring program be consistent with the City's standard protocols. Mitigation Measure M-CR-2b would ensure that work would halt if archeological resources are inadvertently discovered during project implementation and that proper procedures are followed to ensure appropriate treatment of significant archeological resources. Therefore, impacts on archeological resources would be ***less than significant with mitigation.***

Mitigation Measure M-CR-2a. Archeological Testing, Monitoring, and/or Data Recovery

Based on the results of the project Archeological Research Design and Treatment Plan[73] (ARDTP), legally-significant prehistoric archeological resources are present within the archeological C-APE. The following measures shall be undertaken to avoid any potentially significant adverse effects from the project on an historical resource under CEQA. The SFPUC shall retain the services of a qualified archeological consultant(s), based on standards developed by the City and County of San Francisco Environmental Review Officer (ERO). The archeological consultant(s) shall have demonstrated experience in geoarcheology and historical archeology. The archeological consultant shall implement archeological testing and other treatment as specified in the project ARDTP, as detailed below, which shall include archeological monitoring and data recovery as required pursuant to findings of ongoing testing and this measure. The archeological consultant's work shall be conducted in accordance with this measure and with the requirements of the project ARDTP at the direction of ERO or its designated representative and in coordination with the SFPUC. In instances of inconsistency between the requirement of the project ARDTP and of this archeological mitigation measure, the requirements of this archeological mitigation measure shall prevail. Project design changes after finalizing the ARDTP eliminated the portion of the C-APE that was identified in the ARDTP as sensitive for historical archeological resources. Testing as discussed below for historical archeological resources shall only be required if future design changes call for excavation in that location. If future project design changes further revise other parts of the C-APE, then testing shall only be required in archeologically sensitive areas that potentially would be adversely affected by project implementation. All plans and reports prepared by the consultant as specified herein shall be submitted directly to the ERO for review and comment and concurrently to the SFPUC for review and comment, and shall be considered draft reports, subject to revision until final approval by the ERO. Archeological monitoring and/or data recovery programs required by this measure could suspend construction of the affected area of the project for up to a maximum of four weeks. At the direction of the ERO, the suspension of construction can be extended beyond

[73] Byrd, Brian F., Philip Kaijankoski, Rebecca Allen, and Matthew Russell, Archaeological Research Design and Treatment Plan for the Biosolids Digester Facility Project, Southeast Water Pollution Control Plant, San Francisco, California. Prepared for San Francisco Public Utilities Commission, October, 2016.

four weeks only if such a suspension is the only feasible means to reduce to a less-than-significant level potential effects on a significant archeological resource as defined in CEQA Guidelines Section 15064.5 (a) and (c).

Consultation with Descendant Communities. On discovery of an archeological site[74] associated with descendant Native Americans, the Overseas Chinese, or other potentially interested descendant group, an appropriate representative[75] of the descendant group, the ERO, and the SFPUC shall be contacted. The representative of the descendant group shall be given the opportunity to monitor archeological field investigations of the site and to offer recommendations to the ERO and SFPUC regarding appropriate archeological treatment of the site, of recovered data from the site, and, if applicable, any interpretative treatment of the associated archeological site. A copy of the Final Archeological Resources Report shall be provided to the representative of the descendant group.

Archeological Testing Program–Prehistoric Archeology. Depending on the results of on-going prehistoric archeological testing outlined in the project ARDTP, additional testing may be required to define site boundaries of CA-SFR-171 or other prehistoric deposits at the SEP, and to assess whether redeposited and/or reworked prehistoric archeological material identified in the project ARDTP within the C-APE has sufficient integrity to contribute to the significance of known resources at SEP. At the direction of the ERO and in coordination with SFPUC, additional testing may be rolled into a subsequent data recovery program (see below).

Archeological Testing Program–Historical Archeology. If future design changes would affect the area identified as sensitive for historical archeological resources, the archeological consultant shall implement the historical archeological testing plan outlined in the project ARDTP for potential historical archeological resources that could be adversely affected by the project. The archeological testing program shall be conducted in accordance with the approved ARDTP. The project ARDTP identifies the property types of the expected archeological resource(s) that could be adversely affected by the project, the testing method to be used, and the locations recommended for testing. The purpose of the archeological testing program will be to determine to the extent possible the presence or absence of historical archeological resources and to identify and to evaluate whether any archeological resource encountered on the site constitutes an historical resource under CEQA.

If future project design changes further alter the C-APE from what is identified in the ARDTP, then the archeological consultant shall prepare and submit to the ERO for review and approval an archeological testing plan (ATP) for both prehistoric and historical archeological resources to address any area added to the C-APE to accommodate the project design changes. The archeological testing program shall be conducted in accordance with the approved ATP. The ATP shall identify the property types of the expected archeological resource(s) that potentially could be adversely affected by the project, the testing method to be used, and the locations

74 By the term "archeological site" is intended here to minimally include any archeological deposit, feature, burial, or evidence of burial.

75 An "appropriate representative" of the descendant group is here defined to mean, in the case of Native Americans, any individual listed in the current Native American Contact List for the City and County of San Francisco maintained by the California Native American Heritage Commission and in the case of the Overseas Chinese, the Chinese Historical Society of America. An appropriate representative of other descendant groups should be determined in consultation with the Department archeologist.

recommended for testing. The purpose of the archeological testing program will be to determine to the extent possible the presence or absence of archeological resources and to identify and to evaluate whether any archeological resource encountered on the site constitutes an historical resource under CEQA.

At the completion of the archeological testing program, as required, the archeological consultant shall submit a written report of the findings to the ERO and the SFPUC. If based on the archeological testing program the archeological consultant finds that significant archeological resources may be present, the ERO in consultation with the archeological consultant and coordination with the SFPUC shall determine if additional measures are warranted. Additional measures that may be undertaken include additional archeological testing, archeological monitoring, and/or an archeological data recovery program. No archeological data recovery shall be undertaken without the prior approval of the ERO or the Planning Department archeologist. If the ERO determines that a significant archeological resource is present and that the resource could be adversely affected by the project, at the discretion of the SFPUC either:

A) The project shall be re-designed so as to avoid any adverse effect on the significant archeological resource; or

B) An archeological data recovery program shall be implemented, unless the ERO determines that the archeological resource is of greater interpretive than research significance and that interpretive use of the resource is feasible.

Archeological Monitoring Program. Preparation of an archeological monitoring program (AMP) may be required prior to project construction depending on the results of the prehistoric and historical archeological testing programs outlined above. If the ERO in consultation with the archeological consultant determines that an archeological monitoring program shall be implemented, the archeological monitoring program shall minimally include the following provisions:

- The archeological consultant, SFPUC, and ERO shall meet and consult on the scope of the AMP reasonably prior to commencement of any project-related soils disturbing activities. The ERO in consultation with the archeological consultant shall determine what project activities shall be archeologically monitored based on the results of pre-construction archeological testing currently approved and underway or planned, and archeological sensitivity assessment based on the results of that testing;
- The archeological consultant shall advise all project contractors to be on the alert for evidence of the presence of the expected resource(s), of how to identify the evidence of the expected resource(s), and of the appropriate protocol in the event of discovery of a potential archeological resource;
- The archeological monitor(s) shall be present on the project site according to a schedule agreed upon by the archeological consultant and the ERO or until the ERO has, in consultation with project archeological consultant, otherwise determined that project construction activities could have no effects on significant archeological deposits and monitoring can conclude;
- The archeological monitor shall record and be authorized to collect soil samples and artifactual/ecofactual material as warranted for analysis;

- If an intact archeological deposit is encountered, all soils-disturbing activities in the vicinity of the deposit shall cease. The archeological monitor shall be empowered to temporarily redirect demolition/excavation/construction activities and equipment until the deposit is evaluated. The archeological consultant shall immediately notify the ERO and the SFPUC of the encountered archeological deposit. The archeological consultant shall make a reasonable effort to assess the identity, integrity, and significance of the encountered archeological deposit, and present the findings of this assessment to the ERO and the SFPUC.

Whether or not significant archeological resources are encountered, the archeological consultant shall submit a written report of the findings of the monitoring program to the ERO and the SFPUC.

Archeological Data Recovery Program. An archeological data recovery program shall be implemented in accord with an archeological data recovery plan (ADRP). The ADRP shall incorporate (1) programmatic-level procedures for deeply buried prehistoric archeological deposits; (2) site-specific procedures for identified prehistoric archeological deposits; (2) and site-specific procedures for historical archeological deposits (as warranted).

The archeological consultant, SFPUC, and ERO shall meet and consult on the scope of the ADRP prior to preparation of a draft ADRP. The archeological consultant shall submit a draft ADRP to the ERO and SFPUC. The ADRP shall identify how the proposed data recovery program will preserve the significant information the archeological resource is expected to contain. That is, the ADRP shall identify what scientific/historical research questions are applicable to the expected resource, what data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions. Data recovery, in general, should be limited to the portions of the historical resource that could be adversely affected by the project. Destructive data recovery methods shall not be applied to portions of the archeological resources if non-destructive methods are practical.

The scope of the ADRP shall include the following elements:

- *Field Methods and Procedures*. Descriptions of proposed field strategies, procedures, and operations for the following elements:

    1) Programmatic-level procedures for deeply buried prehistoric archeological deposits potentially uncovered during excavation for deep foundations (e.g., driven, drilled, or augured piles).

    2) Site-specific procedures for known/identified prehistoric archeological deposits potentially affected by project excavation activities (e.g. CA-SFR-171).

    3) Site-specific procedures for historical archeological deposits (as warranted) potentially affected by project excavation activities.

- *Cataloguing and Laboratory Analysis*. Description of selected cataloguing system and artifact analysis procedures.

- *Discard and Deaccession Policy*. Description of and rationale for field and post-field discard and deaccession policies.

- *Interpretive Program*. Consideration of an on-site/off-site public interpretive program during the course of the archeological data recovery program.
- *Security Measures*. Recommended security measures to protect the archeological resource from vandalism, looting, and non-intentionally damaging activities.
- *Final Report*. Description of proposed report format and distribution of results.
- *Curation*. Description of the procedures and recommendations for the curation of any recovered data having potential research value, identification of appropriate curation facilities, and a summary of the accession policies of the curation facilities.

Human Remains and Associated or Unassociated Funerary Objects. The treatment of human remains and of associated or unassociated funerary objects discovered during any soils disturbing activity, in the context of an archeological deposit or in isolation, shall comply with applicable state and federal laws. This shall include immediate notification of the Coroner of the City and County of San Francisco and in the event of the Coroner's determination that the human remains are Native American remains, notification of the California State Native American Heritage Commission (NAHC) who shall appoint a Most Likely Descendant (MLD) (PRC Section 5097.98). PRC 5097.98 indicates that " The descendants shall complete their inspection and make their recommendation within 48 hours of their notification by the Native American Heritage Commission." The archeological consultant, SFPUC, ERO, and MLD shall have up to but not beyond six days of discovery to make all reasonable efforts to develop an agreement for the treatment of human remains and associated or unassociated funerary objects with appropriate dignity (CEQA Guidelines Section 15064.5[d]). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects. Nothing in existing State regulations or in this mitigation measure compels the SFPUC and the ERO to accept recommendations of an MLD. The archeological consultant shall retain possession of any Native American human remains and associated or unassociated burial objects until completion of any scientific analyses of the human remains or objects as specified in the treatment agreement if such as agreement has been made or, otherwise, as determined by the archeological consultant and the ERO.

Final Archeological Resources Report. The archeological consultant shall submit a Draft Final Archeological Resources Report (FARR) to the ERO and SFPUC that evaluates the historical significance of any discovered archeological resource and describes the archeological and historical research methods employed in the archeological testing/monitoring/data recovery program(s) undertaken. The FARR shall include new updated DPR forms, as applicable. Information that may put at risk any archeological resource shall be provided in a separate removable insert within the final report.

Once approved by the ERO, copies of the FARR shall be distributed as follows: Northwest Information Center (NWIC) of the California Historical Resources Information System shall receive one (1) copy and the ERO shall receive a copy of the transmittal of the FARR to the NWIC. The Environmental Planning division of the Planning Department shall receive one bound, one unbound and one unlocked, searchable PDF copy on CD of the FARR along with copies of any formal site recordation forms (CA DPR 523 series) and/or documentation for nomination to the National Register of Historic Places/California Register of Historical

Resources. In instances of high public interest in or the high interpretive value of the resource, the ERO may require a different final report content, format, and distribution than that presented above.

Mitigation Measure M-CR-2b. Accidental Discovery of Archeological Resources

The following mitigation measure is required to avoid any potential adverse effect from the project on accidentally discovered buried or submerged historical resources as defined in CEQA Guidelines Section 15064.5(a) and (c). The project sponsor shall distribute the Planning Department archeological resource "ALERT" sheet to the project prime contractor; to any project subcontractor (including demolition, excavation, grading, foundation, pile installation, etc. firms); or utilities firm involved in soils disturbing activities within the project site. Prior to any soils disturbing activities being undertaken each contractor is responsible for ensuring that the "ALERT" sheet is circulated to all field personnel including, machine operators, field crew, pile drivers, supervisory personnel, etc.

A preconstruction training shall be provided to all construction personnel by a qualified archeologist prior to their starting work on the project. The training may be provided in person or using a video and include a handout prepared by the qualified archeologist. The video and materials shall be reviewed and approved by the ERO and the SFPUC. The purpose of the training is to enable personnel to identify archeological resources that may be encountered and to instruct them on what to do if a potential discovery occurs. Images or video of expected archeological resource types and archeological testing and data recovery methods should be included in the training. As possible, video or images should utilize archeological investigations that have occurred at the project site. The training should also include general information about the known archeological resources identified within the project site.

The project sponsor shall provide the Environmental Review Officer (ERO) with a signed affidavit from the responsible parties (prime contractor, subcontractor[s], and utilities firm) to the ERO confirming that all field personnel have received copies of the Alert Sheet and have taken the preconstruction training.

Should any indication of an archeological resource be encountered during any soils disturbing activity of the project, the project Head Foreman and/or project sponsor shall immediately notify the ERO and the SFPUC and shall immediately suspend any soils disturbing activities in the vicinity of the discovery until the ERO, in coordination with the SFPUC, has determined what additional measures should be undertaken.

If the ERO determines that the find may represent an archeological resource, the project sponsor shall retain the services of an archeological consultant. The archeological consultant shall advise the ERO and the SFPUC as to whether the discovery is an archeological resource, retains sufficient integrity, and is of potential scientific/historical/cultural significance. If an archeological resource is present, the archeological consultant shall identify and evaluate the archeological resource. The archeological consultant shall make a recommendation as to what action, if any, is warranted. Based on this information, the ERO may require, if warranted, specific additional measures to be implemented by the project sponsor.

Measures might include: preservation in situ of the archeological resource; an archeological monitoring program; or an archeological testing program. If an archeological monitoring program or archeological testing program is required, it shall be consistent with the

Environmental Planning (EP) division guidelines for such programs. The ERO may also require that the project sponsor immediately implement a site security program if the archeological resource is at risk from vandalism, looting, or other damaging actions.

The project archeological consultant shall submit a Final Archeological Resources Report (FARR) to the ERO and the SFPUC that evaluates the historical significance of any discovered archeological resource and describing the archeological and historical research methods employed in the archeological monitoring/data recovery program(s) undertaken. Information that may put at risk any archeological resource shall be provided in a separate removable insert within the final report.

Copies of the Draft FARR shall be sent to the ERO for review and approval and concurrently to the SFPUC for review and comment. Once approved by the ERO, copies of the FARR shall be distributed as follows: California Archaeological Site Survey Northwest Information Center (NWIC) shall receive one (1) copy and the ERO shall receive a copy of the transmittal of the FARR to the NWIC. The Environmental Planning division of the Planning Department shall receive one bound copy, one unbound copy and one unlocked, searchable PDF copy on CD three copies of the FARR along with copies of any formal site recordation forms (CA DPR 523 series) and/or documentation for nomination to the National Register of Historic Places/California Register of Historical Resources. In instances of high public interest or interpretive value, the ERO may require a different final report content, format, and distribution than that presented above.

Impact CR-3: The project could disturb human remains, including those interred outside of formal cemeteries. (Less than Significant with Mitigation)

To date, no known human burial locations have been identified within the archeological C-APE, though the possibility of such a discovery cannot be discounted. Project construction could result in direct impacts on previously undiscovered human remains during earthmoving activities.

Under state law, human remains and associated burial items may be significant resources in two ways: they may be significant to descendant communities for patrimonial, cultural, lineage, and religious reasons; and human remains may also be important to the scientific community, such as prehistorians, epidemiologists, and physical anthropologists. The specific stake of some descendant groups in ancestral burials is a matter of law for some groups, such as Native Americans (CEQA Guidelines Section 15064.5[d], Public Resources Code Section 5097.98). In other cases, the concerns of the associated descendent group regarding appropriate treatment and disposition of discovered human burials may become known only through outreach. As described in Mitigation Measure M-CR-2a (Archeological Testing, Monitoring, and/or Data Recovery), if human remains or associated or unassociated funerary objects are discovered during any soils-disturbing activity, their treatment shall comply with applicable state and federal laws, including immediate notification of the Coroner of the City and County of San Francisco and in the event of the Coroner's determination that the human remains are Native American remains, notification of the California State NAHC who shall appoint a Most Likely Descendant (MLD) (Public Resources Code Section 5097.98).

The SFPUC shall be required to retain a qualified archeological consultant, in conjunction with the SFPUC, the ERO (or its designated representative) and the MLD, shall make all reasonable efforts to develop an agreement for the treatment of, with appropriate dignity, human remains and associated or unassociated funerary objects (CEQA Guidelines Section 15064.5[d]). The agreement shall take into consideration the appropriate excavation, removal, recordation, analysis, curation, possession, and final disposition of the human remains and associated or unassociated funerary objects.

Because the project would be required to comply with the regulations described above and to implement the measures specified under those regulations, impacts related to disturbance of human remains would be ***less than significant with mitigation.***

> **Mitigation Measure M-CR-2a. Archeological Testing, Monitoring, and/or Data Recovery** (see Impact CR-2)

Cumulative Impacts

Impact C-CR-1: The project, in combination with past, present, and probable future projects, would substantially contribute to cumulative adverse historic architectural resources impacts. (Significant and Unavoidable with Mitigation)

Cumulative Effects on Historic District

The geographic scope for cumulative effects on the historic district includes the SEP and the boundaries of the *Southeast Treatment Plant Streamline Moderne Industrial Historic District*. Cumulative projects at the SEP with the potential to result in cumulative impacts on the district in combination with the impacts of the project include: the Existing Digester Roof Repairs and Gas Handling Improvements (affecting Buildings 630-730, Anaerobic Digester Tanks 1-10); and the foreseeable demolition of all existing digesters and their central control buildings (Buildings 620 and 680), as part of the Demolition of the Existing SEP Digesters and Southside Renovation Project (see Section 4.1, Table 4.1-1, for description of cumulative projects). These cumulative projects are all within the *Southeast Treatment Plant Streamline Moderne Industrial Historic District*. The cumulative impact of the BDFP with two of the projects (roof repairs and gas handling improvements to the existing digesters) is discussed first, since this impact would occur approximately between 2013 and 2018, the scheduled period for the construction of these two projects and demolition phase of the BDFP. Repairs to two existing digester covers and replacement of three covers with new floating covers have been completed. The cumulative impact of the BDFP and the future demolition of all existing digesters is discussed separately, because demolition would occur at some future date after 2025.

The impacts associated with the loss of Building 870, as a contributor to the historic district, in combination with the proposed roof repairs and gas handling improvements to the existing digesters could potentially result in a cumulative impact on the district, but the cumulative impact would be less-than-significant. Based on the nature of the roof repairs and gas handling improvements, these projects would not substantially affect the character-defining features of the utilitarian concrete tanks, but rather would prolong the useful life and functionality of the digesters. These improvements would be similar to past physical alterations to the digesters, and the digesters would be expected to retain sufficient integrity to convey their association with the implementation of the 1935 Sewer System Master Plan, as well as the Streamline Moderne architectural style. The loss of Building 870, as discussed above in Impact CR-1, would have a less-than-significant impact on the overall significance and historic integrity of the district. Therefore, the cumulative impact of the loss of Building 870 under the project in combination with the proposed roof repairs and gas handling improvements to the existing digesters would have a less-than-significant impact on the overall significance and historic integrity of the district.

However, the impacts associated with the loss of Building 870 in combination with the impact associated with the proposed future demolition of all existing digesters (Buildings 630-730) and their control buildings (Buildings 620 and 680), as part of the Demolition of the Existing SEP Digesters and Southside Renovation Project, would result in a significant, adverse cumulative impact on historic architectural resources. With these two projects combined, the district would lose approximately 13 of its 22 contributors, or 59 percent of the district's contributory buildings as part of a future cumulative scenario. The material impairment of over 50 percent of the district's contributory buildings would no longer retain sufficient integrity to convey its associations under National Register/California Register criteria A/1 or C/3, which would be considered a significant impact. Implementation of Mitigation Measure M-CR-1 (Documentation of Historic Resources and Interpretive Display) would reduce the severity of the cumulative impact but would not reduce the impacts to the district to a less-than-significant level. As such, the cumulative impact of the project in combination with the future demolition of the existing digesters and control buildings would be a significant and unavoidable cumulative impact on historic resources, even with mitigation. The proposed future demolition of the existing digesters will be subject to CEQA environmental review.

Although the BDFP would result in the loss of Building 870, only one of the district's 22 contributory buildings, the overall implementation of the BDFP would replace the function of the existing digesters and associated control buildings, thereby allowing for demolition of the existing digesters and control buildings. Therefore, the project's contribution to this cumulative impact would be cumulatively considerable (i.e., significant), and the cumulative impact on historic districts would be ***significant and unavoidable with mitigation.***

Other projects on the cumulative list at the SEP, such as the proposed Southeast Plant Headworks Replacement project and the SEP Primary/Secondary Clarifier Upgrades project, are not anticipated to contribute to cumulative impacts on historic resources. The Southeast Plant Headworks Replacement project would demolish Buildings 011 and 012 on the north side of the plant. Built in 1981 and 1996, respectively, neither building was identified as a historical resource, either individually or as potential contributors to the district. The proposed SEP Primary/Secondary Clarifier Upgrades project would construct a ventilation system to exhaust and dilute the head space in seven primary clarifier tanks at Building 042. Constructed in 1981, Building 042 was not identified as a historical resource, either individually or as potential contributors to the district. As such, the demolition or alteration of these buildings at the SEP would not contribute to a cumulative impact on historic architectural resources.

Cumulative Effects on Individual Historic Resources

The geographic scope for cumulative effects on the historic district includes the SEP and the boundaries of the *Southeast Treatment Plant Streamline Moderne Industrial Historic District*. As described above in Impact CR-1, the loss of Central Shops (including Buildings A and B), as an individually eligible historical resource, would be considered a significant and unavoidable impact even with mitigation. Cumulative projects in the vicinity of the SEP with the potential to combine with this impact of the project include the Pier 70 Waterfront Site Project, located in the Dogpatch neighborhood, which would demolish multiple historic industrial buildings that contribute to the Pier 70 Union Iron Works National Register Historic District and would introduce substantial new construction within that district. The Pier 70 Waterfront Site project is currently undergoing a separate environmental review process that identified potentially significant impacts on historic architectural resources, as well as mitigation measures to reduce impacts to a less-than-significant level. Even though significant impacts on historical resources have been identified as a result of the Pier 70 Waterfront Site Project, such impacts involve buildings that are substantially different in age, scale, and use from those at the BDFP site. For example, historic buildings that would be affected by the Pier 70 Waterfront Site Project were constructed prior to, or during, World War II for ship building and repair purposes, and are industrial-utilitarian in nature. The buildings and structures affected by the BDFP project are post-war industrial water treatment buildings designed in the Streamline Moderne style of architecture and International Style industrial shop buildings. As the projects are nearly a mile apart, the changes at both sites could not be viewed simultaneously, given the substantial amount of intervening development. As such, the potential loss or alteration of buildings within the Pier 70 Historic District would not combine with the potential loss of buildings at the SEP to result in a significant cumulative impact.

Other projects identified in the cumulative projects list, including the San Francisco Wholesale Produce Market Expansion project and the Central Shops Relocation and Land Reuse project, are not anticipated to affect historic architectural resources as none have been identified on these sites, and therefore they would not combine with the impacts of the project to result in a significant cumulative impact.

> **Mitigation Measure M-CR-1. Documentation of Historic Resources and Interpretive Display** (see Impact CR-1)

Impact C-CR-2: The project, in combination with past, present, and probable future projects, could result in cumulative adverse impacts on archeological resources and human remains. (Less than Significant with Mitigation)

The geographic scope for cumulative effects on archeological resources and human remains includes the immediate vicinity of locations where the project would cause ground disturbance. Similar to the proposed project as described under Impacts CR-2 and CR-3, cumulative projects in the project vicinity as listed in Table 4.1-1 could have a significant impact on both recorded and unrecorded archeological resources (including the older stratified part of CA-SFR-171), including human remains interred outside of formal cemeteries, given the substantial amount of construction-related ground disturbance that could occur for many of the cumulative projects. The potential impacts of the project when considered together with similar impacts from other probable future projects in the vicinity could result in a significant cumulative impact on buried archeological resources. The BDFP contribution to this impact could be cumulatively considerable, as documented above under Impacts CR-2 and CR-3. However, implementation of Mitigation Measures M-CR-2a and M-CR-2b would require implementation of legally-required appropriate treatment of human remains as well as archeological testing, monitoring and/or data recovery programs. Therefore, with implementation of Mitigation Measures M-CR-2a and M-CR-2b, the proposed project's contribution to cumulative impacts would not be considerable, and the impact would be ***less than significant with mitigation***.

Mitigation Measure M-CR-2a. Archeological Testing, Monitoring, and/or Data Recovery and Mitigation Measure M-CR-2b. Accidental Discovery of Archeological Resources (see Impact CR-2)

4.6 Transportation and Circulation

This section describes existing transportation and circulation in the vicinity of the Biosolids Digester Facilities Project (BDFP or project), the existing regulatory framework governing transportation, and the potential for implementation of the project to adversely affect the circulation system. This impact analysis evaluates the potential transportation and circulation impacts of the project and identifies mitigation measures to avoid or reduce adverse impacts, as appropriate. **Appendix TR** presents supporting information for the transportation analysis.

4.6.1 Setting

4.6.1.1 Regional and Local Road Network and Travel Patterns

Travel to and from the project site and off-site staging areas involves the use of regional highway transportation facilities that link San Francisco with other parts of the Bay Area, as well as Northern and Southern California. The project site and off-site staging areas are accessible by local streets with connections to and from regional freeways and highways in the state system. Please refer to Figure 2-1 in Chapter 2, *Project Description,* for the location of these regional transportation facilities and local streets, which are discussed further below.

Regional Freeways

U.S. Highway 101

U.S. Highway 101 (Highway 101) is generally a north-south freeway, connecting San Francisco with the Peninsula and beyond to the south and Marin County and beyond to the north. It connects with Interstate 80 (I-80), which is located approximately two miles north of the project site and provides access to the East Bay and points farther east via the San Francisco-Oakland Bay Bridge. Between I-80 and the City and County of San Francisco (CCSF or City) line approximately 2.5 miles south of the project site, Highway 101 is an eight- to ten-lane limited-access freeway. In the project site vicinity, Highway 101 has both northbound and southbound on- and off-ramps near Silver Avenue and at Industrial Street/Bayshore Boulevard/Alemany Boulevard and Bayshore Boulevard/Jerrold Avenue/Cesar Chavez Street. No southbound on-ramp is provided from westbound Cesar Chavez Street. Highway 101 is one of the most heavily used freeway corridors in the Bay Area. Highway 101 and Interstate 280 (I-280) merge approximately one mile southwest of the project site, a common location of congestion during weekday a.m. and p.m. commute periods.

Interstate 280

I-280 is a generally north-south freeway that connects San Francisco with the Peninsula and the South Bay. I-280 has an interchange with Highway 101 approximately one mile southwest of the project site and terminates in San Francisco at surface streets in the South of Market/Mission Bay areas. Near the project site, I-280 is a six- to eight-lane facility. The closest access to I-280 is provided at Pennsylvania Street/Cesar Chavez Street (from the south), at Pennsylvania Street/25th Street (from the north and to the south), and at Indiana Street/25th Street (to the north).

Local Streets

Amador Street

Amador Street is an east-west roadway that extends east from Cargo Way to Pier 92 in the Port of San Francisco Intermodal Container Transfer Facility (ICTF) and has one travel lane in each direction. On-street parking is prohibited on the north side of the street, and angled parking is permitted on the south side of the street. Amador Street is a private road, owned by the Port of San Francisco, but access is not restricted.

Bayshore Boulevard

Bayshore Boulevard is a north-south arterial that generally parallels Highway 101 with three travel lanes each way, separated by a median. The *San Francisco General Plan* (General Plan) designates Bayshore Boulevard as a Major Arterial[1] in the Congestion Management Program (CMP) Network, part of the San Francisco Bay Region's nine-county Metropolitan Transportation System (MTS) Network, a Transit Preferential Street (Secondary, between Cesar Chavez Street and Silver Avenue), and a Neighborhood Commercial Street. The T Third light rail line runs on Bayshore Boulevard between Hester and Sunnydale Avenues. Bayshore Boulevard is part of Bicycle Route 25 between Cesar Chavez Street and Paul Avenue, and part of Bicycle Route 5 south of San Bruno Avenue. Striped bicycle lanes are provided on Bicycle Route 5 between San Bruno and Geneva Avenues.

Cesar Chavez Street

Cesar Chavez Street is a major east-west arterial that runs between Douglass Street to the west and the Port of San Francisco North Container Terminal at Pier 80, east of Third Street. In the vicinity of the project site, Cesar Chavez Street has one to two travel lanes each way, with a center median at some locations. The General Plan designates Cesar Chavez Street as a Major Arterial in the CMP Network from San Jose Avenue to Third Street, as a Secondary Arterial east of Third Street, and as part of the MTS Network. It is identified in the General Plan as a Freight Traffic Route[2] east of Highway 101. Cesar Chavez Street is part of Bicycle Route 60 between Sanchez and Third Streets, and striped bicycle lanes are generally provided between Guerrero and Third Streets.

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1 City roadway designations include Freeways, Major Arterials, Transit Conflict Streets, Secondary Arterials, Recreational Streets, Collector Streets, and Local Streets. Each of these roadways has a different potential capacity for mixed-flow traffic and for changes that might alter traffic patterns on the given roadway. The General Plan also identifies certain Transit Preferential Streets from among the City's roadways, each of which is identified as a Primary Transit Street-Transit Oriented, Primary Transit Street-Transit Important, or Secondary Transit Street. The Pedestrian Network is a classification of streets used to identify streets developed to be primarily oriented to pedestrian use, and includes Citywide Pedestrian Network Streets and Neighborhood Pedestrian Streets. (City and County of San Francisco, *San Francisco General Plan*, 2007 Transportation Element. Available online at http://www.sf-planning.org/ftp/General_Plan/I4_Transportation.htm.)

2 San Francisco does not have a network of signed truck routes, although the San Francisco Municipal Transportation Agency (SFMTA) has identified major Freight Traffic Routes in the Transportation Element of the General Plan that are not designed or signed truck routes. (See General Plan Transportation Element Map 15, attached in Appendix TR and available online at: http://www.sf-planning.org/ftp/General_Plan/images/I4.transportation/tra_map15.pdf.) Nevertheless, a number of streets in San Francisco, and in the Southeast Water Pollution Control Plant (SEP or Southeast Plant) vicinity have "Truck Route" signage. More commonly, streets are designated with truck weight restrictions to discourage through truck traffic from using these streets. Streets with truck weight restrictions are identified in the San Francisco Transportation Plan, Section 501, available online on the SFMTA website at https://www.sfmta.com/sites/default/files/pdfs/2016/Restricted%20Traffic%20Streets_2016-05-06.pdf.

Cargo Way

Cargo Way is a northwest-southeast roadway that extends between Jennings and Third Streets. (Arthur Avenue continues west of Third Street.) Cargo Way provides direct access to the Port of San Francisco ICTF and the South Container Terminal (SCT) on Piers 92, 94, and 96. Cargo Way is a two-way street with two travel lanes in each direction separated by a landscaped median and has non-metered on-street parking on both sides of the street. Active railroad tracks serving the ICTF and SCT run parallel and north of the street from its intersection with Third Street. In the General Plan, Cargo Way is designated as a Freight Traffic Route.

Evans Avenue

Evans Avenue is an east-west arterial, with two travel lanes each way, extending between Cesar Chavez and Jennings Streets. The General Plan identifies Evans Avenue as a Major Arterial in the CMP Network between Cesar Chavez and Third Streets, as a Secondary Arterial east of Third Street, and as part of the MTS Network. In the General Plan, Evans Avenue is also identified as a Freight Traffic Route between Cesar Chavez and Jennings Streets. Evans Avenue is part of Bicycle Route 68 between Cesar Chavez Street and Hunters Point Boulevard. Striped bicycle lanes are provided between Third Street and Hunters Point Boulevard.

Industrial Street

Industrial Street is an east-west street with two travel lanes each way and a raised center median, extending between Bayshore Boulevard and Oakdale Avenue. The General Plan identifies Industrial Street as a Secondary Arterial. The segment of Industrial Street between Loomis Street and Bayshore Boulevard is part of southbound Bicycle Route 25.

Innes Avenue

Innes Avenue is an east-west discontinuous street extending from Milton Ross Lane, east of Toland Street, to Coleman Street, at the Hunters Point Shipyard. The General Plan identifies Innes Avenue east of Hunters Point Boulevard as a Secondary Arterial, part of the MTS Network, and a street with significant truck traffic. To the west of the project site, adjacent to the San Francisco Wholesale Produce Market, Innes Avenue is a paved but unimproved (no curbs, sidewalks, trees or other pedestrian amenities) roadway extending between Milton Ross Lane, near Toland Street, and Rankin Street. To the east of the project site, Innes Avenue is a paved roadway extending between Phelps Street and south of Mendell Street. The main pedestrian access to the Southeast Water Pollution Control Plant (SEP or Southeast Plant) is located at the intersection of Innes Avenue and Phelps Street.

As described in Table 4.1-1 in Section 4.1, Overview, the San Francisco Wholesale Produce Market has developed a plan to vacate the segment of Jerrold Avenue between Toland and Rankin Streets (i.e., to the west of the SEP), which would then be closed to vehicles not related to the produce market. Those vehicles would instead be, for the most part, directed to an improved Innes Avenue from Rankin Street to Toland Street.

Jerrold Avenue

Jerrold Avenue is an east-west street with one travel lane each way, extending from Bayshore Boulevard to Coleman Street, at the Hunters Point Shipyard. Jerrold Avenue, while not an arterial, is one of four east-west streets that cross the Caltrain tracks near the project site, the other three being Evans, Oakdale, and Palou Avenues. Palou and Oakdale Avenues cross over the Caltrain tracks, while Jerrold and Evans Avenues cross under the Caltrain tracks. Jerrold Avenue bisects the SEP between the Caltrain tracks and Phelps Street.

Multiple entrances to the SEP are located on the north and south sides of Jerrold Avenue between Phelps and Quint Streets. SEP staff and City vehicles parking inside the SEP use the vehicle entrances on the north side of Jerrold Avenue. Trucks delivering various chemical products (bisulfite, hypochlorite, and oxygen) to the SEP also use the vehicle entrance on the north side of Jerrold Avenue. Trucks delivering ferric chloride and polymer to the SEP use the vehicle entrance on the south side of Jerrold Avenue, while trucks carrying the plant biosolids to the landfill use the access on the south side of Jerrold Avenue only as an exit.

Jerrold Avenue also bisects the San Francisco Wholesale Produce Market between Rankin and Toland Streets, to the west of the SEP. When the San Francisco Wholesale Produce Market project is implemented, this portion of the street would be vacated and then be enclosed so that only authorized and inspected vehicles could have access to the produce market. Vehicular traffic not related to the San Francisco Wholesale Produce Market would be directed to parallel streets to the north or south on improved segments of Innes and Kirkwood Avenues.

Oakdale Avenue

Oakdale Avenue is an east-west arterial extending from Bayshore Boulevard to Griffith Street, at the Hunters Point Shipyard. The General Plan identifies Oakdale Avenue as a Secondary Arterial between Bayshore Boulevard and Third Street, and as a Freight Traffic Route between Bayshore Boulevard and Industrial Street. Oakdale Avenue is part of Bicycle Route 170 between Bayshore Boulevard and Phelps Street, where striped bicycle lanes are provided on both sides of the street.

Phelps Street

Phelps Street is a north-south discontinuous street between Third Street and Palou Avenue and between Vest and Williams Streets and Bayshore Boulevard and has one travel lane each way. Bicycle Route 7 runs the length of Phelps Street. The main pedestrian entrance to the SEP is located on Phelps Street, at the intersection with Innes Avenue.

Quint Street

Quint Street is a north-south discontinuous street between the Islais Creek Channel and Thomas Avenue and has one travel lane each way. Under the Caltrain tracks between this location and Jerrold Avenue, Quint Street was permanently closed in October 2015 as part of Caltrain's replacement of the Quint Street Bridge with a berm, preventing through vehicular and pedestrian traffic from traveling between Newcomb and Jerrold Avenues. Quint Street is discontinued within the SEP between Jerrold and Evans Avenues. Trucks removing yellow grease and recycled water use the Quint Street vehicle access point, while trucks carrying the plant biosolids to the landfill use the Quint Street access to reenter the SEP.

Rankin Street

Rankin Street is a north-south discontinuous street between the Islais Creek Channel and Revere Avenue. In the vicinity of the project site, Rankin Street runs along the northwest side of the SEP with a vehicular entrance to the SEP on Rankin Street, south of Evans Avenue. On the other side of the railroad tracks along the southern edge of the San Francisco Wholesale Produce Market, Rankin Street is a paved but unimproved roadway extending between Innes and McKinnon Avenues. The existing SEP vehicle access on Rankin Street is used as an exit on an as-needed basis by trucks carrying grit to the landfill.

Third Street

Third Street is the principal north-south arterial in the southeast part of San Francisco, extending from its interchange with Highway 101 at Bayshore Boulevard to its intersection with Market Street in downtown San Francisco, and serving as a through street and an access way to the industrial areas north and east of Highway 101. In the project vicinity, Third Street has two travel lanes each way, with the T Third Line light rail operating in an exclusive median right-of-way, with the exception of the segment between Kirkwood and Thomas Avenues, where the light rail shares the travel lane with vehicles. The General Plan identifies Third Street as a Major Arterial in the CMP Network and as a Transit Preferential Street. Third Street between Jerrold Avenue and the Mission Bay area is identified as a Freight Traffic Route. Third Street is part of Bicycle Route 5 between Custer Avenue and Bayshore Boulevard, and Bicycle Route 7 between Cesar Chavez Street and Custer Avenue.

Toland Street

Toland Street is a north-south street with one travel lane each way, extending between Evans and Oakdale Avenues. Toland Street is located across the railroad tracks from the project site, along the northern boundary of the San Francisco Wholesale Produce Market. The General Plan identifies Toland Avenue between Oakdale and Evans Avenues as a Freight Traffic Route.

Traffic Volumes for Select Streets

Table 4.6-1 shows a summary of the existing a.m. and p.m. peak hour volumes on streets near the project site and off-site staging areas. The traffic data were collected on May 28 and May 29, 2015. Appendix TR includes the detailed vehicle count information.

As shown in Table 4.6-1, peak hour traffic volumes are highest on Third Street (the primary north-south arterial in the SEP vicinity), and Oakdale and Evans Avenues (the primary east-west arterials in the SEP vicinity). On Jerrold Avenue, traffic volumes are highest (i.e., about double) west of, versus east of, Phelps Street. Traffic volumes on Cargo Way are low, generally fewer than 210 vehicles per hour.

TABLE 4.6-1
EXISTING AM AND PM PEAK HOUR TRAFFIC VOLUMES

Street	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
	West of Phelps Street		**East of Phelps Street**	
Evans Avenue	754	763	699	725
Jerrold Avenue	585	531	274	221
Oakdale Avenue	636	745	463	519
Phelps Street	**Between Oakdale and Jerrold Avenues**		**Between Jerrold and Evans Avenues**	
	288	384	419	532
Third Street	**South of Evans Avenue**		**Between Evans Avenue and Cargo Way**	
	1,099	992	1,340	1,369
Cargo Way	**West of Third Street**		**East of Third Street**	
	83	94	165	209

NOTE: Volumes shown are two-way traffic volumes on identified street segments.
SOURCE: Adavant Consulting/LCW Consulting Data Collection May 2015.

Background on Vehicle Miles Traveled (VMT) in San Francisco and Bay Area

Many factors affect travel behavior. These factors include density, diversity of land uses, design of the transportation network, access to regional destinations, distance to high-quality transit, development scale, demographics, and transportation demand management. Typically, low-density development at great distance from other land uses, located in areas with poor access to non-private vehicular modes of travel, generate more automobile travel compared to development located in urban areas, where a higher density, mix of land uses, and travel options other than private vehicles are available.

Given these travel behavior factors, San Francisco has a lower vehicle miles traveled (VMT) ratio than the nine-county San Francisco Bay Area region. In addition, some areas of the city have lower VMT ratios than other areas of the city. These areas of the city can be expressed geographically through traffic analysis zones. Traffic analysis zones are used in transportation planning models for transportation analysis and other planning purposes. The zones vary in size from single city blocks in the downtown core, multiple blocks in outer neighborhoods, to even larger zones in historically industrial areas like the Hunters Point Shipyard.

The San Francisco County Transportation Authority (SFCTA) uses the San Francisco Chained Activity Modeling Process (SF-CHAMP) to estimate VMT by private automobiles and taxis for different land use types. Travel behavior in SF-CHAMP is calibrated based on observed behavior from the California Household Travel Survey 2010-2012, Census data regarding automobile ownership rates and county-to-county worker flows, and observed vehicle counts and transit boardings. SF-CHAMP uses a synthetic population, which is a set of individual actors that represents the Bay Area's actual population, who make simulated travel decisions for a complete day. The SFCTA uses tour-based analysis for office and residential uses, which examines the entire chain of trips over the course of a day, not just trips to and from the project. For retail uses, the SFCTA uses trip-based analysis, which counts VMT from individual trips to and from the project (as opposed to entire chain of trips). A trip-based approach, as opposed to a tour-based approach, is necessary for retail projects because a tour is likely to consist of trips stopping in multiple locations, and the summarizing of tour VMT for each location would over-estimate VMT.[3,4]

The SF-CHAMP model was used to estimate existing average daily VMT per capita for Traffic Analysis Zone (TAZ) 489, which includes the project site. VMT per capita is used to measure the amount and distance that a resident, employee, or visitor drives, accounting for the number of passengers within a vehicle. As shown in **Table 4.6-2,** the current average daily VMT per capita for residents, employees, and visitors in TAZ 489 is less than the regional Bay Area average for the nine-county San Francisco Bay Area.

TABLE 4.6-2
DAILY VEHICLE MILES TRAVELED (VMT) PER CAPITA—EXISTING CONDITIONS

Trip Type (Land Use)	Bay Area Regional Average	Traffic Analysis Zone 489[a]
Households (residential)	17.2	7.8
Employment (office)	19.1	14.0
Visitors (retail)	14.9	8.8

NOTE:
[a] The Traffic Analysis Zone in which the project site is located.

SOURCES: San Francisco Planning Department Resolution Modifying Transportation Impact Analysis, Attachment E: Screening Criteria for Circulation Analysis and Methodology for Travel Demand Analysis (March 2016), and San Francisco Planning Department Transportation Information Map (TIM). Available online at http://www.sftransportationmap.org.

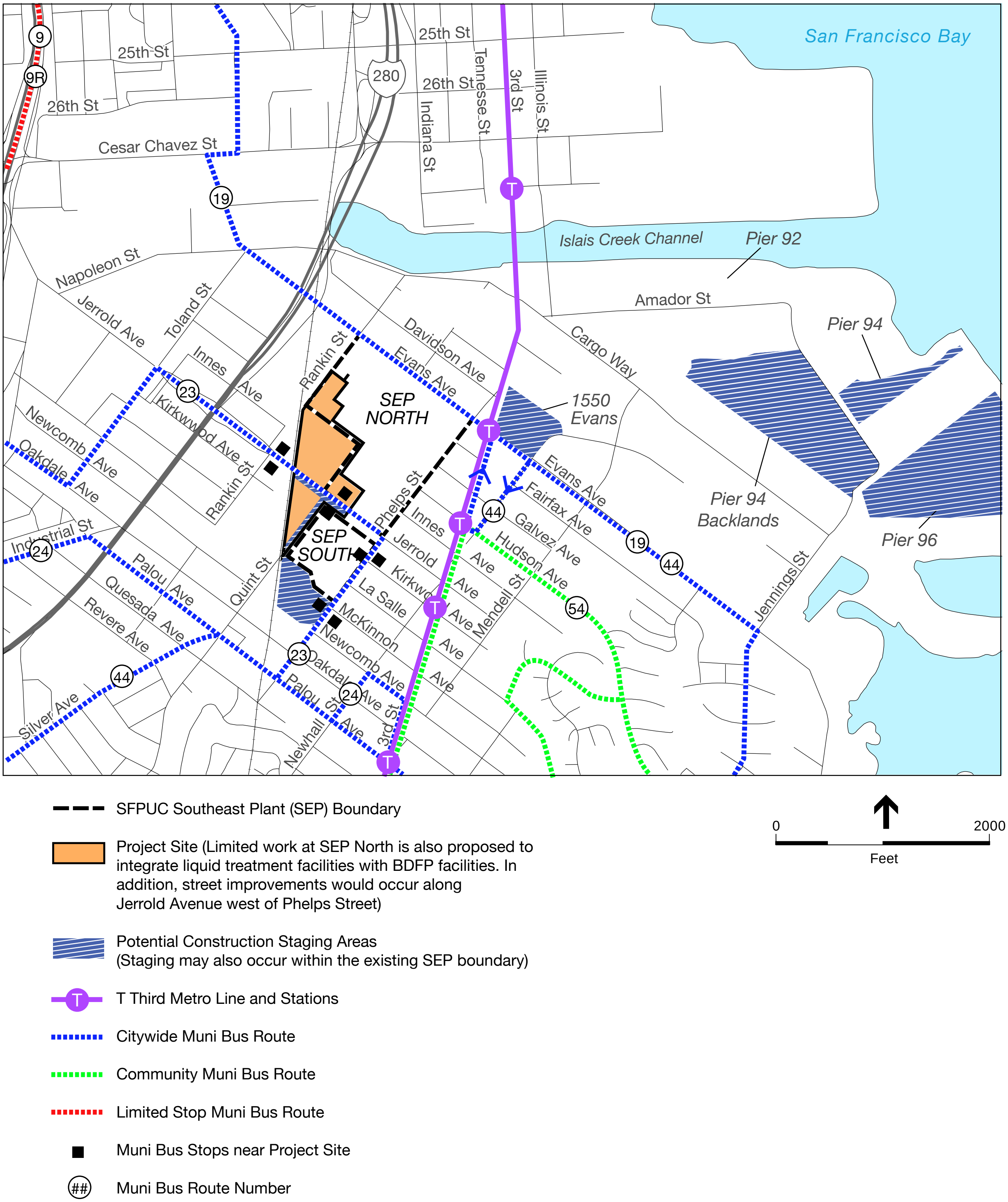
4.6.1.2 Transit Service

The SEP vicinity is served by public transit. Local service is provided by San Francisco Municipal Railway (Muni) bus routes (9 San Bruno, 9R San Bruno Rapid, 19 Polk, 23 Monterey, 24 Divisadero, 44 O'Shaughnessy, 54 Felton) and a light rail line (T Third). **Figure 4.6-1** presents the Muni transit routes in the project vicinity. **Table 4.6-3** presents the service headways[5] for the a.m. and p.m. peak periods for the Muni lines that operate within the transit study area bounded by Cesar Chavez Street, Palou Avenue, Bayshore Boulevard, and the Hunters Point Shipyard. Access to regional transit service providers (such as the 22nd Street Caltrain station) is via Muni service. Service to and from the East Bay is provided by Bay Area Rapid Transit (BART) along Mission and Market Streets, AC Transit buses from the Transbay Terminal, and ferry service from the Ferry Building. Transit service to and from the North Bay is provided by Golden Gate Transit along Van Ness Avenue and at the Transbay Terminal and ferry service from the Ferry Building. Service to and from the Peninsula

3 To state this another way, a tour-based assessment of VMT at a retail site would consider the VMT for all trips in the tour, for any tour with a stop at the retail site. If a single tour stops at two retail locations—for example, a coffee shop on the way to work and a restaurant on the way back home—then both retail locations would be allotted the total tour VMT. A trip-based approach allows apportioning of all retail-related VMT to retail sites without double-counting.

4 San Francisco Planning Department, Executive Summary: Resolution Modifying Transportation Impact Analysis, Appendix F, Attachment A, March 3, 2016.

5 The service headway is the number of minutes between buses or trains on a particular bus or rail route or line.



SOURCE: San Francisco Municpal Transportation Agency, *San Francisco Transit Map,* May 2016.

SFPUC Biosolids Digester Facilities

Figure 4.6-1
Muni Transit Network and Stop Locations

TABLE 4.6-3
AM AND PM PEAK PERIOD HEADWAYS ON SAN FRANCISCO MUNICIPAL RAILWAY (MUNI) ROUTES SERVING PROJECT VICINITY

	Scheduled Service Headway (minutes)	
Route	**AM Peak Period (7:00 a.m. to 9:00 a.m.)**	**PM Peak Period (4:00 p.m. to 6:00 p.m.)**
9 San Bruno	12	12
9R San Bruno Rapid	8	8
19 Polk	15	15
23 Monterey	20	20
24 Divisadero	9	9
44 O'Shaughnessy	9	8
54 Felton	20	20
T Third (K/T)	8	8

SOURCE: 511.org. Available online at http://transit.511.org/schedules/index.aspx?#m1=S&m2=bus&routeid=43865&cid=SF. Accessed on April 7, 2015.

and South Bay is provided by Caltrain from its terminal located at Fourth and Townsend Streets and a station at 22nd Street at Pennsylvania Street, and by the San Mateo County Transit District (SamTrans) at the Transbay Terminal and at locations along Mission Street.

In addition, the San Francisco Public Utilities Commission (SFPUC) provides an employee shuttle van service on weekdays between BART's 24th Street Mission station and the SEP. Four shuttle trips run from the 24th Street Mission station and the SEP between 5:40 and 7:30 a.m., and four trips run between the SEP and the 24th Street Mission station between 2:35 and 4:35 p.m. In the vicinity of the SEP, the shuttle van runs eastbound on Evans Avenue, southbound on Phelps Street, westbound on Jerrold Avenue, and northbound on Toland Street.

Capacity Utilization

Capacity utilization relates the number of passengers per transit vehicle to the design capacity of the vehicle. The capacity per vehicle includes both seated and standing capacity, where standing capacity is somewhere between 30 to 80 percent of seated capacity (depending upon the specific transit vehicle configuration). For example, the capacity of a single light rail vehicle is 119 passengers, the capacity of a historic streetcar is 70 passengers, and the capacity of a standard bus is 63 passengers.

Table 4.6-4 presents the ridership and capacity utilization at the maximum load point (MLP) for the nearby routes within the transit study area during the weekday a.m. and p.m. peak hours for both the inbound and outbound directions. Muni has established a capacity utilization standard of 85 percent (i.e., that Muni transit lines should operate at or below 85 percent capacity utilization), which is applied for assessment of peak hour conditions.

TABLE 4.6-4
SAN FRANCISCO MUNICIPAL RAILWAY (MUNI) TRANSIT ROUTE ANALYSIS AT MAXIMUM LOAD POINT (MLP)
EXISTING CONDITIONS – WEEKDAY AM AND PM PEAK HOUR

	Inbound (toward downtown)			Outbound (away from downtown)		
Peak Hour/Route[a]	**Ridership**	**Capacity**	**Capacity Utilization**	**Ridership**	**Capacity**	**Capacity Utilization**
AM Peak Hour						
9 San Bruno	235	315	74.6%	185	315	58.0%
9R San Bruno Rapid	230	315	73.0%	160	315	50.0%
19 Polk	188	252	74.6%	160	252	63.0%
23 Monterey	93	189	49.2%	105	189	55.0%
24 Divisadero	270	378	71.4%	144	378	38.0%
44 O'Shaughnessy	294	378	77.8%	240	378	63.0%
54 Felton	129	189	68.3%	114	189	60.0%
T Third (K/T)[b]	350	793	44.0%	833	793	**105.0%**
PM Peak Hour						
9 San Bruno	180	315	57.0%	215	315	68.0%
9R San Bruno Rapid	175	315	55.0%	225	315	71.0%
19 Polk	180	252	71.0%	168	252	66.0%
23 Monterey	99	189	52.0%	90	189	47.0%
24 Divisadero	180	378	47.0%	240	378	63.0%
44 O'Shaughnessy	216	378	57.0%	324	378	**85.0%**
54 Felton	117	189	61.0%	123	189	65.0%
T Third (K/T)[c]	782	793	**98.0%**	585	793	73.0%

NOTES:
[a] Capacity utilizations that equal or exceed Muni's 85 percent capacity utilization standard are highlighted in **bold**.
[b] For the T Third during the a.m. peak hour, the inbound direction is from the Bayview and the outbound direction is toward the Bayview. The MLP is at the Embarcadero/Folsom station in the inbound direction and at the Van Ness station in the outbound direction.
[c] For the T Third during the p.m. peak hour, the inbound direction is toward the Bayview and the outbound direction is from the Bayview. The MLP in both directions is at the Embarcadero/Harrison station.

SOURCE: San Francisco Planning Department, Memorandum, Transit Data for Transportation Impact Studies, May 2015.

All bus routes presented in Table 4.6-4 operate at less than the 85 percent capacity utilization standard, except for the 44 O'Shaughnessy, which operates at 85 percent during the p.m. peak hour in the outbound direction at the MLP of Silver Avenue and Mission Street. In addition, the T Third light rail line operates at more than 85 percent capacity utilization during the a.m. peak hour (traveling toward the Bayview at the Van Ness station) and p.m. peak hour (traveling toward the Bayview at The Embarcadero and Harrison Street). In the immediate vicinity of the project site, all bus routes and the T Third light rail line have available capacity to accommodate additional passengers.

Table 4.6-5 presents the daily ridership for the 23 Monterey for the segment of the route that would be affected by the proposed project construction activities. The number of transit riders per stop for the one-mile segment of the route is fewer than 500 passengers exiting and boarding the bus on a daily basis. The closest stop to the project site is located at Jerrold Avenue at Phelps Street. The bus stops with the greatest number of "ons and offs" (i.e., riders boarding and exiting buses) are at Phelps Street and McKinnon Avenue (traveling toward the Bayview) and at Toland Street and Jerrold Avenue (traveling toward San Francisco Zoo). In general, most riders exit the bus in the eastbound direction at Phelps Street and McKinnon Avenue, at Jerrold Avenue and Toland Street (the San Francisco Wholesale Produce Market), and at Jerrold Avenue and Phelps Street (the SEP), and board the bus in the westbound direction at the same locations but across the street from the stops in the eastbound direction.

TABLE 4.6-5
DAILY RIDERSHIP BY BUS STOP FOR 23 MONTEREY FOR SEGMENT BETWEEN TOLAND STREET/OAKDALE AVENUE AND PHELPS STREET/PALOU AVENUE

To Bayview (eastbound on Jerrold Avenue)				To San Francisco Zoo (westbound on Jerrold Avenue)			
Bus Stop	**On**	**Off**	**Total**	**Bus Stop**	**On**	**Off**	**Total**
Toland & Newcomb	5	24	29	Phelps & Oakdale	17	16	33
Toland & Jerrold	6	41	47	Phelps & McKinnon	32	4	36
Jerrold & Selby	1	24	25	Phelps & Jerrold	35	2	37
Jerrold & Rankin	1	7	8	Jerrold & Quint	4	0	4
Jerrold & Quint	0	2	2	Jerrold & Rankin	12	0	12
Jerrold & Phelps	3	37	40	Jerrold & Selby	16	1	17
Phelps & McKinnon	1	42	43	Toland & Jerrold	45	9	54
Phelps & Oakdale	8	15	23	Toland & McKinnon	6	2	8
Phelps & Palou	7	21	28	Toland & Oakdale	27	1	28
Segment Total	**32**	**213**	**245**	**Segment Total**	**194**	**35**	**229**

SOURCE: San Francisco Municipal Transportation Agency (SFMTA), Passenger Activity Report, data collected Fall 2006 – Spring 2007. Available online at https://www.sfmta.com/sites/default/files/projects/PassengerActivity_ByTimePeriod_RT_23.pdf. Accessed September 1, 2016.

Muni Forward

In January 2015, the San Francisco Municipal Transportation Agency (SFMTA) initiated implementation of the Muni Forward projects. The Muni Forward projects, which are informed by the Transit Effectiveness Project, will improve reliability, reduce travel times, provide more frequent service, and update Muni bus routes and rail lines to better match current travel patterns. They include new routes and route extension, more service on busy routes, and elimination or consolidation of certain routes or route segments with low ridership. For routes in the project vicinity, route alignment and increased peak hour frequencies have been implemented on the 9 San Bruno and 9R San Bruno Rapid, and increased peak hour frequencies have been implemented on the T Third, 24 Divisadero, and 44 O'Shaughnessy. The following improvements have not yet been implemented:

- The 19 Polk route will be realigned; it will continue to operate between Van Ness Avenue and North Point Street, but service to the south will be shortened to San Francisco General Hospital at 23rd Street and Potrero Avenue. The route segment south of 24th Street will be replaced with the rerouted 48 Quintara-24th route. With this change, passengers will be required to transfer to reach the Civic Center but will have a more direct connection to Potrero Avenue, the Mission (including the 24th Street BART Station), Noe Valley, and the Sunset District. In addition, the route will be modified in the Civic Center area to simplify route structure and reduce travel times in both directions. Changes to the service frequency are not proposed, and the 19 Polk will continue to run with 15-minute headways between buses. The proposed realignment has been approved, but the timeline for implementation is currently unknown.

- The 23 Monterey would be realigned. The route segment on Toland Street, Jerrold Avenue, and Phelps Street is proposed to be eliminated to provide a more direct path of travel. The route would operate on Oakdale Avenue, Industrial Way, and Palou Avenue. Transit service would be added to Palou Avenue between Barneveld Avenue and Industrial Way, and Barneveld Avenue between Oakdale and Palou Avenues. Changes to the service frequency are not proposed, and the 23 Monterey would continue to run with 20-minute headways between buses. The timeline to implement the proposed realignment has not yet been approved and is currently unknown pending further community outreach.
- The 54 Felton route would be modified in several segments to make service quicker, more direct, and less circuitous for passengers. In the Bayview, two-way service would be provided on Hunters Point hilltop beginning at Third Street and Palou Avenue, running two-way on Hudson Avenue, North Ridge Road, Jerrold Avenue, Kirkwood Street, Kiska Road, Ingalls Street, and Van Dyke Avenue, and then continuing through Silver Terrace. The proposed route realignment has not yet been approved, pending further community outreach. The service frequency on the 54 Felton will be increased from 20 to 15 minutes during the a.m. and p.m. peak periods, and this service improvement has been approved, although the timeline to implement the service frequency increases is unknown pending funding.

4.6.1.3 Bicycle Circulation

Bicycle Routes

Figure 4.6-2 presents the bicycle route network in the vicinity of the project site and the off-site staging areas. Bikeways are typically classified as Class I, Class II, Class III or Class IV facilities.[6] Class I bikeways are bike paths with exclusive right-of-way for use by bicyclists or pedestrians. Class II bikeways are bike lanes striped within the paved areas of roadways and established for the preferential use of bicycles, while Class III bikeways are signed bike routes that allow bicycles to share streets with vehicles. A Class IV bikeway is an exclusive bicycle facility that is separated from vehicular traffic and parked cars by a buffer zone.

As shown on Figure 4.6-2, there are seven bicycle routes in the vicinity of the project site and the off-site staging areas, as follows:[7]

- Bicycle Route 5 is the easternmost north-south bicycle route. This route runs between Visitacion Valley and North Beach, primarily as a Class III facility along Third Street and primarily as a Class II facility along Illinois Street, Bayshore Boulevard, The Embarcadero, and San Bruno Avenue.

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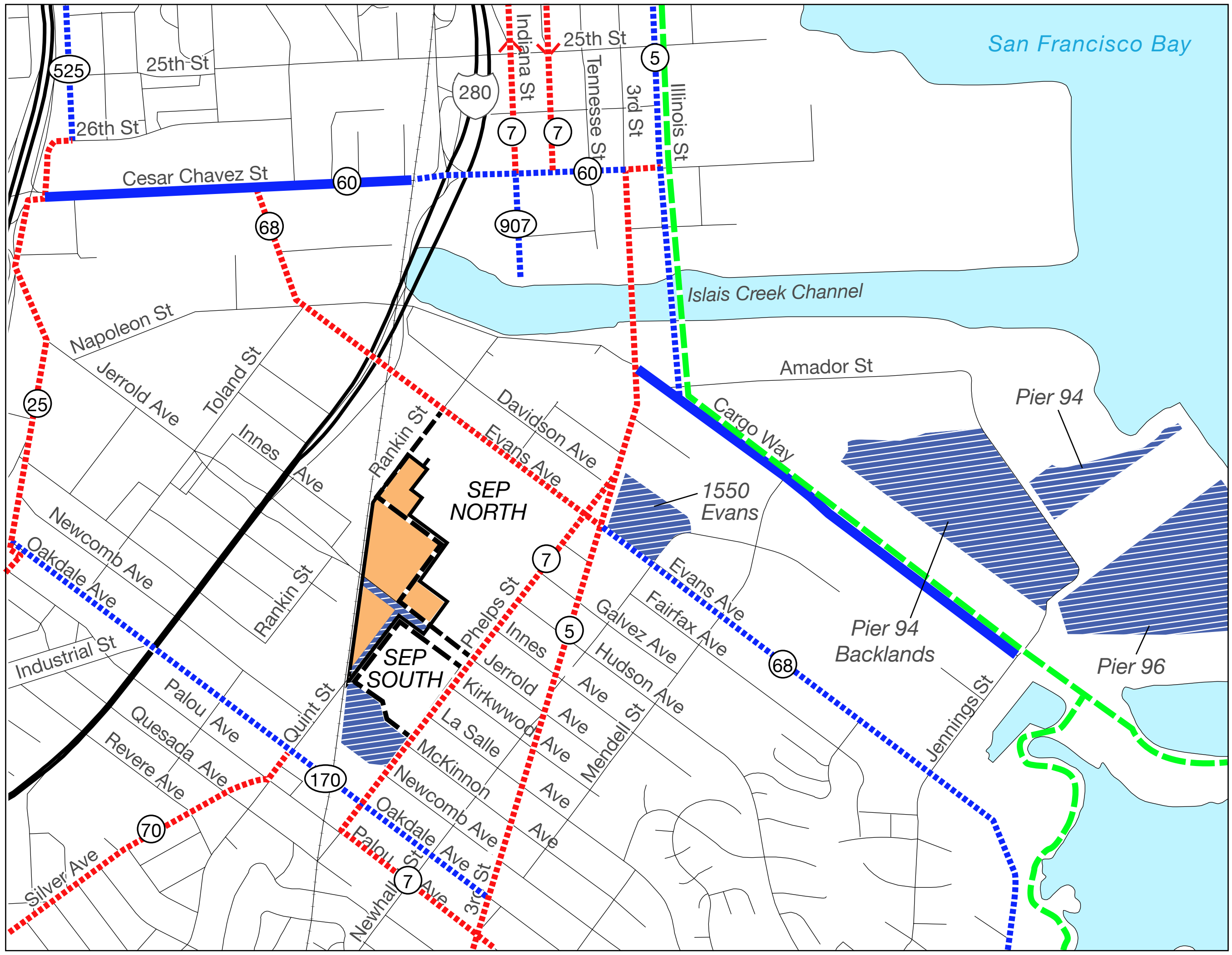
6 Bicycle facilities are defined by the State of California in California Streets and Highway Code Section 890.4.
7 Rufus Graphics, *San Francisco Bike Map & Walking Guide, 14th Edition, 2014*. Available online at https://www.sfbike.org/wp-content/uploads/2014/03/SF_Bike_Map_and_Walking_Guide_2014.pdf.



SFPUC Southeast Plant (SEP) Boundary

Project Site (Limited work at SEP North is also proposed to integrate liquid treatment facilities with BDFP facilities. In addition, street improvements would occur along Jerrold Avenue west of Phelps Street))

Potential Construction Staging Areas (Staging may also occur within the existing SEP boundary)

Class II (Bicycle Lane)

Class III (Shared Travel Lane)

Class IV (Separated Bicycle Lane)

San Francisco Bay Trail

7 Bicycle Route Number

0 2000 Feet

SOURCE: San Francisco Municipal Transportation Agency, San Francisco Bike Map and Walking Guide, 14th Edition, 2014, LCW Consulting, data developed in 2016 for BDFP

SFPUC Biosolids Digester Facilities

Figure 4.6-2
Bicycle Routes in Project Site Vicinity

- Bicycle Route 7 is a Class III bike route that runs between Mariposa Street and Carroll Avenue, via Indiana Street, Minnesota Street, Third Street, Phelps Street (along the east edge of the SEP), Palou Avenue, and Keith Street.

- Bicycle Route 25 runs between the southeastern part of San Francisco and the Marina District. It extends along San Bruno Avenue and Bayshore Boulevard in the Bayview-Hunters Point area. Approximately one mile south of the project site, Bicycle Route 25 runs along Bayshore Boulevard primarily as a Class IV facility. North of Oakdale Avenue, Bicycle Route 25 runs as both a Class II facility (e.g., along Potrero Avenue, Harrison Street, and 11th Street) and a Class III facility (e.g., along 10th Street, Loomis Street, Barneveld Avenue, and Jerrold Avenue).

- Bicycle Route 60 runs east-west between the Great Highway and Illinois Street. In the vicinity of the project site (approximately one mile away), Bicycle Route 60 is a Class II facility along Cesar Chavez Street between the Caltrain tracks and Third Streets, and a Class III facility between Third and Illinois Streets. Between Kansas and Mississippi Streets, a buffered bicycle lane (Class IV facility) is provided; the bicycle lane is painted green and safety bollards are located between the bicycle lane and the adjacent mixed-flow travel lanes.

- Bicycle Route 68 runs between the Innes Avenue north gate of the Hunters Point Shipyard and the intersection of Evans Avenue/Cesar Chavez Street via Innes Avenue, Hunters Point Boulevard, and Evans Avenue. On Evans Avenue between Cesar Chavez and Third Streets, along the north edge of the SEP, this route is a Class III facility. On Evans Avenue/Hunters Point Boulevard between Third Street and Innes Avenue, it becomes a Class II facility with dedicated bicycle lanes on both sides of the street, and on Innes Avenue between Hunters Point Boulevard and the Hunters Point Shipyard gate, this route is a Class III facility.

- Connector Route 170 runs along Oakdale Avenue between Third Street and Bayshore Boulevard and is a Class II facility with bicycle lanes on both sides of the street.

- Connector Route 907 is a two-block Class II facility along Indiana Street between Cesar Chavez Street (Bicycle Route 60) and Tulare Street.

In addition to these designated routes, there is a Class IV bicycle facility on Cargo Way between Jennings and Third Streets. It is a two-way facility, separated from the adjacent travel lane with a raised curb and fence, and is part of the San Francisco Bay Trail.

Figure 4.6-2 also shows the San Francisco Bay Trail in the project vicinity. The San Francisco Bay Trail is designed to create recreational pathway links to the various commercial, industrial, and residential neighborhoods that surround San Francisco Bay. In addition, the trail connects points of historic, natural, and cultural interest, and recreational areas such as beaches, marinas, fishing piers, boat launches, and numerous parks and wildlife preserves. At various locations, the Bay Trail consists of paved multi-use paths, dirt trails, bike lanes, sidewalks, or City streets signed as bicycle routes. In the vicinity of Piers 94 and 96, the Bay Trail path follows the shoreline of San Francisco Bay and runs east-west on Cargo Way and north on Illinois Street.

Bicycle Parking

There are no on-street bicycle parking racks (i.e., Class 2 bicycle parking spaces[8]) on streets adjacent to the project site or the off-site staging areas, and there are no Bay Area Bike Share stations in the vicinity. However, there currently are five bicycle racks and three bike lockers within the SEP, providing 30 bike spaces. In addition, there are about 27 bicycles for employee travel within the SEP.

Existing Bicycle Traffic

During field surveys conducted on May 27, 2015, between 20 and 30 bicyclists were observed at the intersections of Phelps Street/Jerrold Avenue and Phelps Street/Oakdale Avenue during the a.m. and p.m. peak hours, with a greater number during the p.m. peak hour (see Appendix TR). **Table 4.6-6** summarizes bicycle volumes by approach for the a.m. and p.m. peak hours. The predominant direction of bicycle travel is north-south at the intersection of Phelps Street/Jerrold Avenue (Bicycle Route 7 on Phelps Street), and east-west at the intersection of Phelps Street/Oakdale Avenue (Connector Route 170 on Oakdale Avenue). No substantial safety or right-of-way conflicts between bicycles, pedestrians, or vehicles were observed in the vicinity of the project site.

TABLE 4.6-6
AM AND PM PEAK HOUR BICYCLE VOLUMES

	Intersection Approach				
Intersection/Peak Hour	**Northbound**	**Southbound**	**Eastbound**	**Westbound**	**Total**
Phelps Street/Jerrold Avenue					
AM Peak Hour	5	5	7	1	18
PM Peak Hour	9	8	5	4	26
Phelps Street/Oakdale Avenue					
AM Peak Hour	1	1	14	5	21
PM Peak Hour	2	2	13	14	31

NOTE: Bicycle volume counts conducted on May 27, 2015, for the 6:00 a.m. to 9:00 a.m. and 3:00 p.m. to 6:00 p.m. peak periods. Bicycle volumes presented for the peak hour of the peak period.

SOURCE: Adavant Consulting/LCW Consulting Data Collection, May 2015, presented in Appendix TR.

4.6.1.4 Pedestrian Circulation

A qualitative evaluation of existing pedestrian circulation conditions was conducted during field visits to the project site in March and April 2016 (see Appendix TR). Adjacent to the SEP, sidewalks are provided on Evans Avenue, Jerrold Avenue, and Phelps Street and range in width between 8 and 15 feet. The fence surrounding the SEP facilities is set back from the sidewalk along Phelps Street and Evans Avenue, providing an additional 30 to 50 feet of landscaped buffer. In the vicinity of Rankin

8 In San Francisco, Class 2 bicycle parking refers to short-term bicycle parking, such as sidewalk bicycle racks and on-street bicycle corrals (SFMTA, *Bicycle Parking: Standards, Guidelines, Recommendations*, updated December 3, 2015).

Street, the sidewalk adjacent to the site is discontinuous at the location of the rail tracks. There are no sidewalks on Rankin Street south of Evans Avenue.

Quint Street sidewalks are discontinuous, and at-grade rail tracks intersect Quint Street north of Newcomb Avenue. Quint Street has been permanently closed to vehicular and pedestrian traffic between the Caltrain tracks and Jerrold Avenue as part of the Caltrain Quint Street Bridge Replacement Project. The sidewalks adjacent to the SEP on Evans Avenue, Phelps Street, and Jerrold Avenue currently meet the minimum requirements of the *San Francisco Better Streets Plan*, which specifies a minimum sidewalk width of 8 feet and a recommended width of 10 feet for industrial streets.[9] In the vicinity of Piers 94 and 96, an 8-foot-wide sidewalk is provided on the north side of Cargo Way, and the sidewalk is discontinuous at a few locations to accommodate the adjacent rail tracks. There are no sidewalks on Amador Street.

Most intersections along arterial streets such as Bayshore Boulevard, Cesar Chavez Street, Evans Avenue, and Third Street are signalized, and crosswalks and pedestrian signals are generally provided. Remaining intersections are either two-way or all-way stop-sign controlled, and pedestrian crosswalks are generally not provided.

In the vicinity of the project site, pedestrian volumes are very low throughout the day. **Table 4.6-7** presents the number of pedestrians crossing at the crosswalks at the intersections of Phelps Street/Jerrold Avenue and Phelps Street/Oakdale Avenue during the a.m. and p.m. peak hours. At the intersection of Phelps Street/Jerrold Avenue, the total number crossing all four crosswalks during the a.m. and p.m. peak hours was about 30 pedestrians, most of whom were probably workers traveling between the SEP and the 23 Monterey bus stop at Jerrold Avenue/Phelps Street or the T Third light rail stops at Third Street (i.e., at Innes Avenue in the southbound direction and at Kirkwood Avenue in the northbound direction). Along Third Street to the east, pedestrian volumes are higher than on streets adjacent to the project site and SEP, due primarily to the transit stops for the T Third light rail line. Regarding the Piers 94 and 96 and 1550 Evans Avenue staging areas, pedestrian volumes are very low in the vicinity of Piers 94 and 96, and higher on Evans Avenue, due to the institutional land uses to the east (e.g., City College, U.S. Post Office), the T Third light rail stop at the intersection of Third Street/Evans Avenue, and the 19 Polk bus stop at the intersection of Evans Avenue/Newhall Street. During field surveys, no conflicts between pedestrians and vehicles, buses, or bicycles were observed at the intersections adjacent to the project site.

4.6.1.5 Freight Rail

A freight rail spur known as the Quint Street Lead runs at street level parallel to the Caltrain mainline alignment, crossing Jerrold Avenue at grade and continuing on Rankin Street along the western edge of the SEP until it crosses Evans Avenue at grade (refer to Figure 2-2 in Chapter 2, *Project Description*). It is approximately one mile long and connects the Peninsula rail corridor with the Port of San Francisco cargo terminals and rail yards at Piers 80, 92, 94, and 96; it is the only rail

[9] San Francisco Planning Department, *San Francisco Better Streets Plan*, 2010. Available online at www.sf-planning.org/ftp/BetterStreets/proposals.htm#Final_Plan.

TABLE 4.6-7
AM AND PM PEAK HOUR PEDESTRIAN VOLUMES

Intersection/Peak Hour	Intersection Leg				
	North	South	East	West	Total
Phelps Street/Jerrold Avenue					
AM Peak Hour	4	9	9	9	31
PM Peak Hour	5	8	8	13	34
Phelps Street/Oakdale Avenue					
AM Peak Hour	14	13	42	28	97
PM Peak Hour	27	25	23	44	119

NOTE: Pedestrian volume counts conducted on May 27, 2015, for the 6:00 a.m. to 9:00 a.m. and 3:00 p.m. to 6:00 p.m. peak periods. Pedestrian volumes presented for the peak hour of the peak period.

SOURCE: Adavant Consulting/LCW Consulting Data Collection, May 2015, presented in Appendix TR.

line servicing the Port of San Francisco. The Quint Street Lead is jointly owned by Burlington Northern Santa Fe (BNSF) Railway and Union Pacific Railroad and is used intermittently on weekdays to carry bulk materials.

4.6.1.6 Emergency Vehicle Access

Emergency vehicles could have access to the SEP from all five vehicular entrances, as well as the pedestrian entrance on Phelps Street. The SEP has frontages on Rankin Street, Evans Avenue, Phelps Street, Jerrold Avenue, and Quint Street. Vehicular access to the SEP is provided on Rankin Street (east side), Jerrold Avenue (two entrances on the north side and one on the south side), and Quint Street (east side). Pedestrian-only access is provided on Phelps Street through the main office building. As described above, SEP staff and City vehicles parking inside the SEP use the vehicle entrances on the north side of Jerrold Avenue. Trucks delivering various chemical products (bisulfite, hypochlorite, and oxygen) to the SEP, as well as trucks removing grit, screenings, trash, recycle, and compost, also use the vehicle entrance on the north side of Jerrold Avenue. The Rankin Street access is used as an exit on an as-needed basis by trucks carrying grit to the landfill. Trucks delivering ferric chloride and polymer to the SEP use the vehicle entrance on the south side of Jerrold Avenue, while trucks removing yellow grease and recycled water use the Quint Street entrance. Trucks carrying biosolids from the SEP use both the Quint Street access point (for inbound vehicles) and the access point on the south side of Jerrold Avenue (for outbound vehicles).

The two fire stations nearest to the project site are Station 9 located at 2245 Jerrold Avenue between Napoleon and Upton Streets (about 0.6 mile southwest of the project site) and Station 49 located at 1415 Evans Avenue at Mendell Street (about 0.4 mile southeast of the project site). In addition, Station 25 is located at 3305 Third Street north of Cargo Way (about 0.6 mile northeast of the project site), and Station 17 is located at 1295 Shafter Street at Ingalls Street (about 1.0 mile southeast of the project site).

4.6.1.7 Parking and Loading Conditions

The existing parking conditions in the vicinity of the project site were assessed qualitatively and quantitatively. On-street parking is generally provided on most streets in the project site vicinity and parking is unrestricted, except for street cleaning, with no maximum parking limits. The exception is Jerrold Avenue, where on-street parking between Quint and Phelps Streets is limited to an eight-hour period on weekdays between 7:00 a.m. and 6:00 p.m.

On-street parking supply and occupancy surveys were conducted on Thursday, June 4, 2015, for the area bounded by Davidson Avenue (one block north of Evans Avenue), Newhall Street, LaSalle Street, and Rankin Street. **Table 4.6-8** summarizes on-street parking supply and occupancy, with information provided separately for two segments of Jerrold Avenue (i.e., between Rankin and Phelps Streets, and between Phelps and Third Streets) and for the remainder of the study area.

TABLE 4.6-8
ON-STREET PARKING SUPPLY AND OCCUPANCY

Supply/Occupancy		Jerrold Avenue, Rankin Street to Phelps Street	Jerrold Avenue, Phelps Street to Third Street	Rest of Study Area	Total for Study Area[a]
Supply		104	87	1,119	1,310
Occupied Spaces					
AM Period	6:00 a.m.	36	35	396	467
	7:00 a.m.	63	55	476	594
	8:00 a.m.	62	51	516	629
PM Period	3:00 p.m.	60	65	645	770
	4:00 p.m.	9	68	589	666
	5:00 p.m.	5	48	486	539
Percent Occupied					
AM Period	6:00 a.m.	35%	40%	35%	36%
	7:00 a.m.	61%	63%	43%	45%
	8:00 a.m.	60%	59%	46%	48%
PM Period	3:00 p.m.	58%	75%	58%	59%
	4:00 p.m.	9%	78%	53%	51%
	5:00 p.m.	5%	55%	43%	41%

NOTE:
[a] The parking study area is bounded by Davidson Avenue, Newhall Street, LaSalle Avenue, and Rankin Street.

SOURCE: Adavant Consulting/LCW Consulting Data Collection, June 2015.

The streets within the parking study area contain about 1,300 on-street parking spaces, of which 630 were occupied at 8:00 a.m. (48 percent occupied), 770 spaces were occupied at 3:00 p.m. (59 percent occupied), and 540 spaces were occupied at 5:00 p.m. (41 percent occupied). On Jerrold Avenue between Rankin and Phelps Streets, there are 104 on-street parking spaces, of which approximately 42 are angled parking spaces on the north side of the street. During field surveys, 62 spaces were occupied at 8:00 a.m. (60 percent occupied), 60 spaces were occupied at 3:00 p.m. (58 percent occupied), and 5 spaces were occupied at 5:00 p.m. (5 percent occupied). West of Phelps

Street, on-street parking is generally used by employees of the San Francisco Wholesale Produce Market, the SEP, and other light industrial uses, while east of Phelps Street the on-street parking serves the residential and commercial uses east of Phelps Street.

There are no off-street public parking facilities within the parking study area. There are multiple off-street private surface parking lots serving the primarily light industrial and manufacturing uses in the parking study area. The SEP contains multiple areas for vehicle parking, with approximately 150 parking spaces designated for use by SEP vehicles, other SFPUC vehicles, and City vehicles.

There are no on-street commercial loading spaces or passenger loading/unloading zones adjacent to the project site or off-site staging areas. Commercial loading and unloading activities in the project vicinity generally occur within the business sites.

4.6.2 Regulatory Framework

4.6.2.1 Federal Regulations

There are no federal regulations that address transportation impacts associated with the project.

4.6.2.2 State Regulations

Caltrans Responsibilities

The California Department of Transportation (Caltrans) manages interregional transportation, including management and construction of the California highway system. In addition, Caltrans is responsible for permitting and regulating the use of state roadways. Caltrans facilities that are likely to be used by construction workers and construction vehicles as access routes to the proposed worksites include I-280 and I-80.

Caltrans construction practices require temporary traffic control planning "during any time the normal function of a roadway is suspended."[10] Caltrans also requires that permits be obtained for transportation of oversized loads and transportation of certain materials, and for construction-related traffic disturbance. BDFP-related construction and maintenance vehicles would use state roadways solely as access routes for construction workers, and project construction would not occur on state highways or highway rights-of-way; therefore, Caltrans encroachment permits would not be required. The SFPUC or its contractor would acquire permits from Caltrans to allow oversized vehicles (by weight, height, length, or width) needed to transfer certain construction equipment (e.g., cranes) to the project site via state highways**.**

Public Resources Code Section 21099(b)(1) (Senate Bill 743)

Changes to the California Environmental Quality Act (CEQA) contained in Public Resources Code (Section 21099(b)(1)) require that the State Office of Planning and Research (OPR) develop revisions to the CEQA Guidelines establishing criteria for determining the significance of transportation

[10] Caltrans, *California Manual on Uniform Traffic Control Devices*, amended January 13, 2012.

impacts of projects that "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." Public Resources Code Section 21099(b)(2) states that upon certification of the revised guidelines for determining transportation impacts, automobile delay, as described solely by level of service (LOS) or similar measures of vehicular capacity or traffic congestion, shall not be considered a significant impact on the environment under CEQA.

In January 2016, OPR published for public review and comment a Revised Proposal on Updates to the CEQA Guidelines on Evaluating Transportation Impacts in CEQA, recommending that transportation impacts for projects be measured using a VMT metric, as described above.[11] On March 3, 2016, based on compelling evidence in that document and on the City's independent review of the literature on LOS and VMT, the San Francisco Planning Commission adopted OPR's recommendation to use the VMT metric instead of automobile delay to evaluate the transportation impacts of projects (Resolution 19579), as described under *Transportation Sustainability Program* below. (Note: The VMT metric does not apply to the analysis of impacts on non-automobile modes of travel such as riding transit, walking, and bicycling.)

4.6.2.3 Regional Regulations and Plans

San Francisco Bay Trail Plan

The Association of Bay Area Governments (ABAG) administers the San Francisco Bay Trail Plan. The Bay Trail is a multi-purpose recreational trail that, when complete, would encircle San Francisco Bay and San Pablo Bay with a continuous 500-mile network of bicycling and hiking trails. To date, 341 miles of the alignment have been completed. The 2005 Gap Analysis Study, prepared by ABAG for the entire Bay Trail area, attempted to identify the remaining gaps in the Bay Trail system; classify the gaps by phase, county, and benefit ranking; develop cost estimates for individual gap completion; identify strategies and actions to overcome gaps; and present an overall cost and timeframe for completion of the Bay Trail system.[12]

Water Emergency Transportation Authority's Water Transportation System Management Plan

The Water Emergency Transportation Authority (WETA) is a regional agency authorized by the state to operate a comprehensive San Francisco Bay Area public water transit system. In 2009, the WETA adopted the Emergency Water Transportation System Management Plan, which complements and reinforces other transportation emergency plans that will enable the Bay Area to restore mobility after a regional disaster.

11 OPR, *Revised Proposal on Updates to the CEQA Guidelines on Evaluating Transportation Impacts in CEQA, Implementing Senate Bill 743 (Steinberg, 2013)*, January 20, 2016.

12 Alta Planning +Design, Inc., Questa Engineering, Inc., GreenInfo Network, *The San Francisco Bay Trail Project Gap Analysis Study: A Report on Closing the Gaps in the 500-Mile Regional Trail System Encircling San Francisco Bay*. August 2005.

4.6.2.4 Local Regulations and Plans

San Francisco General Plan

The Transportation Element of the *San Francisco General Plan* contains objectives and policies that relate to eight aspects of the citywide transportation system: general regional transportation, congestion management, vehicle circulation, transit, pedestrians, bicycles, citywide parking, and goods management.[13] The Transportation Element references the City's Transit-First Policy in its introduction and contains objectives and policies that are pertinent to travel in the project area.

Transit-First Policy

In 1998, the San Francisco voters amended the City Charter (Charter Article 8A, Section 8A.115) to include a Transit-First Policy, which was first articulated as a City priority policy by the Board of Supervisors in 1973. The Transit-First Policy is a set of principles that underscore the City's commitment that travel by transit, bicycle, and foot be given priority over the private automobile. These principles are embodied in the policies and objectives of the Transportation Element of the *San Francisco General Plan*. All City boards, commissions, and departments are required, by law, to implement transit-first principles in conducting City affairs.

San Francisco Public Works Code

Under Public Works Code Article 2.4, San Francisco Public Works (SFPW) regulates work involving excavations in City streets. The City coordinates all street activities through the SFMTA's Interdepartmental Staff Committee on Traffic and Transportation (ISCOTT), which includes representatives from SFPW, the SFMTA, the San Francisco Fire Department, the San Francisco Planning Department, the San Francisco Police Department, the Port of San Francisco, and the San Francisco Department of Public Health. The SFPUC, as part of its adopted Standard Construction Measures, would abide by the SFMTA's *Regulations for Working in San Francisco Streets* (Blue Book)[14] and coordinate its construction work through the Committee for Utility Liaison on Construction and Other Projects of SFPW and ISCOTT.[15] The Blue Book regulations generally pertain to permits required to work in City streets, work performed in streets with special restrictions, lane closure requirements, parking removal, sidewalk closures, construction zone standards, transit operations, school zones, bicycle routes, use of police officers, detectors in City streets, and emergency procedures.

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[13] CCSF, *San Francisco General Plan, Transportation Element*, Adopted July 1995. Available online at http://www.sf-planning.org/ftp/General_Plan/I4_Transportation.htm. Accessed on February 11, 2015.

[14] SFMTA, *Regulations for Working in San Francisco Streets, 8th Edition*, January 2012. Available online at http://www.sfmta.com/sites/default/files/pdfs/BlueBook8thEd_Accessible.pdf.

[15] In general, travel lane and sidewalk closures are subject to review and approval by the SFMTA's Transportation Advisory Staff Committee (TASC) for permanent travel lane and sidewalk closures, and the ISCOTT for temporary sidewalk and travel lane closures (e.g., special events, construction activities). Both TASC and ISCOTT are interdepartmental committees that include representatives from SFPW, the SFMTA, the San Francisco Police Department, the San Francisco Fire Department, the San Francisco Planning Department, the San Francisco Department of Public Health, and the Port of San Francisco.

San Francisco Bicycle Plan

The *San Francisco Bicycle Plan* describes a City program to provide the safe and attractive environment needed to promote bicycling as a transportation mode.[16] The *San Francisco Bicycle Plan* identifies the citywide bicycle route network, and establishes the level of treatment (i.e., Class I, Class II, Class III or Class IV facility) on each route. The *San Francisco Bicycle Plan* also identifies near-term improvements, many of which have been implemented, to address deficiencies in the bicycle route network, as well as policy goals, objectives, and actions to support these improvements. It also includes long-term improvements to address gaps in the bicycle route network, and minor improvements that would be implemented to facilitate bicycling in San Francisco.

Better Streets Plan

The *San Francisco Better Streets Plan* (Better Streets Plan) focuses on creating a positive pedestrian environment through measures such as careful streetscape design and traffic calming measures to increase pedestrian safety. The Better Streets Plan includes guidelines for the pedestrian environment, which it defines as the areas of the street where people walk, sit, shop, play, or interact. Generally speaking, the guidelines are for design of sidewalks and crosswalks; in some cases, however, the Better Streets Plan includes guidelines for certain areas of the roadway, particularly at intersections.

Transportation Sustainability Program

The Transportation Sustainability Program is an initiative aimed at improving and expanding the transportation system to help accommodate new growth, and create a policy framework for private development to contribute to minimizing its impact on the transportation system, including helping to pay for the system's enhancement and expansion. The Transportation Sustainability Program is a joint effort by the Mayor's Office, the San Francisco Planning Department, the SFMTA, and the SFCTA, comprised of the following three objectives:

- **Fund Transportation Improvements to Support Growth**—The Transportation Sustainability Fee is assessed on new development, including residential development, to help fund improvements to transit capacity and reliability as well as bicycle and pedestrian improvements. The Transportation Sustainability Fee was passed by the Board of Supervisors and signed into law by the Mayor on November 25, 2015 (Board of Supervisors File No. 150790). The new Transportation Sustainability Fee replaces the Transit Impact Development Fee that was levied on most new non-residential development citywide to offset new development's impacts on the transit system.
- **Modernize Environmental Review**—This component of the Transportation Sustainability Program changes how the City analyzes impacts of new development on the transportation system under CEQA. This reform has been helped by California Senate Bill 743, which requires that the existing transportation review standard, which focuses on automobile delay (vehicular level of service), be replaced with VMT. VMT is a measure of the amount and distance that a project causes potential residents, tenants, employees, and visitors of a project to drive; it includes the number of passengers within a vehicle. Resolution 19579 regarding this reform was adopted at the Planning Commission hearing on March 3, 2016.

[16] SFMTA, *San Francisco Bicycle Plan*, June 2009.

- **Encourage Sustainable Travel**—This component of the Transportation Sustainability Program would help manage demand on the transportation network through a Transportation Demand Management (TDM) program, making sure new developments are designed to make it easier for new residents, tenants, employees, and visitors to get around by sustainable travel modes such as transit, walking, and biking. Each measure that would be included in the TDM program is intended to reduce VMT traveled from new development. On February 7, 2017, the Board of Supervisors approved legislation for the TDM Ordinance, and the BDFP would be subject to its requirements.

San Francisco Public Utilities Commission Standard Construction Measures

The SFPUC would implement standard construction measures for the BDFP (described in **Appendix SCM**), including the following measure applicable to traffic:

- 4. TRAFFIC: All projects will implement traffic control measures sufficient to maintain traffic and pedestrian circulation on streets affected by construction of the project. Traffic control measures may include, but not be limited to, flaggers and/or construction warning signage of work ahead; scheduling truck trips during non-peak hours to the extent feasible; maintaining access to driveways, private roads, and off-street commercial loading facilities by using steel trench plates or other such method; and coordination with local emergency responders to maintain emergency access. For projects in San Francisco, the measures will also, at a minimum, be consistent with the requirements of San Francisco Municipal Transportation Agency (SFMTA)'s Blue Book. Any temporary rerouting of transit vehicles or relocation of transit facilities would be coordinated with the applicable transit agency, such as SFMTA Muni Operations in San Francisco. All Projects will obtain encroachment permits from the applicable jurisdiction for work in public roadways.

Section 2.6.1.3 in Chapter 2, *Project Description*, summarizes the contents of the Traffic Control Plan that the SFPUC would prepare for the BDFP.

4.6.3 Impacts and Mitigation Measures

4.6.3.1 Significance Criteria

The project would have a significant impact related to transportation and circulation if the project were to:

- Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit, non-motorized travel, and relevant components of the circulation system (including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit);
- Conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;
- Result in a change in air traffic patterns, including either an increase in traffic levels, obstructions to flight, or a change in location, that results in substantial safety risks;
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);

- Result in inadequate emergency access; or
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

Due to the nature of the project, there would be no impact related to the following topics for the reasons described below:

- ***Result in a Change in Air Traffic Patterns.*** Due to the nature and scope of the BDFP, implementation of the project would not have the potential to change air traffic patterns. In addition, the project would not involve the installation of structures that could interfere with air space. Therefore, this significance criterion is not discussed further in this environmental impact report (EIR).
- ***Conflict with an Applicable Congestion Management Program.*** A congestion management program that establishes measures of effectiveness for the performance of the vehicular circulation system (i.e., roadways and highways) is intended to address potential long-term and permanent project effects on the circulation system. Due to the nature of the BDFP (replacement of the outdated existing solids treatment facilities with more reliable, efficient, modern technologies and facilities), the project would not permanently affect any roadways or highways included in the San Francisco Congestion Management Program. Therefore, this significance criterion is not discussed further in this EIR.

As noted above, the San Francisco Planning Commission adopted OPR's recommendation to use the VMT metric instead of automobile delay to evaluate the transportation impacts of projects (Resolution 19579). Therefore, intersection LOS and vehicle delay are not discussed in this EIR.

As part of implementing CEQA requirements within San Francisco, the City has established additional significance criteria, organized by mode of travel to facilitate analysis. The City's criteria are similar to those in Appendix G of the CEQA Guidelines as listed above, except for the criteria related to traffic hazards and VMT as described above. The City's criteria are as follows:

- The project would have a significant adverse impact if it would cause major traffic hazards.
- The project would have a significant effect on the environment if it would cause substantial additional vehicle miles traveled.
- The project would have a significant effect on the environment if it would substantially induce additional automobile travel by increasing physical roadway capacity in congested areas (i.e., by adding new mixed-flow travel lanes) or by adding new roadways to the network.
- The project would have a significant effect on the environment if it would cause a substantial increase in transit demand that could not be accommodated by adjacent transit capacity, resulting in unacceptable levels of transit service, or cause a substantial increase in delays or operating costs such that significant adverse impacts in transit service levels could result. With the Muni and regional transit screenlines[17] analyses, the project would have a significant effect on the transit provider if project-related transit trips would cause the capacity utilization standard to be exceeded during the evening peak hour.

[17] Screenlines are identified corridors served by a grouping of transit lines.

- The project would have a significant effect on the environment if it would result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to the site and adjoining areas.
- The project would have a significant effect on the environment if it would create potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility to the site and adjoining areas.
- The project would have a significant effect on the environment if it would result in a loading demand during the peak hour for loading activities that could not be accommodated within proposed on-site loading facilities or within convenient on-street loading zones, and would create potentially hazardous conditions or significant delays affecting traffic, transit, bicycles, or pedestrians.
- The project would have a significant effect on the environment if it would result in inadequate emergency access.
- The project would have a significant effect on the environment if it would result in a substantial parking deficit that could create hazardous conditions or significant delays affecting traffic, transit, bicycles or pedestrians and where particular characteristics of the project or its site demonstrably render use of other modes infeasible.
- Construction of the project would have a significant effect on the environment if, in consideration of the project site location and other relevant project characteristics, the temporary construction activities' duration and magnitude would result in substantial interference with pedestrian, bicycle, or vehicle circulation and accessibility to adjoining areas, thereby resulting in potentially hazardous conditions.

As described above in Section 4.6.1.7, there are no on-street commercial loading spaces or passenger loading/unloading zones that would be affected by either project construction or operations. Therefore, the significance criterion related to loading conditions is not discussed further in this EIR.

4.6.3.2 Approach to Analysis and Travel Demand Assumptions

Construction Impacts

As indicated in the significance criteria above, construction-related transportation impacts are not generally considered significant, because the impacts are temporary in duration and limited in scope. Nevertheless, the analysis considers the potential short-term effects of BDFP construction—including those on traffic hazards, transit, pedestrian facilities, bicycle facilities, freight rail facilities, parking, and emergency vehicle access. The potential effects of construction on existing plant operations (e.g., changes to vehicular entrances, delivery truck rerouting, etc.) are also considered in the analysis.

The construction-related information used for the analysis is based on current project specifications, including construction durations. Construction of the project elements would generate vehicle traffic (i.e., construction workers' vehicles, equipment, and trucks) traveling to and from the worksites and staging areas on area roads. All project elements would generate daily commute trips by construction workers. Truck traffic would include vehicle trips to deliver materials/equipment to the site and to haul excavated materials, building debris from demolition, trees, and other vegetation away from the site.

Operational Impacts

The analysis also considers the potential long-term effects of project operations and maintenance activities, including effects on VMT, transit, pedestrian facilities, bicycle facilities, freight rail facilities, parking, and emergency vehicle access.

Cumulative Impacts

Section 4.1.3, Approach to Cumulative Impact Analysis and Cumulative Projects, describes the overall approach to the cumulative analysis for those topics using a list-based approach and summarizes reasonably foreseeable future projects in the vicinity of the project that could contribute to a cumulative impact; please refer to Section 4.1, Table 4.1-1 and Figure 4.1-1 for a description and location of potential cumulative projects in the vicinity of the BDFP. The cumulative analysis for transportation and circulation analyzes the effects of the project in combination with other past, present, and probable future projects in the immediate vicinity. Cumulative construction and operations impacts are analyzed separately because construction of the BDFP would temporarily close a segment of Jerrold Avenue, thereby affecting the various travel modes. The cumulative impact analysis assumes that construction and operations of other projects in the geographical area, listed in Table 4.1-1, would be required to comply with the same regulatory requirements as the project, which would serve to avoid and reduce many impacts to less-than-significant levels on a project-by-project basis. The analysis then considers whether or not there would be a significant, adverse cumulative impact associated with project implementation in combination with past, present, and probable future projects in the geographical area, and if so, whether or not the project's incremental contribution to the cumulative impact would be considerable. Both conditions must apply in order for a project's contribution to cumulative effects to be deemed cumulatively considerable (significant). If so, then mitigation measures are identified to reduce the project's contribution to the extent feasible.

Travel Demand Assumptions

The transportation impact assessments for construction-related, operational, and cumulative impacts were based on the temporary and permanent changes to the transportation circulation network that would occur under existing and cumulative conditions, as well as the additional travel demand generated by the construction and operations and maintenance activities. The methodology and results of estimating the travel demand associated with BDFP construction activities, as well as operations and maintenance activities, are detailed below.

Construction-Related Travel Demand

Construction-related travel demand was estimated on a daily basis and for the a.m. and p.m. peak hours. The a.m. peak hour was defined as the 60-minute period with the highest traffic volume between 6:00 a.m. and 9:00 a.m., while the p.m. peak hour was defined as the 60-minute period with the highest traffic volume between 3:00 p.m. and 6:00 p.m. These two periods are one hour longer than those generally used in the evaluation of transportation impacts (i.e., the a.m. peak period is typically from 7:00 a.m. to 9:00 a.m., and the p.m. peak period is generally from 4:00 p.m. to 6:00 p.m.). The longer peak periods were used to account for the expected earlier arrival and departure of construction workers.

Each of the project construction activities would generate various types of vehicle trips: construction workers traveling to and from the worksites, haul trucks associated with the transfer and disposal of excavated materials, haul trucks importing backfill materials, and delivery trucks bringing materials and equipment to the worksites. Construction activities are expected to generally occur on a single shift primarily during daytime hours (7:00 a.m. to 3:30 p.m.), five days a week, on normal (non-holiday) weekdays (Monday through Friday) and Saturdays and Sundays as needed during these same hours. For approximately one year (mid-2021 to mid-2022) of the approximately 60 months of project construction, and other times during critical functions, there could be two work shifts, from 7:00 a.m. to 3:30 p.m. and from 2:30 p.m. to 11:00 p.m. Monday through Saturday. (Work shifts are 8.5 hours long, and include one half hour for lunch.) Work after 8:00 p.m. would be limited to interior facility work (e.g., electrical work) and outside work that would not result in noise exceeding 5 dBA (A-weighted decibels) over ambient levels pursuant to the City's Noise Ordinance.

The number of construction-related trips would vary each day depending on the project component, construction phase, planned activity, and material needs. Two prototypical dates of analysis were selected based on the construction worker and truck data provided by the SFPUC (see Appendix TR): (1) a typical weekday in October 2018, representing a day when the maximum construction trucks trips are expected to occur (approximately 70 trucks per day, which would occur during the soil excavation and disposal phase for a period of about five months between August and December 2018, as well as 212 daily workers); and (2) a typical weekday in May 2022, representing a day when the maximum number of construction and project office workers (approximately 550 workers per day, which would occur during facilities construction for approximately one year, from mid-2021 to mid-2022) are expected to be present at the SEP. For purposes of the transportation analysis, the two scenarios assume a BDFP construction start date of February 2018, although the SFPUC has indicated that construction could start anytime between February and August 2018. If construction is initiated after February 2018, the maximum travel demand presented below would shift accordingly. The scenario with the maximum number of workers represents the most conservative conditions of person-trips and vehicle-trips generated by construction, while the maximum construction trucks scenario represents above-average vehicle trips on area roadways. **Table 4.6-9** summarizes the daily numbers of construction workers and trucks for the two peak construction months.

Once the number of construction workers was identified (212 daily workers in October 2018 and 550 daily workers in May 2022), the mode split analysis determined the portion of these trips that would be made via automobile, transit, or any other mode of transportation, based upon the expected origin/destination of the trips and the availability of various modes of travel.

Table 4.6-10 presents the weekday daily, a.m. peak hour, and p.m. peak hour person and vehicle trips associated with construction worker travel to and from the site. The trips were calculated using a daily trip generation rate of two person trips per worker, one inbound and one outbound. The a.m. and p.m. peak hour trip generation represents the number of construction workers arriving and departing during those periods. Worker trips to the construction site would occur prior to the a.m. peak traffic hour, but trips from the work sites would likely occur during the p.m. peak traffic hour. While one work shift has been assumed to estimate the project travel demand, a conservative assumption, it is possible that two work shifts could occur during the mid-2021 to mid-2022 period.

TABLE 4.6-9
BDFP DAILY CONSTRUCTION WORKER AND CONSTRUCTION TRUCKS FOR PEAK MONTHS

Peak Construction Months[a]	Daily Construction Workers	Daily Construction Trucks	Major Construction Phase
October 2018 (maximum construction trucks)[b]	212[c]	71	Site Preparation
May 2022 (maximum construction workers)	550[d]	28[e]	Foundations and Facilities Construction

NOTES:
BDFP = Biosolids Digester Facilities Project

[a] Other construction-period combinations are not expected to have a greater number of construction workers or construction trucks on a daily basis.
[b] This analysis assumes construction would begin in February 2018 and last until approximately January 2023. However, as noted in Chapter 2, *Project Description*, construction could start anytime between February and August 2018, causing the maximum construction truck trips and the maximum construction workers scenarios to shift accordingly.
[c] 90 project office staff workers plus 122 construction workers.
[d] 215 project office staff workers plus 335 construction workers.
[e] Although there would be more workers in this phase, there would be fewer truck trips as there would be fewer delivery and off-haul trips in this phase.

SOURCES: San Francisco Public Utilities Commission (SFPUC), spreadsheets entitled "Construction Trucks – Daily" and "Construction Workers and Shuttle Bus" in Appendix TR, August 26, 2016; Adavant Consulting/LCW Consulting analysis for BDFP.

TABLE 4.6-10
BDFP CONSTRUCTION WORKER TRIPS BY MODE FOR PEAK MONTHS[a]

Peak Construction Months and Mode of Travel	Daily Person Trips		AM Peak Hour Person Trips		PM Peak Hour Person Trips	
October 2018 (maximum construction trucks)						
Auto	338	80%	169	80%	169	80%
Transit and other modes	86	20%	43	20%	43	20%
Total construction worker person trips	424	**100%**	212	**100%**	212	**100%**
May 2022 (maximum construction workers)						
Auto	878	80%	439	80%	439	80%
Transit and other modes	222	20%	111	20%	111	20%
Total construction worker person trips	1,100	**100%**	550	**100%**	550	**100%**

NOTES:
BDFP = Biosolids Digester Facilities Project
Due to rounding, numbers in columns may not add to totals.

[a] The modal split for construction workers was obtained from the San Francisco Transportation Impact Analysis Guidelines, for work trips in Superdistrict 3, where the project is located, except that those identified within the "other" mode (i.e., trips by bicycle, walk, taxi, etc.,) were shifted to auto person trips to reflect the industrial character of the area and the expected hours of construction.

SOURCES: San Francisco Public Utilities Commission (SFPUC), spreadsheets entitled "Construction Trucks – Daily" and "Construction Workers and Shuttle Bus" in Appendix TR, August 26, 2016; Adavant Consulting/LCW Consulting analysis for BDFP.

The a.m. and p.m. peak hour trip rates are the same on those days when there is a single work shift, while the a.m. peak hour rate is lower than the p.m. peak hour rate on those days when there are two work shifts (evening shift workers arrive at the project site around 2:30 p.m. and are assumed to overlap with the morning workers departing around 3:30 p.m.).[18] The modal split and origin/destination trip distribution percentages for the construction workers were obtained from the San Francisco Transportation Impact Analysis Guidelines (SF Guidelines)[19] for work trips in Superdistrict 3 (SD3),[20] where the project is located, except that those identified within the "other" category person trips in the SF Guidelines (those occurring by bicycle, walk, taxi, etc.) were shifted to auto person trips to reflect the industrial character of the area and the expected hours of construction. In addition, it was assumed that a portion of the transit percentage could include trips by bicycle and walk modes.

Overall, approximately 80 percent of the construction worker trips are expected to occur by automobile and 20 percent by transit and other modes (i.e., bicycling and walking). Automobile occupancy rates were then developed based on information from the SF Guidelines,[21] to determine the average number of construction workers in a vehicle and thus determine the number of construction worker vehicles that would be traveling to and from the project site and adjacent construction staging areas. The SF Guidelines[22] were also used to determine the trip distribution patterns for the construction workers. About 51 percent of the construction workers are anticipated to be from San Francisco, about 30 percent from the South Bay, and the remaining 19 percent from the rest of the Bay Area.

The number of construction-related haul truck trips per day would vary depending on the type of construction technique, the volume of spoils and fill, and the pace of work. The highest number of construction trucks (71 daily trucks) would occur in October 2018, during the site preparation phase.

As shown in **Table 4.6-11**, the majority of construction truck travel would occur between the project site and the Altamont Landfill in Livermore, particularly in October 2018 when the largest number of construction trucks is expected to occur. Figure 2-15 in Chapter 2, *Project Description*, graphically presents the truck routes for construction trucks entering and leaving the project site.

[18] Construction project office staff would work a single shift (7:00 a.m. to 3:30 p.m.) in October 2018 and May 2022, while construction workers would work a single shift (7:00 a.m. to 3:30 p.m.) in October 2018 and could work one shift (7:00 a.m. to 3:30 p.m.) or two shifts (7:00 a.m. to 3:30 p.m. and 2:30 p.m. to 11:00 p.m.) in May 2022.

[19] San Francisco Planning Department, San Francisco Transportation Impact Analysis Guidelines (SF Guidelines), October 2002. Available online at http://sf-planning.org/sites/default/files/FileCenter/Documents/5370-SF%20 Transportation%20Impact%20Analysis%20Guidelines%20Oct%202002.pdf.

[20] Superdistricts are travel analysis zones established by the Metropolitan Transportation Commission (MTC). These Superdistricts provide geographic subareas for planning purposes in San Francisco; a map with the Superdistrict boundaries is included in Appendix TR.

[21] SF Guidelines, Appendix E - Table E-5 Work Trips to SD3 (All).

[22] Ibid.

TABLE 4.6-11
BDFP DAILY CONSTRUCTION TRUCK DELIVERIES HAULING TO/FROM PROJECT SITE

Type of Construction Truck Delivery or Haul Truck	Origin/Destination Location	October 2018 (maximum construction trucks)	May 2022 (maximum construction workers)
Concrete trucks	400 and 500 blocks of Amador Street in San Francisco	14	0
Dump trucks			
Contaminated excavated soil	Port facility at Cargo Way	12	2
Unsuitable excavated soil	Altamont Landfill in Livermore	37	6
Flatbed trucks			
Equipment deliveries to Piers 94/96	Various sites in Bay Area	2	5
Equipment deliveries to Southeast Greenhouses site	Various sites in Bay Area	2	5
Small delivery trucks[a]	From Piers 94/96 to construction site	4	10
	Total Daily Trucks	**71**	**28**

NOTES:
BDFP = Biosolids Digester Facilities Project
[a] Assumes two small delivery trucks for every flatbed truck delivering construction materials to Piers 94 and 96.

SOURCES: San Francisco Public Utilities Commission (SFPUC), spreadsheets entitled "Construction Trucks – Daily" and "Construction Workers and Shuttle Bus" in Appendix TR, August 26, 2016; Adavant Consulting/LCW Consulting analysis for BDFP.

The number of truck trips was estimated by multiplying the number of construction trucks by a factor of two, to account for one inbound and one outbound trip per vehicle. Since haul truck trips would be spread over the course of the day, the total number of daily truck trips was divided by eight hours to yield the average number of truck trips per hour. These trips were then split into inbound and outbound trips; **Table 4.6-12** summarizes these results.

As presented in Chapter 2, *Project Description*, project construction could include multiple locations for construction worker parking, including the Piers 94 and 96 staging areas, in combination with the 1550 Evans Avenue site or the Southeast Greenhouses site. When construction workers park at the Piers 94 and 96 staging areas, a worker shuttle bus service would be provided from the piers to the project site. The SFPUC has identified the main pedestrian entrance to the SEP North on Phelps Street as the location for the construction shuttle bus stop location. The shuttle would run from approximately one hour before and one hour after the project construction worker arrival and departure hours.

The project travel demand presented in the previous tables would not change based on the location of the staging areas, except under those scenarios that rely on the worker staging areas at Piers 94 and 96 (e.g., at the project site, Southeast Greenhouses, and Piers 94 and 96 under the maximum construction worker scenario). The trips generated by the worker shuttle bus service would then be added to the overall demand. In those instances, the worker shuttle bus service trips represent a minimal (less than 2 percent) increase in the number of project-generated vehicle trips.

TABLE 4.6-12
BDFP CONSTRUCTION VEHICLE TRIPS BY TYPE FOR PEAK MONTHS[a,b]

Peak Construction Months and Vehicles Trips	Daily Vehicle Trips		AM Peak Hour Vehicle Trips[c]		PM Peak Hour Vehicle Trips[c]	
October 2018 (maximum construction trucks)						
Inbound construction worker vehicle trips	132	50%	132	100%	0	0%
Outbound construction worker vehicle trips	132	50%	0	0%	132	100%
Total construction worker vehicle trips	264	**100%**	132	**100%**	132	**100%**
Inbound construction truck trips	71	50%	9	50%	9	50%
Outbound construction truck trips	71	50%	9	50%	9	50%
Total construction truck trips	142	**100%**	18	**100%**	18	**100%**
Total all construction vehicle trips – inbound	203	50%	141	94%	9	6%
Total all construction vehicle trips – outbound	203	50%	9	6%	141	94%
Total all construction vehicle trips[d]	406	**100%**	150	**100%**	150	**100%**
May 2022 (maximum construction workers)						
Inbound construction worker vehicle trips	343	50%	343	100%	0	0%
Outbound construction worker vehicle trips	343	50%	0	0%	343	100%
Total construction worker vehicle trips	686	**100%**	343	**100%**	343	**100%**
Inbound construction truck trips	28	50%	4	50%	4	50%
Outbound construction truck trips	28	50%	4	50%	4	50%
Total construction truck trips	56	**100%**	8	**100%**	8	**100%**
Total all construction vehicle trips – inbound	371	50%	347	99%	4	1%
Total all construction vehicle trips – outbound	371	50%	4	1%	347	99%
Total all construction vehicle trips[d]	742	**100%**	351	**100%**	351	**100%**

NOTES:
BDFP = Biosolids Digester Facilities Project

[a] Due to rounding, numbers in columns may not add to totals. Construction project office staff would work a single shift (7:00 a.m. to 3:30 p.m.) in October 2018 and May 2022, while construction workers would work a single shift (7:00 a.m. to 3:30 p.m.) in October 2018 and could work one shift (7:00 a.m. to 3:30 p.m.) or two shifts (7:00 a.m. to 3:30 p.m. and 2:30 p.m. to 11:00 p.m.) in May 2022.

[b] The number of construction worker vehicle trips has been calculated using an average vehicle occupancy of 1.28 passengers per vehicles, based on San Francisco Transportation Impact Analysis Guidelines (SF Guidelines) Appendix E - Table E-5 Work Trips to SD3 (All).

[c] It has been conservatively assumed that construction workers would arrive at the site during the AM peak hour and depart during the PM peak hour.

[d] Construction vehicle trips represent the sum of construction worker vehicle trips and construction truck trips.

SOURCES: San Francisco Public Utilities Commission (SFPUC), spreadsheets entitled “Construction Trucks – Daily” and “Construction Workers and Shuttle Bus” in Appendix TR, August 26, 2016; Adavant Consulting/LCW Consulting analysis for BDFP.

Table 4.6-13 summarizes the general allocation of construction worker auto trips to the site by parking location. The two construction worker staging scenarios include the Southeast Greenhouses and 1550 Evans Avenue sites used alone or in combination with the Piers 94 and 96 sites. Whenever possible due to capacity constraints, workers have been allocated to the staging location nearest to the construction site, since doing so would create the highest concentrated congested conditions and thus allow for a conservative, worst-case analysis.

**TABLE 4.6-13
BDFP DAILY CONSTRUCTION WORKER AUTO PERSON TRIPS
BY PARKING LOCATION FOR PEAK MONTHS**

Parking Staging Location	Construction Worker Auto Person Trips in October 2018 (maximum construction trucks)	Construction Worker Auto Person Trips in May 2022 (maximum construction workers)
Project Site, Southeast Greenhouses, and Piers 94/96		
Project Site	64	64
Southeast Greenhouses site	274	495
Piers 94/96[a]	0	319
Total daily construction worker auto person trips	**338**	**878**
Project Site, 1550 Evans Avenue, and Piers 94/96		
Project Site	64	64
1550 Evans Avenue	274	814
Piers 94/96[a]	0	0
Total daily construction worker auto person trips	**338**	**878**

NOTES:
BDFP = Biosolids Digester Facilities Project
Due to rounding, numbers in columns may not add to totals.

[a] Value is zero in those instances when construction worker parking demand can be fully accommodated on-site, at the 1550 Evans Avenue site, or the Southeast Greenhouses site.

SOURCES: San Francisco Public Utilities Commission (SFPUC), spreadsheets entitled "Construction Trucks – Daily" and "Construction Workers and Shuttle Bus" in Appendix TR, August 26, 2016; Adavant Consulting/LCW Consulting analysis for BDFP.

The potential off-site construction staging areas include portions of Piers 94 and 96, the Southeast Greenhouses site, and the 1550 Evans Avenue site. For traffic analysis purposes, it has been assumed that either the Southeast Greenhouses site or the 1550 Evans Avenue site would be used, in both cases supplemented with Piers 94 and 96, as needed, for construction materials storage and construction worker parking. As shown in Table 4.6-13, the Piers 94 and 96 site would not be necessary for construction worker parking in October 2018, due to the lower expected number of construction employees during that period, compared to June 2022. As also shown in Table 4.6-13, if the Piers 94 and 96 site was not available as an off-site location, the use of both the Southeast Greenhouses and 1550 Evans Avenue sites would also provide sufficient space to accommodate construction worker parking during the highest demand periods (e.g., May 2022).

Table 4.6-14 summarizes the weekday daily, a.m. peak hour, and p.m. peak hour construction vehicle trips, including trucks, by expected construction staging location. The number of truck trips is somewhat higher than those previously presented in Table 4.6-12 because the delivery truck trips traveling between the project site or the Southeast Greenhouses site and Piers 94 and 96 are also accounted for in these totals (see Table 4.6-12). The expected number of shuttle bus trips between the project site and Piers 94 and 96 is presented in Table 4.6-14 as well.

TABLE 4.6-14
BDFP CONSTRUCTION VEHICLE TRIPS BY STAGING LOCATION FOR PEAK MONTHS

Location of Staging Area		October 2018 (peak construction trucks)[a,b,c,d] Daily	AM Peak Hour	PM Peak Hour	May 2022 (peak construction workers)[a,b,c] Daily	AM Peak Hour	PM Peak Hour
Project Site, Southeast Greenhouses, Piers 94/96							
Project Site	Workers	50	25	25	50	25	25
	Trucks	134	17	17	36	5	5
	Shuttle bus	0	0	0	8	4	4
	Subtotal	184	42	42	94	34	34
Southeast Greenhouses	Workers	214	107	107	386	193	193
	Trucks	4	1	1	10	2	2
	Subtotal	218	108	108	396	195	195
Piers 94 and 96	Workers	0	0	0	249	125	125
	Trucks	12	2	2	30	4	4
	Shuttle bus	0	0	0	8	4	4
	Subtotal	12	2	2	287	133	133
All locations	***Workers***	264	132	132	686	343	343
	Trucks	150	20	20	76	11	11
	Shuttle bus	0	0	0	16	8	8
	Total	414	152	152	778	362	362
Project Site, 1550 Evans Avenue, Piers 94/96							
Project Site	Workers	50	25	25	50	25	25
	Trucks	134	17	17	36	5	5
	Shuttle bus	0	0	0	0	0	0
	Subtotal	184	42	42	86	30	30
1550 Evans Avenue	Workers	214	107	107	636	318	318
	Trucks	4	1	1	10	2	2
	Subtotal	218	108	108	646	320	320
Piers 94 and 96	Workers	0	0	0	0	0	0
	Trucks	12	2	2	30	4	4
	Shuttle bus	0	0	0	0	0	0
	Subtotal	12	2	2	30	4	4
All locations	***Workers***	264	132	132	686	343	343
	Trucks	150	20	20	76	11	11
	Shuttle bus	0	0	0	0	0	0
	Total	414	152	152	762	354	354

NOTES:
BDFP = Biosolids Digester Facilities Project

[a] Due to rounding, numbers in columns may not add to totals.
[b] The number of construction worker vehicle trips was calculated using an average vehicle occupancy of 1.28 passengers per vehicles, based on San Francisco Transportation Impact Analysis Guidelines (SF Guidelines) Appendix E - Table E-5 Work Trips to SD3 (All).
[c] Truck and shuttle bus trips traveling between the project site or the Southeast Greenhouses and Piers 94 and 96 are also included in the trip totals.
[d] Value is zero in those instances when construction worker parking demand can be fully accommodated at the project site, at the 1550 Evans Avenue site, or the Southeast Greenhouses site.

SOURCES: San Francisco Public Utilities Commission (SFPUC), spreadsheets entitled "Construction Trucks – Daily" and "Construction Workers and Shuttle Bus" in Appendix TR, August 26, 2016; Adavant Consulting/LCW Consulting analysis for BDFP.

The highest concentration of construction worker vehicle trips to and from the work site would be on the roads that provide direct access to the sites (e.g., on Oakdale Avenue, Third Street, and Cargo Way). However, as it is assumed that workers' residences would be spread among various Bay Area cities, project trips would also be dispersed on multiple streets providing access to the project site and off-site staging areas. Similarly, local and regional roadways such as I-280 and Highway 101 would be used to haul construction materials and deliveries, as would other streets that provide the most direct route to the work site and minimize the use of local streets. As noted above, the expected construction truck routes are presented in Figure 2-15 in Chapter 2, *Project Description*, and the majority of construction truck trips would travel to and from the SEP entrance on Evans Avenue at Rankin Street.

Construction worker parking demand was determined based on the number of expected worker vehicle trips at each staging location. **Table 4.6-15** summarizes the estimated weekday peak parking demand for construction worker vehicles. The peak parking demand would likely occur around 3:00 p.m. on days with two work shifts, as workers from the first shift are getting ready to leave and workers from the second shift start arriving. It is estimated that the project would generate a peak parking demand of about 130 parking spaces in October 2018 and 340 parking spaces in May 2022.

TABLE 4.6-15
BDFP CONSTRUCTION WORKER PARKING DEMAND

Location of Staging Area	October 2018 (peak construction trucks)[a]	May 2022 (peak construction workers)[b]
Project Site, Southeast Greenhouses, Pier 94		
Project Site	25	25
Southeast Greenhouses	107	193
Pier 94	0	125
Total	***132***	***343***
Project Site, 1550 Evans Avenue, Pier 94		
Project Site	25	25
1550 Evans Avenue	107	318
Pier 94	0	0
Total	***132***	***343***

NOTES:
BDFP = Biosolids Digester Facilities Project

a Based on a total number of 212 daily construction workers, accounting for an 80 percent auto use and an average occupancy of 1.28 persons per vehicle.

b Based on a total number of 550 daily construction workers, accounting for an 80 percent auto use and an average occupancy of 1.28 persons per vehicle.

SOURCES: San Francisco Public Utilities Commission (SFPUC), spreadsheets entitled "Construction Trucks – Daily" and "Construction Workers and Shuttle Bus" in Appendix TR, August 26, 2016; Adavant Consulting/LCW Consulting analysis for BDFP.

Operations Travel Demand

The proposed solids treatment facilities would operate in a similar manner to existing conditions, with no expected increase in the existing operations staff levels of about 280 people. The number of daily hauling and delivery truck trips is also anticipated to be similar to existing conditions; **Table 4.6-16** summarizes the number of daily truck deliveries by type of delivery for existing conditions and future conditions upon implementation of the BDFP. As indicated in Table 4.6-16, the number of daily trucks delivering or hauling materials under future-with-project conditions would be a slight increase over the existing condition, from about 33 to 36 trucks per day. The increase in biosolids haul trips would be due to the increase in solids load associated with projected population growth by 2045.

TABLE 4.6-16
EXISTING AND FUTURE (WITH BDFP) DAILY TRUCK DELIVERIES TO/FROM SEP

Type of Deliveries/Hauling	Existing Average Daily Truck Trips	Future (with BDFP) Average Daily Truck Trips[a]	Typical Delivery/Hauling Hours
Chemical deliveries	< 6	< 6	Daytime
Grit hauling	< 1	< 1	Before noon
Coarse and fine screenings hauling	< 2	< 1	Coarse screenings in a.m., fine screenings in p.m.
Trash, recycle, compost hauling	1	1	Morning
Yellow grease loadout	< 1	< 1	Before 7:00 a.m.
Yellow grease dropoff	4	4	Leave early morning, return mid-afternoon
Biosolids hauling	10	14	Very early morning
Recycled water pickup	4	4	Any time throughout the day
Other miscellaneous deliveries	4	4	Daytime
Total Daily Trucks	< 33	< 36	

NOTES:
BDFP = Biosolids Digester Facilities Project; SEP = Southeast Water Pollution Control Plant

[a] At project completion. As noted in Table 2-1 in Chapter 2, *Project Description*, the increase in biosolids hauling in the future is due to the increase in solids load associated with projected population growth by 2045, and not to the BDFP.

SOURCE: San Francisco Public Utilities Commission (SFPUC), *BDFP Conceptual Engineering Report*, 2016.

4.6.3.3 Impact Evaluation

Construction Impacts

Impact TR-1: Project construction would not result in substantial interference with pedestrian, bicycle, or vehicle circulation and accessibility to adjoining areas, and would not result in potentially hazardous transportation conditions. (Less than Significant)

Traffic Circulation Effects

As shown in Table 4.6-14, during the peak months of construction activity, the BDFP would result in a temporary increase in vehicular traffic traveling to and from the project site and off-site staging areas. For the period of maximum construction trucks (October 2018), BDFP construction would generate about 420 daily construction worker vehicle and truck trips, while for the period of maximum construction worker trips (May 2022), BDFP construction would generate about 780 daily construction worker vehicle, shuttle, and truck trips. These vehicle trips would travel to and from the various staging areas, and between staging areas and the project site. Figure 2-15 in Chapter 2, *Project Description*, depicts the anticipated construction haul and delivery truck routes. Trucks delivering materials to the Piers 94 and 96 staging areas would likely travel from Highway 101 and I-280 via Cesar Chavez Street, Illinois Street, and Amador Street. Deliveries from the Piers 94 and 96 staging areas would travel to the Rankin Street entrance via Evans Avenue, Third Street, and Cargo Way. Figure 2-16 shows interim truck deliveries and off-haul routes for SEP operations, including the existing solids treatment processes, that would be used temporarily during the five-year construction period.

As described in Chapter 2, *Project Description*, project construction activities would require the temporary closure of approximately two blocks of Jerrold Avenue to public through traffic (starting at the Caltrain right-of-way and up to the SEP entrance west of Phelps Street) for approximately five years. The closure would affect approximately 6,800 daily vehicles currently traveling on Jerrold Avenue between Phelps and Rankin Streets, about 510 of which (7.5 percent of the total) travel in the a.m. peak hour and 400 of which (6 percent of the total) travel in the p.m. peak hour. Approximately 60 percent of the total daily traffic travels westbound, from Phelps Street toward Rankin Street.[23]

Single-unit and multi-unit truck traffic on Jerrold Avenue near Rankin Street represents approximately 8 percent of the total daily traffic, or 545 trucks per day. About 55 percent of the total daily truck traffic occurs between 10:00 a.m. and 4:00 p.m., and 16 percent occurs between 6:00 p.m. and 7:00 a.m. the following day.

The temporary closure of Jerrold Avenue to public through traffic between the Caltrain bridge to the SEP entrance west of Phelps Street would remove the 6,800 daily vehicles currently traveling through this section, and instead between 35 and 50 daily eastbound (inbound) construction truck trips during the period of maximum construction truck traffic (August to December 2018) and 5 to 10 daily eastbound (inbound) truck trips during the period of maximum construction worker traffic (May to October 2022) would travel on this section of Jerrold Avenue. No outbound construction trucks or construction workers are expected to travel on Jerrold Avenue west of the Caltrain tracks.

Two nearby parallel east-west routes, Oakdale Avenue and Evans Avenue, would offer alternative travel paths for the vehicles currently traveling on the section of Jerrold Avenue that would be closed during BDFP construction. While the detour would be an inconvenience for motorists, both streets are located approximately one-quarter mile north and south of Jerrold Avenue and would represent minimal out-of-way travel for affected vehicles. Based on the traffic analysis conducted for this project,[24] both Oakdale and Evans Avenues have sufficient capacity to accommodate diverted traffic

[23] Vehicle classification counts conducted on Jerrold Avenue near Rankin Street in August 2016. The detailed count information is included in Appendix TR.

[24] Technical Memorandum Biosolids Digester Facilities Project – Case No. 2015.000644ENV, Intersection Level of Service Analysis Documentation, prepared by Adavant Consulting and LCW Consulting for Debra Dwyer (San Francisco Planning Department) and Karen Frye (San Francisco Public Utilities Commission), December 29, 2016.

without a substantial effect on local vehicle circulation. In addition, the SFPUC would implement a Traffic Control Plan as part of the project that would be consistent with the SFMTA's Blue Book regulations that would be applicable at the time of project construction. Traffic control measures would include installation of warning and detour signs advising motorists to follow appropriate detour routes well in advance of the Jerrold Avenue closure. Section 2.6.1.3, Construction Coordination, presents an outline of the SFPUC's proposed Traffic Control Plan.

The closure of Jerrold Avenue would also affect access to the existing San Francisco Wholesale Produce Market, located on Jerrold Avenue between Toland and Rankin Streets. Most of the wholesale activity at the market takes place after 8:00 p.m. when mostly semi-trailer trucks start arriving, and is largely completed by 9:00 a.m.[25] Approximately 7 percent (about 25 truck trips) of all daily truck traffic bound for the market enters and leaves the site from Jerrold Avenue east of Rankin Street, while 93 percent enters and leaves the market using the Jerrold Avenue/Toland Street intersection entrance.

The closure of Jerrold Avenue east of the Caltrain tracks would represent an inconvenience for those vehicles currently entering or exiting the market from the east and traveling to or from Third Street. The east side entrance to the San Francisco Wholesale Produce Market at Rankin Street would remain operational, and vehicles could still travel to and from the south via Toland Street, turning into McKinnon or Kirkwood Avenues to reach Rankin Street, but this would represent four blocks of out-of-the-way travel. Therefore, it is likely that those trucks and other vehicles currently using the east side entrance would instead use the Jerrold Avenue/Toland Street intersection entrance/exit and maneuver within the market area to make a U turn. The median of Jerrold Avenue within the San Francisco Wholesale Produce Market site is occupied by surface parking lots and small structures in between, where vehicle turns, including U turns, are currently allowed.

As previously described, the San Francisco Wholesale Produce Market would experience a reduction of up to 6,000 daily vehicles of existing through traffic traveling on Jerrold Avenue through the site, in combination with an increase of up to 50 daily construction truck trips.

During project construction, traffic volumes on Jerrold Avenue east of Phelps Street would also be reduced by approximately 50 percent as a result of the temporary street closure. Overall traffic volumes on Phelps Street would be similar to existing conditions, as the potential reductions in through traffic turning left or right onto Jerrold Avenue would be offset by the addition of BDFP construction-related traffic, as described above.

Traffic volumes during the peak commute hours on Evans and Oakdale Avenues west of Phelps Street would increase as a result of project construction activities (including existing traffic reroutes due to the temporary street closure and project construction-related traffic) by approximately 20 to 25 percent and 15 to 20 percent, respectively, compared to existing conditions. Traffic volumes on Oakdale Avenue east of Phelps Street could increase by as much as 30 to 35 percent, as a result of construction truck traffic, construction workers, and deliveries to the project

[25] Adavant Consulting, San Francisco Wholesale Produce Market Retention and Expansion Project Transportation Study Final Report, Case Number 2009.1153E, March 23, 2011. This report is available for public review at the San Francisco Planning Department, 1660 Mission Street, Suite 400, San Francisco, California 94103.

site and the Southeast Greenhouses staging site. Traffic volumes on Third Street during the peak commute hours would increase between 2 and 4 percent, while traffic on Cargo Way could increase by as much as 65 percent under those scenarios when Piers 94 and 96 are used for construction staging and parking. None of these increases would substantially affect traffic circulation along these streets since the larger percent increases correspond to those streets with low traffic volumes and maximum available capacity. Existing vehicular and truck access to the SEP would be modified during the construction period. The temporary closure of Jerrold Avenue to public through traffic would start to the west of the three vehicle entrances on the north and south sides of Jerrold Avenue, which would remain fully operational. Chemical delivery trucks that approach the Jerrold Avenue entrance from the west (fewer than six trucks per day) would continue to do so, entering the SEP through the secondary construction gate located near the Caltrain right-of-way (refer to Figure 2-16 in Chapter 2, *Project Description*).

During BDFP construction, the Quint Street entrance to the SEP would be closed. It is currently used by trucks removing yellow grease and recycled water (fewer than nine trucks per day), as well as biosolids (10 trucks per day, inbound only); these trucks would be redirected to use the south entrance on Jerrold Avenue via Phelps Street. The Rankin Street access point, which is currently used as an exit only on an as-needed basis, would be used during the construction period for both entering and exiting by trucks carrying grit and screenings to the landfill (fewer than three trucks per day). These changes to existing SEP gate operations would represent minimal changes to the current truck paths.

As presented in Table 4.6-14, on a daily basis and during the a.m. and p.m. peak hours, the construction worker trips represent the greatest proportion of BDFP construction traffic, and the maximum number of construction truck trips during the a.m. and p.m. peak hours would be about 20 truck trips. BDFP construction vehicle trips would be dispersed among a number of destinations (e.g., SEP site, Southeast Greenhouses, Piers 94 and 96) depending on the activity. Construction vehicles would travel through intersections and on roadways that experience higher vehicle delays (e.g., the intersection of Evans Avenue/Toland Street/Napoleon Street), but the overall contribution to total traffic volumes and to increased vehicle delay would be minimal.

Therefore, for the reasons described above, construction-related project impacts on traffic circulation would be less than significant.

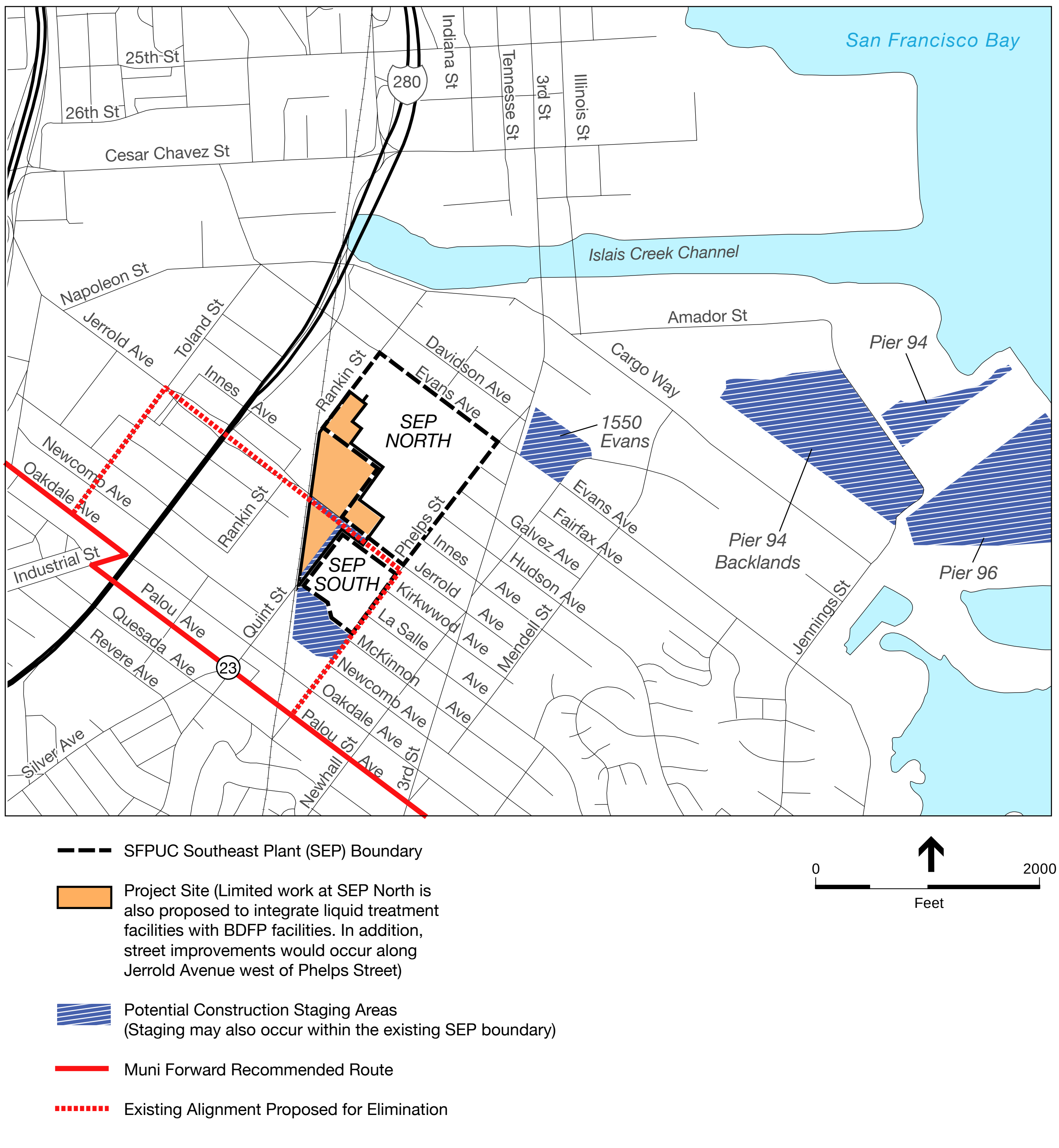
Impacts on Public Transit

As described above, some of the construction workers at the project site would take transit, which would increase the capacity utilization of the transit routes serving the site. The increase in transit trips would vary depending on the construction phase and would be greatest during the third year of construction when the number of construction workers at the project site would range from about 400 to 550 workers per day. At other times during the construction period, the number of construction workers would range from 120 to 440 workers per day. Approximately 20 percent of construction workers are anticipated to take transit to and from the project site. The additional transit riders would be accommodated on the bus routes serving the project site, which operate at less than Muni's 85 percent capacity utilization standard (see Table 4.6-4). The T Third light rail, which operates at or above the 85 percent capacity utilization standard at the maximum load point (i.e., traveling toward the Bayview at the Van Ness station during the a.m. peak period and traveling toward the Bayview at The Embarcadero and Harrison Street during the p.m. peak period), has had recent service increases in 2015 to provide additional capacity. In addition, with initiation of the Central Subway project in 2019, capacity on the T Third will further increase as two-car trains (rather than one-car trains) will serve the Third Street corridor.

The five-year closure of Jerrold Avenue between the Caltrain tracks and Phelps Street would require the temporary rerouting of the 23 Monterey bus route (see **Figure 4.6-3**). The route segment on Toland Street between Oakdale and Jerrold Avenues, Jerrold Avenue between Toland and Phelps Streets, and Phelps Street between Jerrold and Palou Avenues would be temporarily discontinued, and the 23 Monterey would be routed on Oakdale Avenue between Toland and Industrial Streets, on Industrial Street between Oakdale and Palou Avenues, and on Palou Avenue between Industrial and Phelps Streets. With the reroute, the 18 existing bus stops on Toland Street, Jerrold Avenue, and Phelps Street (see Table 4.6-5) would be temporarily discontinued, and new temporary bus stops may be required on Oakdale Avenue and/or Industrial Street, as determined by the SFMTA. The 24 Divisadero route runs on Palou Avenue between Industrial and Phelps Streets and the 44 O'Shaughnessy route runs on Palou Avenue between Silver Avenue and Phelps Street; the rerouted 23 Monterey would likely use the existing bus stops serving the 24 Divisadero and 44 O'Shaughnessy routes in this segment. Transit operations on the affected streets would be similar to existing conditions, as the three additional buses along the temporary route (i.e., peak period frequency of three buses per hour or every 20 minutes on the 23 Monterey during the peak periods) would not substantially affect bus stop operations or bus delay at intersections along the reroute. Consistent with the SFMTA's Blue Book, the SFPUC or its contractors would be required to ensure that appropriate signage indicating temporarily discontinued stops and temporary new stops would be posted, and appropriate notification of the 23 Monterey reroute would occur prior to initiation of BDFP construction. Prior to construction, the project contractor would coordinate with Muni's Street Operations and Special Events Office to coordinate construction activities and avoid impacts on transit operations. The reroute of the 23 Monterey would increase the distance required (by up to 1,400 feet or about one-quarter mile) for riders with origins or destinations along Toland Street, Jerrold Avenue, and Phelps Street to reach the 23 Monterey (approximately 500 riders exiting and boarding the 23 Monterey at these stops on a daily basis – see Table 4.6-5). However, the reroute would decrease the distance for riders along Palou Avenue, and it would not substantially affect accessibility to transit or transit operations.

During BDFP construction, the SFPUC SEP employee shuttle, which currently travels between the BART 24th Street Mission station and the SEP site and travels on Jerrold Avenue between Phelps and Toland Streets, would also need to be rerouted. While the rerouted path for the SFPUC SEP employee shuttle has not yet been determined, it may slightly increase the distance required for employee access to the shuttle (e.g., stop on Phelps Street near the intersection with Jerrold Avenue, instead of on Jerrold Avenue near the intersection with Rankin Street). Nonetheless, shuttle service would be maintained and would not be substantially affected.

As shown on Figure 4.6-1, in the vicinity of the SEP, the 19 Polk runs on Evans Avenue south of Cesar Chavez Street with a peak period frequency of four buses per hour (i.e., every 15 minutes). Adjacent to the SEP, bus stops for the 19 Polk running in the eastbound direction (i.e., toward the Hunters Point Shipyard) are located at Quint Street and at Phelps Street. BDFP construction would



SOURCE: San Francisco Municipal Transportation Agency, Muni Forward, 23 Monterey- On Hold, December 27, 2014

SFPUC Biosolids Digester Facilities

Figure 4.6-3
Proposed Route Realignment for 23 Monterey

not affect the four travel lanes (two lanes in each direction) or the parking lane on Evans Avenue adjacent to the SEP. The additional construction truck and construction worker trips traveling on Evans Avenue would not substantially change traffic volumes on Evans Avenue, and travel times for buses would remain similar to existing conditions. Because there are two westbound travel lanes, 19 Polk buses traveling westbound on Evans Avenue would be able to bypass construction trucks waiting for a gap in the eastbound traffic flow to turn left onto southbound Rankin Street (i.e., into the project site).

Therefore, for the reasons described above, construction-related project impacts on transit service would be less than significant.

Impacts on Bicycle Facilities

As described in Section 4.6.1.3, there are a number of bicycle routes in the project vicinity, including on Phelps Street, Oakdale Avenue, Third Street, Evans Avenue, and Cesar Chavez Street. During the BDFP construction period, Oakdale Avenue and Phelps Street would be used as access routes for construction workers parking within the Southeast Greenhouses site (if available for use as staging), and if Pier 94 is used for parking for construction workers, the construction worker shuttle bus would be routed on Phelps Street southbound between Third Street and Jerrold Avenue with a stop on Phelps Street north of the intersection with Jerrold Avenue. The short segment of Phelps Street between Third Street and Evans Avenue would also be used by equipment deliveries and concrete trucks (traveling to and from the Piers 94 and 96 staging areas), trucks carrying recyclable and unrecyclable demolition materials (traveling from I-280), and trucks transferring unsuitable excavated soils to the Piers 94 and 96 staging areas. (Refer to Figure 2-15 in Chapter 2, *Project Description*, for construction haul and worker shuttle routes.) Similarly, Evans Avenue between Third and Cesar Chavez Streets (Bicycle Route 68, Class III facility) and Cesar Chavez Street between Highway 101 and Third Street (Bicycle Route 60, Class II facility between Third Street and Caltrain tracks and Class III facility from west of Caltrain tracks to Sanchez Street) would be used for construction truck access to and from Highway 101, I-280, and Pier 94, as well as by construction workers.

This increased construction truck traffic would result in temporary increased potential for vehicle-bicycle conflicts at locations where bicycle lanes are not provided, particularly on the segment of Phelps Street between Third Street and Evans Avenue, and along Evans Avenue—both Class III bicycle facilities. However, the potential for vehicle-bicycle conflicts would not increase to a level that would adversely affect bicycle travel in the area. The period of greatest project-generated truck traffic on area roadways would be for a limited period during the soil excavation and disposal phase, a period of about five months between August and December 2018 when there would be about 70 construction trucks per day, although not all of the additional vehicles would travel on Evans Avenue. Following soil excavation and disposal, the number of construction trucks would decrease substantially to an average of about 25 and a maximum of 40 trucks per day. As described in Section 2.6.1.3, Construction Coordination, the project's Traffic Control Plan would include measures to maintain bicycle access and circulation during project construction. As part of the project's Traffic Control Plan, bicyclists could be detoured to other roadways such as Third Street or Newhall Street, and/or advance warning signs stating "Share the Road" would be posted for the safety of bicyclists on Phelps Street and Evans Avenue. Overall, while project construction would result in increased potential for vehicle-bicycle conflicts, it would not substantially affect bicycle travel in the area or result in potentially hazardous conditions for bicyclists, and construction-related project impacts on bicyclists would be less than significant.

Impacts on Pedestrian Travel

BDFP construction would result in a temporary increase in the number of pedestrians on sidewalks in the vicinity of the SEP and the 1550 Evans Avenue staging area. As discussed above, the size of the construction work force would vary over time, ranging up to 550 construction workers per day. Construction workers who drive would travel primarily in the area of the Piers 94 and 96 staging areas, but also in the vicinity of the SEP, and/or 1550 Evans Avenue and the Southeast Greenhouses site, if available. A BDFP shuttle would be provided to transport workers between the parking areas at the Piers 94 and 96 staging areas and the project site with a shuttle stop anticipated on Phelps Street at Jerrold Avenue; however, construction workers parking at 1550 Evans Avenue would walk to and from the project site. Construction workers would use Evans Avenue, Phelps Street, Jerrold Avenue, and Third Street to walk between the project site and the 1550 Evans Avenue parking area. As noted in Section 4.6.1.4, in the vicinity of the SEP, pedestrian volumes are very low throughout the day. At the intersection of Phelps Street/Jerrold Avenue, during both the a.m. and p.m. peak hours, the total number of pedestrians crossing all four crosswalks was about 30 pedestrians during each peak hour; most of these pedestrians were probably workers traveling between the SEP and the SEP shuttle stop on Jerrold Avenue, the 23 Monterey bus stop at Jerrold Avenue/Phelps Street, or the T Third light rail stops at Third Street (i.e., at Innes Avenue in the southbound direction, and at Kirkwood Avenue in the northbound direction). The additional pedestrians would be accommodated on area sidewalks without substantially affecting pedestrian conditions.

During the BDFP construction period, Jerrold Avenue would be closed between the Caltrain tracks and the SEP entrance (just north of Phelps Street), and pedestrian access to this segment would be restricted, except for existing SEP employee and construction worker access to the SEP. Because pedestrian access to the SEP would be maintained for both existing employees and construction workers, pedestrian impacts due to the Jerrold Avenue roadway closure would be minimal.

In addition, in the case of public streets under SFMTA and SFPW jurisdiction, the SFMTA Blue Book regulations require the implementation of construction safety measures with respect to pedestrians. Construction activities that require use of any portion of the adjacent sidewalk are required to maintain pedestrian access for all users, and where complete sidewalk closures are required, alternative pedestrian access routes and detours are required to be implemented with adequate signage. Thus, pedestrians using this segment of Jerrold Avenue as a route to other locations along Jerrold Avenue (e.g., the San Francisco Wholesale Produce Market) would be detoured to Evans Avenue or Oakdale Avenue about 1,400 feet to the north or south of Jerrold Avenue, as other east-west streets (i.e., Innes, Hudson, Galvez, Fairfax, Kirkwood, LaSalle, McKinnon, and Newcomb Avenues) are discontinuous in this area. This detour may be an inconvenience to some pedestrians, but it would not result in potentially hazardous conditions for pedestrians. As part of the pedestrian detours, appropriate pedestrian signs, including but not limited to "Sidewalk Closed," would be posted.

Overall, while construction of the BDFP would temporarily increase the travel distance for some pedestrians who currently use the segment of Jerrold Avenue between the Caltrain tracks and Phelps Street, it would not result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility. Construction-related project impacts on pedestrians would therefore be less than significant.

Impacts on Freight Rail

A portion of the excavated soils that would be unsuitable for reuse on-site as backfill due to geotechnical or environmental considerations would be hauled off-site. The contaminated soil would be trucked to the Port of San Francisco transfer facility on Cargo Way adjacent to Pier 94 Backlands (a maximum of about 20 round trips per day between the project site and Pier 94 Backlands for a three-month period, and about five round trips per day at other times), from which it would be shipped by rail to the ECDC Landfill in Utah.

The San Francisco Bay Railroad would be the rail operator responsible for transferring the contaminated soils via rail. The disposal would be conducted by adding rail cars to already scheduled trains, or alternately, but less likely, by creating new trains consisting solely of the BDFP excavated materials. New trains would leave the rail yard between 11:00 a.m. and 2:00 p.m., or during the overnight hours, to avoid conflicts with Caltrain peak commuter passenger rail service. As noted in Section 4.6.1.5, both freight trains and Caltrain passenger trains share tracks south of the Quint Street Lead in San Francisco, and freight and passenger rail operations are regulated to ensure that Caltrain commuter rail schedules are not affected.

BDFP construction would generate a demand for two rail cars per day during the peak five months (approximately from August to December 2018) of excavation for the anaerobic digesters at the project site, and up to one rail car per day for the remainder of the five-year construction period. The additional up to two rail cars per day would not substantially affect operations of the Caltrain commuter rail service.

Union Pacific Railroad (UPRR) has a series of safety requirements for construction work being conducted near active railroad tracks. The requirements specify minimum clearance distances, necessary safety training for construction personnel, vehicle operations near the tracks, and other safety regulations. BDFP construction protocols would adhere to these requirements when performing construction activities near UPRR's Quint Street Lead on the western boundary of the project site. The mandatory implementation of these requirements by BDFP contractors would maintain construction safety and avoid affecting operations of the UPRR rail service.

Thus, for the reasons stated above, the construction-related project impacts on freight rail operations would be less than significant.

Impacts on Parking

As presented in Table 2-10 in Chapter 2, *Project Description*, BDFP construction activities would entail an on-site work force of up to 550 construction workers during peak activities during the five-year construction period. The maximum number of parking spaces required to accommodate construction worker vehicles would be up to about 340 parking spaces and would vary, depending on the construction phase and construction activity. The construction period when the parking demand would be greatest and would exceed 300 spaces would occur between approximately May 2021 and July 2022 (15 months). Temporary surface parking lots would be provided to accommodate the construction worker parking demand, including within the SEP (up to 40 spaces), within the Piers 94 and 96 staging areas (up to 385 spaces), and, if available, within the Southeast Greenhouses site (up to 215 spaces) or 1550 Evans Avenue (up to 340 spaces). For construction workers parking at the Piers 94 and 96 staging areas, shuttle buses with seating for up to 50 passengers would transport workers between the parking area and the proposed shuttle stop for the project site on southbound Phelps Street north of Jerrold Avenue at the beginning and end of each shift (refer to Figure 2-14 in Chapter 2).

Table 4.6-17 presents the parking supply and maximum demand for the two peak analysis months (i.e., October 2018 when the number of construction truck trips would be greatest, and May 2022 when the number of construction workers at the project site would be greatest) for the two construction staging area combinations (depending on availability of either the Southeast Greenhouses or 1550 Evans Avenue staging areas). As shown in Table 4.6-17, the construction-related parking demand would be accommodated within the identified staging areas, and construction workers would not be expected to seek on-street parking in the vicinity of the SEP.

TABLE 4.6-17
BDFP PARKING SUPPLY AND DAILY PEAK PARKING DEMAND DURING CONSTRUCTION AT PROJECT SITE AND OFF-SITE STAGING AREAS

	October 2018			May 2022		
Location of Staging	**Supply (spaces)**	**Demand (spaces)**	**Percent Utilization**	**Supply (spaces)**	**Demand (spaces)**	**Percent Utilization**
Project Site, Southeast Greenhouses, Piers 94/96						
Project Site	40	25	62%	40	25	62%
Southeast Greenhouses site	215	107	50%	215	193	90%
Piers 94/96	0	0	--	385	125	32%
Total	***255***	***132***	***52%***	***640***	***343***	***54%***
Project Site, 1550 Evans Avenue, Piers 94/96						
Project Site	40	25	62%	40	25	62%
1550 Evans Avenue	340	107	31%	340	318	93%
Piers 94/96	0	0	--	260	0	--
Total	***380***	***132***	***35%***	***640***	***343***	***54%***

NOTE:
BDFP = Biosolids Digester Facilities Project

SOURCES: San Francisco Public Utilities Commission (SFPUC), spreadsheets entitled "Construction Trucks – Daily" and "Construction Workers and Shuttle Bus" in Appendix TR, August 26, 2016; Adavant Consulting/LCW Consulting analysis for BDFP.

During the five-year construction period, on-street parking on Jerrold Avenue between the Caltrain tracks and Phelps Street would be temporarily restricted and the parking demand associated with these spaces would be accommodated on other nearby streets. As discussed in Section 4.6.1.7, on-street parking is available on nearby streets throughout the day, and with the temporary reduction of about 85 parking spaces on Jerrold Avenue, the overall parking study area occupancy would increase minimally (i.e., from 48 to 51 percent during the a.m. period and from 59 to 63 percent during the p.m. period). Construction-related impacts on parking would be less than significant.

Impacts Related to Traffic Safety Hazards

Construction-related vehicles traveling to and from the project site and off-site staging areas would share the roadways with other vehicles, as well as with bicyclists and pedestrians. In general, increased construction traffic could increase traffic safety hazards due to potential conflicts between construction trucks, which have slower speeds and wider turning radii than automobiles, and automobiles, bicyclists, and pedestrians. The greatest increase in the number of project-related construction trucks would occur in October 2018 when the number of construction trucks transporting excavated soils would be greatest.

For most of the project construction period, construction activities at the project site would generally occur Monday through Friday from 7:00 a.m. to 3:30 p.m., with work on Saturday and Sundays as needed. Work would occur on holidays, and 24 hours per day only if needed and for critical facility connections. For approximately one year (mid-2021 to mid-2022) of the approximately 60 months of project construction, there could be two work shifts, from 7:00 a.m. to 3:30 p.m. and from 2:30 p.m. to 11:00 p.m. Monday through Saturday. (Work shifts are 8.5 hours long, and include one half hour for lunch.) Work after 8:00 p.m. would be limited to interior facility work (e.g., electrical work) and some outside work (refer to Section 2.6.1.1 in Chapter 2).

As described in Section 2.6.1.3, Construction Coordination, the SFPUC or its contractor would prepare and implement a Traffic Control Plan that conforms to the SFMTA's Blue Book (which also requires a Special Traffic Permit for the Jerrold Avenue closure). The elements of the Traffic Control Plan, which would be prepared in consultation with the SFMTA, would include circulation and detour routes, bus stop relocation, advance warning signage, construction truck routes, maintenance of pedestrian and bicycle access and circulation (including detour routes, as appropriate), designation of sufficient staging areas, scheduling of and monitoring of construction vehicle movement, and coordination with public service providers such as fire, police schools, hospitals, and transit. The Traffic Control Plan would serve to inform City agencies of project construction and to minimize temporary traffic effects in the vicinity of the construction areas. Prior to implementation, the Traffic Control Plan, including its procedures to minimize localized construction impacts on the transportation network, would be reviewed by the SFMTA and multi-agency ISCOTT.

Because the project includes implementation of a Traffic Control Plan, construction-related project impacts on transportation safety would be less than significant.

Summary of Impact TR-1

Overall, construction of the BDFP would occur over five years, with varying levels of construction work force and construction truck deliveries and disposal of excavated materials. The period of greatest project-generated construction truck trips would be limited to a period of five months out of the overall five-year period. The existing transportation network in the vicinity of the SEP would be adequate to accommodate the temporary vehicle, transit, bicycle, and pedestrian travel demand associated with construction activities. BDFP construction would require closure of Jerrold Avenue between the Caltrain tracks and the SEP entrance (just north of Phelps Street) throughout the construction period, and would require temporary rerouting of vehicles and bicyclists using this segment, the 23 Monterey bus route, and the SFPUC SEP shuttle serving the BART 24th Street Mission station; however, the closure would not result in potentially hazardous transportation conditions or substantially affect accessibility to transit or interfere with pedestrian or vehicle accessibility to nearby land uses because alternate routes exist to accommodate these temporary changes. The BDFP would include implementation of a site-specific Traffic Control Plan that would establish measures to reduce traffic congestion and temporarily discontinue and relocate bus stops, along with other measures to reduce potential traffic, bicycle, pedestrian, transit, and emergency vehicle access disruptions and safety hazards in conformance with the SFMTA's Blue Book, which establishes regulations for working in City streets to ensure the activities are conducted safely and with the least possible interference with pedestrians, bicyclists, transit, and vehicles. For these reasons, construction-related project impacts on traffic circulation, transit, pedestrians, bicyclists, parking, and freight rail would be ***less than significant.***

Mitigation: None required.

Impact TR-2: Project construction would not result in inadequate emergency vehicle access. (Less than Significant)

Construction activities associated with the project would be conducted within the project site and within identified off-site staging areas, including the currently closed segment of Quint Street, SFPUC property at 1550 Evans Avenue, Port of San Francisco properties at Piers 94 and 96, and/or adjacent to the SEP at the Southeast Greenhouses site. In addition, as part of the BDFP, Jerrold Avenue between the Caltrain right-of-way and the SEP entrance just north of Phelps Street would be temporarily closed during the five-year construction period for use as a staging and parking area; however, emergency vehicles would be allowed access through Jerrold Avenue or a detour route would be provided as determined through coordination with emergency service providers (see Section 2.6.2 in Chapter 2, *Project Description*). The temporary closure of Jerrold Avenue for the two-block segment would be reviewed by ISCOTT, which includes review by the Fire Department to ensure that emergency vehicle access is not impaired. Three fire stations are located within 0.6 mile to the west (Station 9 at 2245 Jerrold Avenue) and east (Station 49 at 1415 Evans Avenue and Station 25 at 3305 Third Street) of the project site, and emergency vehicles from these stations would be able to use other east-west arterials (e.g., Evans Avenue to the north of Jerrold Avenue, and Oakdale Avenue to the south of Jerrold Avenue) to reach their destination. In addition, pursuant to the requirements of the SFMTA's Blue Book, the SFPUC or its contractor would be required to work with the SFMTA to identify detour routes and locations where detour signs would be implemented, and incorporate the detour plans into the project's Traffic Control Plan. The project would not include any other roadway or travel lane closures that would affect emergency vehicle access.

The temporary increases in construction-related vehicles, including construction worker vehicles and construction trucks, on streets in the vicinity of the SEP and off-site staging areas would not substantially affect emergency vehicle access. California law requires that drivers yield the right-of-way to emergency vehicles and remain stopped until the emergency vehicle passes.

Therefore, because emergency vehicle access in the project vicinity would not be substantially affected by the temporary closure of a two-block segment of Jerrold Avenue or by the addition of construction-related vehicles to the local roadway network, construction-related project impacts on emergency vehicle access would be ***less than significant.***

Mitigation: None required.

Operational Impacts

Impact TR-3: Project operations and maintenance activities would not cause substantial additional vehicle miles traveled (VMT), substantially induce automobile travel, or cause or worsen traffic safety hazards. (Less than Significant)

Vehicle Miles Traveled

After completion of project construction activities, the proposed solids treatment facilities would operate as needed, 24 hours per day, seven days per week, and would require operations and maintenance, similar to existing conditions. No increase in the existing operations staff of about 280 people for the entire SEP is anticipated.

As described in Section 4.6.3.2, once the project is in operation, the number of daily haul and delivery truck trips is also anticipated to remain largely unchanged from existing conditions. In 2045, however, the number of biosolids hauling truck trips would increase from the current 7 to 10 trips per day to approximately 10 to 14 haul trips per day due to projected increases in solids loads associated with anticipated population growth. In addition, an estimated two truck trips per week would be required for off-hauling debris from the screening bins. This minimal increase in trips would not substantially increase total VMT associated with BDFP operations.[26]

The project includes a new second vehicle entrance and exit to the SEP site via Rankin Street to facilitate the movement of truck traffic to and from proposed facilities. Two entrances (as well as emergency access gates) on either side of Jerrold Avenue and one on Quint Street are also proposed (refer to Section 2.4.2 and Figure 2-5 in Chapter 2, *Project Description*). The project would include redesign of on-site vehicular circulation within the SEP boundaries to accommodate the new entrances, exits, and facility layout. The improvements to entrances, new entrances, and on-site circulation improvements would not substantially affect traffic circulation in the SEP vicinity. As depicted on Figure 2-12 in Chapter 2, upon implementation of the BDFP, truck trips associated with chemical deliveries and yellow grease loadout and biosolids disposal (about 21 trucks per day – see Table 4.6-16) would change their access routes to and from the SEP; the trucks, which currently travel from Highway 101 to Jerrold Avenue, would instead use Highway 101 to Cesar Chavez Street and

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[26] As described in Chapter 2, *Project Description*, existing solids processing produces Class B biosolids; the BDFP would produce Exceptional Quality Class A biosolids, which have fewer restrictions on use compared to Class B biosolids. Consequently, there are more market reuse options for Class A biosolids, and some of the options could be located closer to the SEP. Thus, the production of Class A biosolids by the BDFP could result in decreased haul distances (and VMT).

Evans Avenue to the new Rankin Street entrance. This reroute in truck trips would not substantially alter existing traffic circulation associated with facility operations and would reroute operational truck trips to Evans Avenue, identified as a Freight Truck Route in the *San Francisco General Plan*.

The BDFP would include features that would alter the transportation network. The project would redesign and reconstruct the segment of Jerrold Avenue between Phelps Street and the Caltrain tracks in accordance with *San Francisco Better Streets Plan* guidelines, which would be expected to result in traffic calming effects. The redesign would provide a wider landscaped buffer zone with street trees between the parking lane and the sidewalk. To accommodate this green buffer zone, the width of the existing center two-way turn lane and the two travel lanes would be reduced, and the angled parking would be replaced with parallel parking on the north side of the street. Figure 2-9 in Chapter 2, *Project Description*, depicts a typical section of the proposed Jerrold Avenue improvements. The proposed roadway and sidewalk changes would be reviewed by the SFMTA's Transportation Advisory Staff Committee (TASC), which reviews permanent changes to the roadway and sidewalk network.

As noted above, the project would also include a new second gate to the SEP via Rankin Street to facilitate the movement of truck traffic to and from proposed facilities. Two entrances (as well as emergency access gates) on either side of Jerrold Avenue and one on Quint Street are also proposed (refer Section 2.4.2 and to Figure 2-5 in Chapter 2, *Project Description*). The project features that would alter the transportation network would be consistent with the general types of projects identified by the San Francisco Planning Department that do not substantially induce automobile travel (e.g., wastewater treatment systems). Therefore, as a part of the wastewater treatment system, project operations would not result in a substantial increase in automobile travel, and overall, operational impacts related to VMT would be less than significant.

Impacts on Public Transit

As noted above, following completion of project construction, Jerrold Avenue between Phelps Street and the Caltrain tracks would be reopened. As noted in Section 4.6.1.2, as part of Muni Forward, the SFMTA anticipates rerouting the 23 Monterey bus route onto Oakdale Avenue, Industrial Street, and Palou Avenue (i.e., the anticipated route alignment of the 23 Monterey during BDFP construction). This Muni Forward service improvement for the 23 Monterey is currently on hold, subject to additional neighborhood outreach, and if the SFMTA decides not to implement this service improvement following completion of the BDFP, the 23 Monterey route would return to Toland Street, Jerrold Avenue, and Phelps Street, and service would continue as under existing conditions. In addition, the SFPUC SEP employee shuttle route between the BART 24th Street Mission station and the SEP would be rerouted back to Jerrold Avenue. As part of the Jerrold Avenue redesign, the bus stops in the westbound direction at Quint Street and in the eastbound direction at Phelps Street may be reconfigured from pole stops to curbside bus stops.[27] In addition, improved sidewalks and a

[27] A pole stop (also referred to as a flag stop) is defined as a transit stop without a designated curbside zone and where parking is not restricted. Some pole stops are located on streets without parking, in which case the bus can either stop in the mixed-flow travel lane or pull over to the curb. At pole stops adjacent to on-street parking, all passengers must board and exit the bus in the street since the bus cannot pull to the curb.

wider landscaped buffer zone would enhance the transit rider experience at bus stops on this segment of Jerrold Avenue.

With implementation of the project, the existing operations staff of about 280 people for the entire SEP would not change, and therefore the project would not result in a need for additional transit routes or substantially increase ridership on nearby Muni bus routes (e.g., 23 Monterey, 19 Polk, 24 Divisadero) or the T Third light rail line in the project vicinity. Because project operation would not substantially affect the capacity utilization of nearby Muni routes and would not affect the operations of the nearby Muni routes, the project's operational impact on transit would be less than significant.

Impacts on Bicycle and Pedestrian Travel

With implementation of the project, pedestrian and bicycle circulation in the project vicinity would be the same as under existing conditions. Proposed improvements to Jerrold Avenue between Phelps Street and the Caltrain tracks (i.e., new sidewalks, landscaped buffers, corner bulb-outs, crosswalks at the intersection of Phelps Street/Jerrold Avenue and at two midblock locations, and bicycle sharrows within the travel lane) would enhance conditions for pedestrians and bicyclists. (Refer to Figure 2-9 in Chapter 2, *Project Description*, for the proposed cross-section of Jerrold Avenue and to Figure 2-11 for the proposed extent and location of landscaping and crosswalks.) Project operations would not result in a substantial increase in pedestrian or bicycle trips, as the number of operations staff is expected to remain the same as existing conditions. Thus, project operations would not result in overcrowding or an increased demand for pedestrian and bicycle facilities, and the project's operational impacts on bicycles and pedestrians would be less than significant.

Impacts on Emergency Vehicle Access

Implementation of the project would not introduce unusual design features nor substantially change the street network, and therefore emergency vehicle access would remain similar to existing conditions. Upon completion of the project, Jerrold Avenue between Phelps Street and the Caltrain tracks would be reopened and redesigned in accordance with *San Francisco Better Streets Plan* guidelines. As part of the redesign, a center turn lane and one mixed-flow travel lane in each direction would be maintained, similar to existing conditions. The detail design of the reconfiguration would be reviewed by the SFMTA and the San Francisco Fire Department as part of TASC review to ensure that it meets all applicable standards. With implementation of the project, emergency vehicle access in the project vicinity would not be affected, and therefore the project's operational impacts on emergency vehicle access would be less than significant.

Impacts on Freight Rail

Similar to existing conditions, operations and maintenance of the solids treatment facility would not affect rail service on the Quint Street spur tracks. Disposal of grit, screening, yellow grease loadout, and biosolids and chemical deliveries would continue to occur by trucks, similar to existing conditions. (Refer to Figure 2-12 in Chapter 2, *Project Description*.) Therefore, the impact of project operations and maintenance on freight rail operations would be less than significant.

Impacts on Parking

Implementation of the project would not increase the number of operations staff at the SEP, and therefore the project would not increase parking demand. With project implementation, the number of parking spaces within the SEP would remain similar to existing conditions. Proposed improvements to Jerrold Avenue between Phelps Street and the Caltrain tracks would include reconfiguration of the 40 angled parking spaces on the north side of the street with about 20 parallel spaces, resulting in the elimination of 20 on-street parking spaces.[28] As described in Section 4.6.1.7, there are currently about 104 parking spaces on Jerrold Avenue between Rankin and Phelps Streets, with a maximum occupancy of about 60 percent. With the elimination of 20 on-street parking spaces due to the reconfiguration from angled to parallel spaces, the parking utilization on this segment of Jerrold Avenue would increase from 60 to 75 percent (indicating that there would continue to be available on-street parking spaces), and/or some nearby streets may experience an increase in the on-street parking utilization. Thus, the reconfiguration of on-street parking on Jerrold Avenue resulting in the removal of approximately 20 parking spaces would not substantially affect area-wide parking conditions or create hazardous transportation conditions or significant delays affecting traffic, transit, bicycles, or pedestrians, and would not be considered a significant impact.

Summary of Impact TR-3

With respect to overall transportation conditions, operation of the BDFP would be generally similar to existing conditions, with no increase in the total number of employees at the SEP and a very minimal increase in the number of haul trucks required for disposal of biosolids and debris from the screening bins. Jerrold Avenue between Phelps Street and the Caltrain tracks would be improved in accordance with *San Francisco Better Streets Plan* guidelines and pedestrian and bicycle circulation on this segment would be enhanced. The Muni 23 Monterey bus route would be returned to pre-construction operations on Toland Street, Jerrold Avenue, and Phelps Street, unless the SFMTA, following additional neighborhood outreach, determines that the planned Muni Forward service improvements for the 23 Monterey along the rerouted segment would be made permanent. In addition, the SFPUC SEP employee shuttle to the BART 24th Street Mission station would return to pre-construction operations on Jerrold Avenue. Other proposed improvements, such as the new entrance on Rankin Street and new entrances on Jerrold Avenue and Quint Street, would enhance vehicle, pedestrian, and bicycle access to the site. Reconfiguration of on-street parking would not substantially affect area-wide parking conditions or create hazardous transportation conditions or significant delays affecting traffic, transit, bicycles, or pedestrians. For these reasons, impacts of project operations and maintenance on VMT, transit, pedestrians, bicyclists, freight rail, and emergency vehicle access would be ***less than significant.***

Mitigation: None required.

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[28] The angled parking spaces are about 9 feet wide, and a parallel space is about 20 feet wide. Thus, roughly dividing by two, the reconfiguration of 40 angled parking spaces to parallel parking would eliminate 20 spaces.

Cumulative Impacts

The geographic scope of cumulative impacts related to transportation and circulation includes the roadways adjacent to the project site and staging areas, and truck access routes to and from the regional roadway network.

Existing and probable future projects listed in Table 4.1-1 in Section 4.1, Overview, could contribute to cumulative impacts related to transportation and circulation. Project construction is expected to begin in February 2018 and end in January 2023, and construction of the project facilities would occur in the same time frame and vicinity as other planned and proposed projects that would use the same roadways for access to work sites.

On the basis of the schedule information presented in Table 4.1-1, the following cumulative projects are completed or would be completed prior to construction of the BDFP: SEP Chemical System Relocation and Facilities Upgrade, SEP Existing Digester Roof Repairs, SEP Primary/Secondary Clarifier Upgrades, SEP North Side Reliability Project, SEP Oxygen Generation Plant Replacement, Central Shops Relocation and Land Reuse, Land Reuse – 1801 Jerrold Avenue (Asphalt Plant site), Griffith Yard Improvements, Southeast Greenhouses Demolition, Jerrold Bridge North Span Replacement, Quint Street Bridge Replacement Project, and Quint Street Lead Track. Two SFPUC projects would start following completion of the BDFP: Demolition of Existing SEP Digesters and Southside Renovation Project, and Eastside Recycled Water Project. The project definition and/or anticipated construction period of the following projects is unknown: Southeast Community Center Rehabilitation, San Francisco Wholesale Produce Market, Blue Greenway Project and Heron's Head Improvements Project, Pier 90-94 Backlands Improvement Project, Asphalt and Concrete Recycling and Production Facility, Pier 96 Bulk Export Terminal, 2225 Jerrold Avenue Facility, and the San Francisco Gateway project.[29]

Of the projects included in Table 4.1-1 in Section 4.1, Overview, eight SFPUC projects at the SEP (Southeast Plant Headworks Replacement Project, Existing Digester Gas Handling Improvements, Building 521 Replacement/522 Disinfection Upgrade, Power Feed and Primary Switchgear Upgrades, Primary/Secondary Clarifier Upgrades, Seismic Reliability and Condition Assessment Improvements, Oxygen Generation Plant Replacement, and Repair and Replacement Projects) and 12 other projects (Central Bayside System Improvement Project, Kansas and Marin Streets Sewer Improvements, Southeast Outfall Islais Creek Crossing Replacement, 1995 Evans Avenue, Candlestick Point-Hunters Point Shipyard Development, Event Center and Mixed-Use Development at Mission Bay Blocks 29-32, Pier 70 Waterfront Site, Quint-Jerrold Connector Road, Griffith Pump Station, Marin Street Sewer Replacement, India Basin Mixed-Use Development, and Peninsula Corridor Electrification Project) would overlap with construction activities of the BDFP. Of these projects, SFPUC SEP Repair and

29 Construction of the Southeast Community Center Rehabilitation, San Francisco Wholesale Produce Market, Blue Greenway Project and Heron's Head Improvements, Pier 96 Bulk Export Terminal, and the San Francisco Gateway projects may overlap with a portion of the BDFP construction period. These projects may result in increases in construction worker vehicles and construction trucks, may use the same or similar construction access routes to regional facilities, and may result in temporary travel lane closures. Construction Traffic Control Plans for these projects would take into account construction activities of other cumulative projects that may be underway during the overlap period.

Replacement Projects and Candlestick Point-Hunters Point Shipyard Development are ongoing projects, and construction activities are reflected in existing conditions.

Impact C-TR-1: Construction of the project, in combination with past, present, and probable future projects, would not result in significant transportation impacts. (Less than Significant)

The cumulative analysis considers the construction-phase traffic and other transportation system changes associated with the identified construction projects with overlapping construction schedules for the same two periods assessed for existing plus project conditions (in Impact TR-1): (1) October 2018, which represents the period with the greatest project construction truck traffic; and (2) May 2022, which represents the period with the greatest project construction worker traffic. In October 2018, BDFP construction would overlap with the Headworks project, SEP Power Feed and Primary Switchgear Upgrades, SEP Seismic Reliability and Condition Assessment Improvements, SEP Repair and Replacement Projects, Kansas and Marin Streets Sewer Improvements, 1995 Evans Avenue, Candlestick Point-Hunters Point Shipyard Development, Event Center and Mixed-Use Development at Mission Bay Blocks 29-32, Pier 70 Waterfront Site, Quint-Jerrold Connector Road, Griffith Pump Station, India Basin Mixed-Use Development, and the Peninsula Corridor Electrification Project.

Table 4.6-18 presents the available daily construction worker and construction trucks for the cumulative projects that would overlap with the BDFP. Information is presented for the peak construction activity for the BDFP (i.e., October 2018 and May 2022); at other times, the number of construction trucks and workers would be less, either because cumulative projects would be completed or because the number of BDFP trips would be less. As indicated in Table 4.6-18, in the vicinity of the project site, the BDFP and the Headworks project would generate the greatest number of temporary construction vehicle trips during the October 2018 BDFP peak construction period. In May 2022, when the number of construction workers associated with the BDFP would peak, there would be limited overlap with other projects in the vicinity of the project site.

Traffic Circulation Effects

As described in Impact TR-1, the construction of the BDFP, including temporary closure of Jerrold Avenue between the Caltrain tracks and Phelps Street, would not substantially affect traffic circulation in the area as alternative routes, including Evans and Oakdale Avenues, would be available. Existing operations of the San Francisco Wholesale Produce Market would not be substantially affected, as streets west of the Caltrain tracks would not be affected by the BDFP and adequate truck maneuvering area is provided within the portion of Jerrold Avenue between Toland and Rankin Streets. Vehicles currently traveling between the San Francisco Wholesale Produce Market and Third Street via Jerrold Avenue would need to use Toland Street for access to Oakdale Avenue or Evans Avenue. Construction access to the SEP (refer to Figure 2-15 in Chapter 2, *Project Description*) would be primarily via Evans Avenue (to the new entrance to the SEP located near the Caltrain right-of-way, about 650 feet south of Evans Avenue); the existing Rankin Street entrance to the SEP located near Evans Avenue would remain operational. Secondary access for construction and operational trucks would be permitted via Jerrold Avenue from the east and west. The SFPUC Land Reuse – 1801 Jerrold Avenue project, which will be completed prior to BDFP construction, includes closure of the adjacent dead-end block of Quint Street between the Caltrain tracks and Jerrold Avenue, however, this street closure would not affect vehicle circulation in the SEP vicinity.

TABLE 4.6-18
DAILY CONSTRUCTION WORKERS AND CONSTRUCTION TRUCKS FOR CUMULATIVE PROJECTS

Cumulative Project[a]	October 2018[b,c]		May 2022	
	Workers	Trucks	Workers	Trucks
BDFP (proposed project)	212	71	550	28
Southeast Headworks Replacement Project	172	80	--	--
Power Feed and Primary Switchgear Upgrades	20	1	--	--
Seismic Reliability and Conditions Assessment	30	100	--	--
Central Bayside Improvement Project	--	--	75	15
Kansas and Marin Streets Sewer Improvements	10	3	--	--
1995 Evans/Forensic Services Division and Traffic Control	45	100	--	--
Mission Bay Blocks 29-32[d]	350	0	--	--
Pier 70 Development[d]	17	0	404	0
India Basin Mixed-Use Development	50	85	250	85
Total	**906**	**440**	**1,279**	**128**

NOTES:
BDFP = Biosolids Digester Facilities Project; SFPUC = San Francisco Public Utilities Commission

a See Table 4.1-1 in Section 4.1, Overview, for construction schedules and descriptions of cumulative projects.
b Construction of the Quint-Jerrold Connector Road between Quint Street and Jerrold Avenue (late 2018-2019), the Peninsula Corridor Electrification Project (2017-2020), and the Griffith Pump Station (2017-2018) would partially overlap with BDFP construction. Construction worker vehicle and construction truck trips associated with construction of these projects are not known; however, during the October 2018 BDFP peak construction period, these trips would not be anticipated to be substantial and are therefore not included in this table.
c SEP Repair and Replacement Projects and Candlestick Point-Hunters Point Shipyard Development are currently ongoing and travel demand associated with these projects is part of existing conditions.
d Construction truck traffic routes for development at Mission Bay Blocks 29-32 and at Pier 70 would not substantially overlap with BDFP truck routes due to distance from project site (three miles away) and so are not shown. Construction worker parking would not overlap with the BDFP parking study area.

SOURCES: CHS Consulting Group, *SFPUC Southeast Treatment Plant New Headworks Project Transportation Impact Study*, October 2016;SFPUC, SE10 SEP Power Feed and Primary Switchgear Upgrades, provided to ESA+Orion on November 6, 2015; SFPUC, Biosolids Cumulative Impact Analysis Traffic and Air Emissions Data, Seismic Reliability and Condition Assessment- Phase 3, provided to ESA+Orion on November 6, 2015; SFPUC, Biosolids Cumulative Impact Analysis Traffic and Air Emission Data, Central Bayside System Improvement Project, provided to ESA+Orion on January 22, 2016; SFPUC, Biosolids Cumulative Impact Analysis Traffic and Air Emissions Data, Kansas & Marin Sewer Improvements, provided to ESA+Orion on November 6, 2015; San Francisco Planning Department, *Final Mitigated Negative Declaration, 1995 Evans Avenue/San Francisco Police Department (SFPD) Forensic Service Division (FSD) & Traffic Company (TC), Case No. 2013.0342E*, October 2, 2013, amended on November 15, 2013; Office of Community Investment and Infrastructure, *Subsequent Environmental Impact Report, Event Center and Mixed-Use Development at Mission Bay Blocks 29 to 32*, State Clearinghouse No. 2014112045, November 3, 2015; San Francisco Planning Department, *Notice of Preparation of an Environmental Impact Report and Notice of a Public Scoping Meeting, Pier 70 Mixed-Use District Project*, Case No. 2014-001272ENV, August 14, 2013; San Francisco Planning Department, *India Basin – 700 Innes Final Transportation Impact Study*, Case No. 2014-00254ENV, March 2017.

The Southeast Headworks Replacement Project would use the parking lane on the south side of Evans Avenue between Rankin and Quint Streets (about 670 feet) for construction staging for the duration of the Headworks project's 5.5-year construction period, and on-street parking on the north side would also be temporarily restricted in order to maintain two travel lanes in each direction on Evans Avenue. However, for an approximately five-month period during Headworks Replacement Project construction, two of the four travel lanes on Evans Avenue between Rankin and Quint Streets would be closed, and one travel lane would be provided in each direction. The Traffic Control Plan for the Headworks project would address the travel lane reduction, including using advance warning signs, identifying detours/alternative routes, and using flaggers, as appropriate to maintain vehicular traffic flow on Evans Avenue and minimize potential for delays to transit vehicles and conflicts among construction traffic, other vehicular traffic, and bicyclists. In addition, as part of the Headworks project, the segment of Rankin Street between Evans and Davidson Avenues, and Davidson Avenue between Rankin and Quint Streets, would require travel lane closures, and vehicles currently using these roadways could be diverted. On Rankin Street, both travel lanes would be closed for up to nine months for sewer connection work, but local access on the west side of Rankin Street would be maintained throughout the nine-month construction period. On Davidson Avenue, the southern lane would be temporarily closed for sewer connection construction for up to five months, but one travel lane would remain open at all times. As described above, the Traffic Control Plan for the Headworks project would specify the use and location of flaggers, detour signs, and other measures that would be implemented as part of the temporary road and travel lane closures. The temporary travel lane closures on Rankin Street and Davidson Avenue would not affect traffic flow on Evans Avenue or access to the BDFP site. No other cumulative projects in the vicinity of the SEP would result in foreseeable roadway or travel lane closures during the BDFP construction period.

As indicated above and presented in Table 4.6-18, the BDFP would generate the greatest number of construction truck trips during the October 2018 peak construction period, and would overlap with a number of other cumulative projects. The greatest overlap of BDFP and other cumulative project vehicles trips would occur primarily on Evans Avenue, which serves as a primary access route between a number of the cumulative projects and the regional freeway facilities. The addition of cumulative construction vehicle trips, as well as vehicle reroutes due to the BDFP's temporary closure of Jerrold Avenue between the Caltrain tracks and Phelps Street, would result in a noticeable increase in traffic volumes on Evans Avenue, and vehicle delays at intersections along Evans Avenue would increase. The increase in vehicle delays would be greatest when, as part of the Headworks construction, two of the four travel lanes on Evans Avenue between Rankin and Quint Streets would be closed for an approximately five-month period, and only one travel lane would be provided in each direction. The Traffic Control Plan for the Headworks project would address the travel lane reduction, including using advance warning signs, identifying detours/alternative routes, and using flaggers, as appropriate to maintain vehicular traffic flow on Evans Avenue and minimize potential for delays to transit vehicles and conflicts among construction traffic, other vehicular traffic, and bicyclists.

Overall, BDFP construction, in combination with other cumulative projects, would not substantially affect traffic circulation in the area and would result in less-than-significant cumulative construction-related traffic circulation impacts.

Impacts on Traffic Safety

As described in Impact TR-1, during construction, the BDFP would implement a Traffic Control Plan that would help maintain the safety of public streets for vehicles, bicyclists, and pedestrians. In addition to the project-specific Traffic Control Plan, given the multitude of planned projects and ongoing operations at the SEP, the SFPUC has formed a Site Logistics Committee to coordinate future site construction and ongoing operations activity at the SEP (see Section 2.6.1.3 in Chapter 2, *Project Description*). This committee works with program managers, project managers, and SEP operations staff to establish and update pre-construction plans for coordinated construction staging, parking, project interfaces, and traffic control. The SFPUC would hire a Southeast Area Program Construction Manager prior to the start of construction of major SEP projects (i.e., the Headworks and BDFP) and would manage implementation of pre-construction plans and lead coordination efforts between projects and SEP operations through construction. The Southeast Area Program Construction Manager would also be responsible for coordinating with the project teams to update the SFMTA as needed to address local traffic, transit, bicycle, and pedestrian issues. Therefore, for the above reasons, BDFP construction, in combination with construction of other cumulative projects, would result in less-than-significant cumulative construction-related traffic safety impacts.

Impacts on Public Transit

As described in Impact TR-1, construction of the BDFP would require temporary rerouting of the 23 Monterey bus route, as well as the SFPUC SEP employee shuttle that runs between the SEP site and the BART 24th Street Mission station during the morning and evening employee commute periods. Construction activities of other cumulative projects within and in the vicinity of the SEP would occur off-street, and not within travel lanes of streets in the SEP vicinity. Construction of the Headworks project would use the parking lane on the south side of Evans Avenue between Rankin and Quint Streets for construction staging, but on-street parking on the north side would also be temporarily restricted in order to maintain two travel lanes in each direction for most of the construction period, with the exception of a five-month period when one travel lane would be provided in each direction for construction of a sewer connection. The 19 Polk bus route operates on Evans Avenue; there are bus stops on both the north side and the south side of Evans Avenue at Quint Street, and the bus stop on the south side of Evans Avenue would likely be temporarily relocated as part of the Headworks project. In addition, during peak construction periods, both the BDFP and the Headworks project would add truck traffic along Evans Avenue and Rankin Street to the SEP gate accessed from Rankin Street. The intersection of Rankin Street/Evans Avenue is signalized and Evans Avenue has two travel lanes in each direction, which would facilitate trucks access into and out of the SEP at this location. However, as noted above, during a five-month period construction of the Headworks project would result in one travel lane in each direction of Evans Avenue between Rankin and Quint Streets, which could marginally increase travel times for the 19 Polk bus route. In addition, as noted above, a Southeast Area Program Construction Manager would be responsible for coordinating with the BDFP and Headworks project teams and the SFMTA to address local transit issues. Therefore, for the above reasons, BDFP construction, in combination with construction of other cumulative projects, would result in less-than-significant cumulative construction-related transit impacts.

Impacts on Bicycle and Pedestrian Travel

As described in Impact TR-1, BDFP construction would increase the number of construction trucks on Phelps Street and Evans Avenue during the peak construction period between August and December 2018 (i.e., by about 70 daily construction trucks), and both streets are Class III bicycle facilities directly adjacent to the project site (signed route only with sharrows, no separate bicycle lane). As indicated in Table 4.6-18, the Headworks project would generate up to 80 daily construction trucks, thereby increasing the potential for vehicle-bicycle conflicts on these same streets under cumulative conditions, although it would not create potentially hazardous conditions for bicyclists. The Traffic Control Plans for both the BDFP and the Headworks would include measures to ensure bicyclist safety on these streets, and may include temporary detours to other roadways such as Third, Newhall, or Cesar Chavez Streets. The Southeast Area Program Construction Manager would be responsible for coordinating with the BDFP and Headworks project teams and the SFMTA to determine if additional measures would be necessary to address cumulative impacts of these projects on bicyclists during peak construction periods.

As part of construction of the Headworks project, the sidewalk on the south side of Evans Avenue between Rankin and Quint Streets would be temporarily closed, and a temporary traffic signal would be installed at the intersection of Evans Avenue/Quint Street. Due to the proposed sidewalk closure, pedestrians traveling on the south sidewalk would be required to cross Evans Avenue at either the intersection of Evans Avenue/Rankin Street (which is currently signalized) or at the temporary traffic signal at the intersection of Evans Avenue/Quint Street, and continue on the north sidewalk in this segment. Therefore, pedestrian access along Evans Avenue would be maintained. It is not anticipated that other cumulative construction projects at the SEP and in the vicinity would include any sidewalk closures, other than on Jerrold Avenue as part of BDFP construction. Overlap of construction projects at the SEP and in the vicinity would increase the number of pedestrians on sidewalks in the SEP vicinity. However, the additional pedestrians could be accommodated, and cumulative projects would not result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility.

Therefore, for the above reasons, BDFP construction, in combination with construction of other cumulative projects, would result in less-than-significant cumulative construction-related pedestrian and bicycle impacts.

Impacts on Emergency Vehicle Access

As discussed in Impact TR-2, construction of the BDFP, including temporary closure of Jerrold Avenue between the Caltrain tracks and Phelps Street, would not substantially affect emergency vehicle access, as alternative routes, including Evans and Oakdale Avenues, would be available for emergency vehicles. In addition, the SFPUC would coordinate with emergency service providers, and emergency vehicles would be allowed access through the closed portion of Jerrold Avenue, if necessary. Furthermore, in the early stages of BDFP construction, the planned Quint-Jerrold Connector Road Project could be completed, if acquisition of the necessary right-of-way by the City from UPRR is finalized. This project will link Quint Street just north of Oakdale Avenue to Jerrold Avenue via a new roadway along the west side of the Caltrain tracks and will restore access eliminated by the Caltrain project.

Staging areas and construction activities associated with the cumulative projects in the vicinity of the SEP would primarily occur off-street and would not affect the travel lanes of adjacent streets, and therefore would not affect emergency vehicle access on these streets. The Headworks project would use the parking lane on the south side of Evans Avenue between Rankin and Quint Streets for construction staging, and on-street parking on the north side would also be temporarily restricted in order to maintain two travel lanes in each direction on Evans Avenue except during a five-month period. Therefore, emergency vehicle access along Evans Avenue would not be substantially affected.

The temporary increases in construction-related vehicles on streets in the vicinity of the SEP due to cumulative projects that share the same truck access routes as the BDFP (e.g., Headworks) would not substantially affect emergency vehicle access. On these streets, such as Evans Avenue and Cesar Chavez Street, there are multiple travel lanes that would allow vehicles to pull over to the side in order to yield the right-of-way to emergency vehicles and remain stopped until the emergency vehicle passes.

Therefore, for the above reasons, BDFP construction, in combination with construction of other cumulative projects, would result in less-than-significant cumulative construction-related emergency vehicle access impacts.

Impacts on Freight Rail

In addition to the BDFP, other cumulative projects such as the Headworks project and the Event Center and Mixed-Use Development at Mission Bay Blocks 29-32 could also transport excavated soils via the San Francisco Bay Railroad freight rail from Pier 94. Because San Francisco Bay Railroad freight rail operations are regulated to eliminate potential conflicts with Caltrain commuter rail, and because the San Francisco Bay Railroad facility at Pier 94 has capacity to store 300 rail cars and load and unload more than 60 rail cars per day, the one to two rail cars per day associated with the BDFP construction activities would not substantially contribute to the operations of the San Francisco Bay Railroad under cumulative construction conditions. Therefore, for the above reasons, BDFP construction, in combination with construction of other cumulative projects, would result in less-than-significant cumulative construction-related freight rail impacts.

Impacts on Parking

Construction worker parking demand associated with other cumulative projects in the SEP vicinity would primarily be accommodated within off-street staging areas, although for projects with smaller construction work forces, construction worker parking may be accommodated on-street. As indicated in Table 4.6-18, the Headworks project would generate the greatest number of construction workers, and parking for these construction worker vehicles would be accommodated within the SFPUC Bruce Flynn Station site at the northeast corner of the intersection of Evans Avenue/Rankin Street, or at a Pier 94 staging area with a shuttle transporting employees between Pier 94 and the Headworks project site.

The Headworks project would require temporary displacement of about 50 on-street parking spaces on either side of Evans Avenue between Rankin and Quint Streets between January 2017 and December 2021. The parking lane on the south side of Evans Avenue would be used for construction staging, while the parking lane on the north side would be used as a travel lane in order to maintain two travel lanes in each direction on Evans Avenue. The temporary displacement of about 20 on-street parking spaces on Jerrold Avenue as part of the BDFP and 50 on-street parking spaces on Evans Avenue as part of the Headworks project would not substantially affect areawide parking conditions, as the parking demand associated with these temporarily displaced parking spaces could be accommodated on other nearby streets. Therefore, for the above reasons, BDFP construction, in combination with construction of other cumulative projects, would result in less-than-significant cumulative construction-related parking impacts.

Summary of Impact C-TR-1

Overall, impacts of cumulative construction projects in the vicinity of the SEP would be greatest during the peak BDFP construction period between August and December 2018, which would overlap with peak construction truck traffic for the Headworks project. Cumulative construction projects would not result in temporary street closures, with the exception of the closure of Jerrold Avenue between the SEP entrance west of Phelps Street and the Caltrain right-of-way as part of the BDFP construction and travel lane closures on Evans Avenue as part of the Headworks project construction. Project-specific Traffic Control Plans would be prepared for each of the SFPUC-sponsored cumulative projects. In addition, a Southeast Area Program Construction Manager would be hired prior to the start of construction of the Headworks project and would manage implementation of the project-specific Traffic Control Plans and lead coordination efforts between projects and SEP operations throughout construction. For all cumulative projects, construction activities affecting City streets would be required to be conducted in accordance with City requirements to ensure that construction activities are conducted safely and with the least possible interference with pedestrians, bicyclists, transit, and vehicles. For these reasons, construction-related project impacts on traffic, transit, pedestrians, bicyclists, emergency vehicle access, freight rail, and parking, in combination with past, present and other cumulative projects, would be ***less than significant.***

Mitigation: None required.

Impact C-TR-2: Project operations and maintenance activities, in combination with past, present, and probable future projects, would not result in significant transportation impacts. (Less than Significant)

Impacts on Traffic and Circulation

As presented in Table 4.1-1 in Section 4.1, Overview, cumulative projects include infrastructure improvement projects as well as land use development projects such as those at Candlestick Point-Hunters Point Shipyard and Pier 70 that would result in increased travel demand. The infrastructure improvement projects such as the Quint-Jerrold Connector Road and the improvements associated with the San Francisco Wholesale Produce Market would replace and/or enhance existing facilities and would not be expected to result in a substantial increase in travel demand. Operations and maintenance of these facilities would remain similar to existing operations and would not result in a noticeable increase in VMT in the area.

When the San Francisco Wholesale Produce Market project is implemented, the City would vacate a portion of Jerrold Avenue between Toland and Rankin Streets (i.e., to the west of the SEP). This portion of Jerrold Avenue would then be enclosed so that only authorized and inspected vehicles could have access to the produce market. Vehicular traffic not related to the San Francisco Wholesale Produce Market would be directed to parallel streets to the north or south on segments of Innes and Kirkwood Avenues, which would be improved. In addition, the Wholesale Produce Market project would relocate a portion of Rankin Street between Jerrold Avenue and Innes Avenue to parallel the existing and adjacent Caltrain right-of-way, thereby allowing for rerouting of westbound traffic on Jerrold Avenue west of Rankin Street.[30] No tentative date has been identified for these roadway

[30] The closure of Jerrold Avenue between Toland and Rankin Streets was approved as part of the Wholesale Produce Market Project Mitigated Negative Declaration, Case No. 2009.1153E (San Francisco Planning Department, May 11, 2011, amended on July 5, 2011). Available online at http://sf-planning.org/sites/default/files/FileCenter/Documents/8783-2009.1153E_SFWholesaleProduceMarketFMND.pdf.

improvements, which would be built and operational prior to the construction of the San Francisco Wholesale Produce Market project. The recently proposed San Francisco Gateway project would redevelop two City blocks to the west and south of the SEP (the two blocks bounded by Kirkwood Avenue, McKinnon Avenue, Toland Street, and Rankin Street) as a multi-building Production, Distribution and Repair center, and would vacate and close Selby Street between Kirkwood and McKinnon Avenues. Selby Street is currently the unimproved right-of-way (i.e., no curbs, gutters, or sidewalks) under the I-280 freeway structure providing access to the adjacent uses, and its closure to through traffic would not substantially affect circulation in the SEP vicinity.

Quint Street was permanently closed to through traffic, pedestrians, and bicycles at the Caltrain tracks in October 2015 as part of Caltrain's Quint Street Bridge Replacement project. In parallel with Caltrain's bridge replacement project, the City is leading a project to construct a new Quint-Jerrold Connector Road along the west side of the Caltrain tracks that will replace the north-south access lost with the Quint Street closure. The roadway would be approximately 1,000 feet long between existing Quint Street and Jerrold Avenue, with one lane each way and a sidewalk on the west side. CEQA environmental review of the Quint-Jerrold Connector Road project has been completed,[31] and the project is currently under design; its construction is contingent on the acquisition of the necessary property from UPRR. Construction is expected to start late 2018 and would last approximately one year.

As noted in Impact TR-3, vehicle trips associated with BDFP operations and maintenance activities would remain similar to existing conditions (i.e., would increase from fewer than 33 per day under existing conditions to fewer than 36 per day by 2045 due to anticipated population growth). In addition, operation of the BDFP would not result in an increase in the total number of employees at the SEP. Therefore, the BDFP would not increase total VMT associated with SEP operations. In addition, the redesign and reconstruction of the segment of Jerrold Avenue between Phelps Street and the Caltrain tracks fit within the general types of projects identified by the San Francisco Planning Department that would not substantially induce automobile travel. Therefore, for the above reasons, the BDFP, in combination with past, present and probable future development projects and transportation network changes, would result in less-than-significant cumulative VMT impacts.

Impacts on Public Transit

As noted in Impact TR-3, following completion of BDFP construction, Jerrold Avenue between Phelps Street and the Caltrain tracks would be reopened, and the temporary construction-related reroute of the 23 Monterey bus route would be discontinued, unless the SFMTA implements the proposed Muni Forward service improvements for the 23 Monterey, in which case the temporary reroute would become permanent. If the Muni Forward service improvements for the 23 Monterey are not implemented, the closure of Jerrold Avenue to through traffic between Toland and Rankin Streets as part of the San Francisco Wholesale Produce Market project would require the relocation of the 23 Monterey to Innes Avenue between Toland and Rankin Streets and to the relocated Rankin Street between Innes and Jerrold Avenues. The Quint-Jerrold Connector Road project is being designed to

[31] San Francisco Planning Department, Quint-Jerrold Connector Road Project Mitigated Negative Declaration, Case No. 2013.0858E, August 5, 2015, amended on September 23, 2015. Available online at http://sfmea.sfplanning.org/2013.0858E_FMND.pdf.

accommodate a potential future Caltrain station at Oakdale Avenue (i.e., along the Caltrain tracks between Oakdale and Jerrold Avenues), and the BDFP would not conflict with or preclude the proposed new station. Operation of the BDFP would not cause or contribute to potential significant cumulative impacts on transit capacity utilization or transit operations in the SEP vicinity because operation of the BDFP would not result in an increase in the total number of employees at the SEP or the number of transit trips. In addition, operation of the BDFP would result in a very minimal increase in the number of haul trucks trips traveling to and from the SEP. Therefore, for the above reasons, the BDFP, in combination with past, present, and probable future development projects and transportation network changes, would result in less-than-significant cumulative transit impacts.

Impacts on Bicycle and Pedestrian Travel

Operation of the BDFP would not cause or contribute to potential significant cumulative impacts on pedestrians or bicycles because operation of the BDFP would not result in an increase in the total number of employees at the SEP or the number of pedestrian and bicycle trips in the area. In addition, operation of the BDFP would result in a very minimal increase in the number of haul truck trips traveling to and from the SEP. The BDFP would improve the sidewalk on Jerrold Avenue between the Caltrain tracks and Phelps Street. Other cumulative projects include improvements that would further enhance pedestrian conditions in the project site vicinity. For example, the Headworks project would install bulb-outs on Evans Avenue. The San Francisco Wholesale Produce Market project would create new sections of Innes and Kirkwood Avenues, relocate Rankin Street between Jerrold and Innes Avenues to parallel the existing and adjacent Caltrain tracks, and provide new curb, gutters, and sidewalks on the improved sections of Innes and Kirkwood Avenues and the new Rankin Street. In addition, the Headworks project would install sidewalk bulb-outs on the south side of Evans Avenue between Rankin and Quint Streets.

For the above reasons, the BDFP, in combination with past, present, and probable future development, would result in less-than-significant cumulative pedestrian and bicycle impacts.

Impacts on Freight Rail

Operation of the BDFP would not include activities using freight rail, and therefore the project would not contribute to cumulative freight rail impacts. Therefore, the BDFP, in combination with past, present, and probable future development, would result in less-than-significant cumulative freight rail impacts.

Impacts on Emergency Vehicle Access

With implementation of the cumulative projects, emergency vehicle access conditions in the project vicinity would remain similar to existing conditions, as the BDFP and other cumulative projects would not change the roadway network in the area. The exception is the San Francisco Wholesale Produce Market project, which, if implemented, would vacate the portion of Jerrold Avenue between Toland and Rankin Streets, improve and extend Innes and Kirkwood Avenues to connect with Toland Street, and relocate a portion of Rankin Street between Innes and Jerrold Avenues. These changes would not substantially affect emergency vehicle access in the SEP vicinity. Implementation of the BDFP would not cause or contribute to potentially significant cumulative impacts on emergency vehicle access because the BDFP would not close any streets and operation of the BDFP would not substantially affect vehicle travel on adjacent roadways. Therefore, for the above reasons, the BDFP, in combination with past, present, and probable future development, would result in less-than-significant cumulative emergency vehicle access impacts.

Impacts on Parking

Operations and maintenance activities at the SEP following completion of the BDFP would not result in additional employees or increased parking demand. With implementation of cumulative projects at the SEP, including the BDFP, area-wide parking conditions would remain similar to existing conditions. The parking demand associated with the San Francisco Wholesale Produce Market would be accommodated on-site. There are limited cumulative land use development projects in the vicinity of the SEP, and it is not anticipated that area-wide parking demand would substantially increase. Parking demand associated with cumulative land use development projects located a mile or more east and north of the SEP, such as Candlestick Point-Hunters Point Shipyard, Pier 70 Waterfront Site, and development on Mission Bay Blocks 29-32, would not affect parking conditions in the vicinity of the SEP. The BDFP would not contribute considerably to cumulative parking impacts.

With implementation of all cumulative projects, area-wide on-street parking supply would increase over existing conditions. While the proposed reconfiguration of Jerrold Avenue between the Caltrain tracks and Phelps Street as part of the BDFP would result in a loss of about 20 on-street parking spaces, implementation of the San Francisco Wholesale Produce Market project would create new sections of Innes and Kirkwood Avenues (between Toland and Rankin Streets), which would add about 240 on-street parking spaces. Implementation of the City's Transit-First Policy, the City's Better Streets Plan, and related projects on area streets may reduce on-street parking supply to promote sustainable travel modes and sustainable street designs, and may lead to a mode shift from private passenger vehicles to transit or other modes of travel. Therefore, for the above reasons, the BDFP, in combination with past, present, and other cumulative projects, would result in less-than-significant cumulative parking impacts.

Summary of Impact C-TR-2

Overall, BDFP operations, in combination with past, present, and probable future projects, would not substantially contribute to adverse cumulative transportation conditions in the area. Operations and maintenance activities at the SEP would be similar to existing conditions, and BDFP operations would not contribute to cumulative increases in travel demand. The San Francisco Wholesale Produce Market project would close Jerrold Avenue between Toland and Rankin Streets and create new sections of Innes and Kirkwood Avenues, but these cumulative changes would not substantially affect circulation in the area or result in significant transportation impacts. For these reasons, the cumulative impacts on VMT, traffic hazards, transit, pedestrians, bicyclists, emergency vehicle access, parking, and freight rail resulting from BDFP operations, in combination with past, present, and probable future projects, would be ***less than significant***.

Mitigation: None required.

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4.7 Noise and Vibration

This section describes the existing noise and vibration environment in the project area, reviews the existing regulatory framework governing noise and vibration, evaluates potential construction-related and operational noise and vibration impacts associated with implementation of the Biosolids Digester Facilities Project (BDFP or project), and identifies mitigation measures to avoid or reduce significant adverse impacts. **Appendix NOI** presents supporting information for the noise analysis.

4.7.1 Setting

4.7.1.1 Sound Fundamentals

Sound is characterized by various parameters that describe the rate of oscillation (frequency) of sound waves, the distance between successive troughs or crests in the wave, the speed that it travels, and the pressure level or energy content of a given sound. The sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound, and the decibel (dB) scale is used to quantify sound intensity. Because sound can vary in intensity by over one million times within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level. Since the human ear is not equally sensitive to all sound frequencies within the entire spectrum, human response is reflected in the A-weighted decibel (expressed as "dBA"), which refers to a scale of noise measurement that approximates the range of sensitivity of the human ear to sounds of different frequencies. On this scale, the normal range of human hearing extends from about 0 dBA to about 140 dBA. Except in carefully controlled laboratory experiments, a change of only 1 dBA in sound level cannot be perceived. Outside of the laboratory, a 3-dBA change is considered a perceptible difference. A 10-dBA increase in the level of a continuous noise represents a perceived doubling of loudness.[1]

Noise Descriptors

Noise is generally defined as sound that is loud, disagreeable, unexpected, or unwanted. Sound is mechanical energy transmitted in the form of a wave by a disturbance or vibration that causes pressure variation in air the human ear can detect. Variations in noise exposure over time are typically expressed in terms of a steady-state energy level (called L_{eq}) that represents the acoustical energy of a given measurement, or alternatively as a statistical description of what sound level is exceeded over some fraction (10, 50, or 90 percent) of a given measurement period (i.e., L_{10}, L_{50}, L_{90}). $L_{eq}(24)$ is the steady-state acoustical energy level measured over a 24-hour period. L_{max} is the maximum, instantaneous noise level registered during a measurement period. Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, state law requires that, for planning purposes, an artificial dBA increment be added to evening and nighttime

[1] California Department of Transportation (Caltrans), *Technical Noise Supplement (TeNS) to the Traffic Noise Analysis Protocol* pp. 2-44 to 2-45, September 2013. Available online at http://www.dot.ca.gov/hq/env/noise/pub/TeNS_Sept_2013B.pdf. Accessed on April 14, 2015.

noise levels to form a 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL). CNEL adds a 5-dBA penalty during the evening (7:00 p.m. to 10:00 p.m.) and a 10-dBA penalty at night (10:00 p.m. to 7:00 a.m.). Another 24 hour noise descriptor, called the day-night noise level (Ldn), is similar to CNEL. Both CNEL and Ldn add a 10-dBA penalty to all nighttime noise levels between 10:00 p.m. and 7:00 a.m., but Ldn does not add the evening 5-dBA penalty between 7:00 p.m. and 10:00 p.m. In practice, Ldn and CNEL usually differ by less than 1 dBA at any given location for transportation noise sources.[2] **Table 4.7-1** presents representative noise sources and their corresponding noise levels in dBA at varying distances from the noise sources.

TABLE 4.7-1
REPRESENTATIVE ENVIRONMENTAL NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock Band
Jet Fly-Over at 100 feet		
	100	
Gas Lawnmower at 3 feet		
	90	
Diesel Truck going 50 mph at 50 feet		Food Blender at 3 feet
	80	Garbage Disposal at 3 feet
Noise Urban Area during Daytime		
Gas Lawnmower at 100 feet	70	Vacuum Cleaner at 10 feet
Commercial Area		Normal Speech at 3 feet
Heavy Traffic at 300 feet	60	
		Large Business Office
Quiet Urban Area during Daytime	50	Dishwasher in Next Room
Quiet Urban Area during Nighttime	40	Theater, Large Conference Room (background)
Quiet Suburban Area during Nighttime		
	30	Library
Quiet Rural Area during Nighttime		Bedroom at Night, Concert Hall (background)
	20	
		Broadcast/Recording Studio
	10	
	0	

NOTES:
dBA = A-weighted decibel; mph = miles per hour

SOURCE: California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013, p. 2-20.

2 Ibid. pp. 2-48.

Attenuation of Noise

A receptor's distance from a noise source affects how noise levels attenuate (decrease). Transportation noise sources tend to be arranged linearly, such that roadway traffic attenuates at a rate of 3.0 dBA to 4.5 dBA per doubling of distance from the source, depending on the intervening surface (paved or vegetated, respectively). Point sources of noise, such as stationary equipment or construction equipment, typically attenuate at a rate of 6.0 dBA to 7.5 dBA per doubling of distance from the source.[3] For example, a sound level of 80 dBA at 50 feet from the noise source will be reduced to 74 dBA at 100 feet, 68 dBA at 200 feet, and so on. Noise levels can also be attenuated by "shielding" or providing a barrier between the source and the receptor. With respect to interior noise levels, noise attenuation effectiveness depends on whether windows are closed or open. Based on the United States Environmental Protection Agency (USEPA) national average, closed windows reduce noise levels by approximately 25 dBA, while open windows reduce noise levels by about 15 dBA.[4]

Health Effects of Environmental Noise

The World Health Organization (WHO) is perhaps the best source of current knowledge regarding health impacts of noise. According to WHO, sleep disturbance can occur when continuous indoor noise levels exceed 30 dBA (L_{eq}) or when intermittent interior noise levels reach or exceed 45 dBA (L_{max}), particularly if background noise is low. With a bedroom window slightly open (a reduction from outside to inside of 15 dB), the WHO criteria for avoiding sleep disturbance would suggest exterior continuous (ambient) nighttime noise levels should be 45 dBA (L_{eq}) or below, and short-term events should not generate noise levels at the exterior of the residence in excess of 60 dBA (L_{max}). WHO also notes that maintaining noise levels within the recommended levels during the first part of the night is believed to be effective for the ability to fall asleep.[5]

Other potential health effects of noise identified by WHO include decreased performance for complex cognitive tasks, such as reading, attention span, problem solving, and memorization; physiological effects such as hypertension and heart disease (after many years of constant exposure, often by workers, to high noise levels); and hearing impairment (again, generally after long-term occupational exposure, although shorter-term exposure to very high noise levels, for example, exposure several times a year to concert noise at 100 dBA, can also damage hearing). Finally, noise can cause annoyance and can trigger emotional reactions like anger, depression, and anxiety. WHO reports that, during daytime hours, few people are seriously annoyed by activities with noise levels below 55 dBA or moderately annoyed with noise levels below 50 dBA.

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3 The 1.5-dBA variation in attenuation rate (6 dBA vs. 7.5 dBA) can result from ground absorption effects, which occur as sound travels over soft surfaces such as soft earth or vegetation (7.5-dBA attenuation rate) vs. over hard ground such as pavement or very hard-packed earth (6-dBA rate). (U.S. Housing and Urban Development, *The Noise Guidebook*, 1985, p. 24. Available online at https://www.hudexchange.info/onecpd/assets/File/Noise-Guidebook-Chapter-4.pdf. Accessed on March 9, 2016.)

4 United States Environmental Protection Agency (USEPA), *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, March 1974, Appendix B, Table B-4, p. B-6.

5 World Health Organization (WHO), *Guidelines for Community Noise*, April 1999, Chapter 3, p. 46. Available online at http://www.who.int/docstore/peh/noise/guidelines2.html. Accessed on March 10, 2016.

Vehicle traffic and continuous sources of machinery and mechanical noise contribute to ambient noise levels. Short-term noise sources, such as truck backup beepers, the crashing of material being loaded or unloaded, car doors slamming, and engines revving outside a nightclub, contribute very little to 24-hour noise levels but are capable of causing sleep disturbance and severe annoyance. The importance of noise to receptors depends on both time and context. For example, long-term high noise levels from large traffic volumes can make conversation at a normal voice level difficult or impossible, while short-term peak noise levels, if they occur at night, can disturb sleep.

Groundborne Vibration and Noise

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Typically, groundborne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Vibration is typically measured by peak particle velocity (PPV) in inches per second (in/sec). With the exception of long-term occupational exposure, vibration levels rarely affect human health. Instead, most people consider vibration to be an annoyance that can affect concentration or disturb sleep. People may tolerate infrequent, short-duration vibration levels, but human annoyance from vibration becomes more pronounced if the vibration is continuous or occurs frequently. High levels of vibration can damage fragile buildings or interfere with sensitive equipment. Depending on the age of the structure and type of vibration (transient, continuous, or frequent intermittent sources), threshold vibration levels can range from 0.1 to 2.0 in/sec PPV for damage to a structure.[6]

Typical sources of groundborne vibration in San Francisco are large-scale construction projects that involve pile driving or underground tunneling, and transit operations of Caltrain and Muni Metro's light rail vehicles and historic streetcars. Vibration is also caused by transit vehicles in the subway system under Market Street, including Muni Metro light rail vehicles and Bay Area Rapid Transit (BART) trains. Because rubber tires provide vibration isolation, rubber tire vehicles such as Muni buses, trucks, and automobiles rarely create substantial groundborne vibration effects unless there is a discontinuity or bump in the road that causes the vibration.[7]

4.7.1.2 Local Setting

Sensitive Receptors

In general, people in residences, schools, daycare centers, libraries, churches, hospitals, and convalescent care facilities are more sensitive to noise than those at commercial and industrial establishments. Consequently, the noise standards for such land uses are more stringent than those for less sensitive uses (as reflected in the *San Francisco General Plan* Environmental Protection Element's noise compatibility guidelines). Workers are not typically considered noise-sensitive

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6 California Department of Transportation (Caltrans), *Transportation and Construction-Induced Vibration Guidance Manual,* 2004, Table 19, p. 27. Available online at http://www.dot.ca.gov/hq/env/noise/pub/vibrationmanFINAL.pdf, Accessed on March 10, 2016.

7 U.S. Department of Transportation Federal Transit Administration (FTA), *Transit Noise and Vibration Impact Assessment*, DTA-VA-90-1003-06, May 2006, p. 10-6. Available online at http://www.fta.dot.gov/12347_2233.html. Accessed on March 10, 2016.

receptors because employers are required to comply with regulations set forth by the Occupation Safety and Health Administration (OSHA) to ensure the health and well-being of their employees, which includes hearing protection.

Project Site

Noise

This noise analysis focuses on areas within 1,000 feet of the project site because the site is located in an urban environment where most typical construction and operation noise sources of concern attenuate to background or acceptable noise levels within this distance, even when no intervening structures are present. Since the project vicinity is developed and there are intervening structures located between the project site and nearby sensitive receptors, existing intervening structures would provide noise attenuation benefits.[8]

Sensitive receptors within 1,000 feet of the project site include residences, a school/educational facility, a daycare facility, and various churches. Of these nearby receptors, residences and schools are among the land uses generally considered to be the most sensitive to noise. The closest residential uses to the project site are located along the east side of Phelps Street directly across the street from the Southeast Water Pollution Control Plant (Southeast Plant or SEP) and along Jerrold Avenue on the block east of Phelps Street. These residences are located about 600 to 700 feet from the closest BDFP facilities. There are existing SEP facilities such as the existing digesters between proposed BDFP facility locations and these residences, interrupting the lines-of-sight (and, consequently, future noise) between the project site and these ground-level receptors. In addition, a masonry wall that extends along the SEP boundary adjacent to Phelps Street also interrupts the lines-of-sight between ground-level sources and ground-level receptors. However, there are more distant residences in higher elevations of the Silver Terrace neighborhood to the south (1,700 feet or more from the BDFP site) with direct or uninterrupted lines-of-sight.

The Southeast Community Facility (1800 Oakdale Avenue) is approximately 750 feet south of proposed BDFP facilities; services provided in this facility include an education/training center operated by the City College of San Francisco and a daycare facility, the Wu Yee South East Child Development Center at 1300 Phelps Street.[9] No other schools or daycare facilities are located within 1,000 feet of BDFP facilities.

No libraries, hospitals, or convalescent care facilities are located within 1,000 feet of project facilities.

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8 Because the noise attenuation benefits from intervening buildings would vary depending on the height of the receptor (ground floor versus second or third floor) and the varying heights and continuity of intervening structures (i.e., a continuous wall versus existing digester tanks), attenuation benefits were not included in this analysis. By not including attenuation benefits from intervening structures, this analysis is considered very conservative, with some receptors likely subject to lower than predicted noise levels where there are intervening structures. (See Section 4.7.3.2 for more discussion of noise attenuation factors.)

9 A complete listing of services provided at this facility is available online at City and County of San Francisco, Southeast Community Facility Commission, Partners and Services. Available online at http://sfgov.org/sefacility/servicesofferings-and-locations. Accessed on February 8, 2017.

Religious facilities located within 1,000 feet of the project site include two churches located on the south side of Oakdale Avenue, approximately 850 to 900 feet southwest of the project site: Calvary Apostolic Church (1869 Oakdale Avenue) and Galilee Missionary Baptist Church (1901 Oakdale Avenue).

Active parks, recreation centers, and playgrounds are not as sensitive to noise as residences, schools, hospitals, or convalescent care facilities, because background noise levels at active parks and recreation centers and at playgrounds tend to be elevated. However, users of natural recreation areas may value an increased degree of quiet for passive recreational uses. There are no natural recreation areas within 1,000 feet of BDFP facilities. The closest park is the Palou & Phelps Mini-Park, located at the southeast corner of Palou Avenue and Phelps Street, approximately 1,000 feet south of the SEP boundary.

Vibration

The responses of human receptors and structures to vibration are influenced by a combination of factors, including soil/rock type, distance from the source, duration, the number of perceived vibration events, and time of day. Vibration-sensitive structures include old or fragile structures (some of which may be historic) or vibration-sensitive manufacturing, research, or laboratory activities. While energy transmitted through the ground as vibration can reach levels that can cause cosmetic damage or disrupt vibration-sensitive activities, humans are much more sensitive to vibration, and the vibration amplitudes that can be perceived by humans are well below the levels that cause cosmetic damage.

There are no known fragile structures or vibration-sensitive land uses in the immediate project vicinity. Although historic structures are often considered to be more fragile than modern structures, the adjacent and nearby SEP structures that are identified as historic (see Section 4.5, Cultural Resources) have been engineered for industrial use and lack fragile architectural features; therefore, they are not considered to be sensitive to vibration. Similar to noise-sensitive receptors, however, nearby residential uses to the east and south are considered to be sensitive to vibration if it occurs during the nighttime hours and causes sleep disturbance.

Potential Off-Site Staging Areas

Piers 94 and 96

There are no residences, schools, libraries, religious facilities, hospitals, or convalescent care facilities located within 1,000 feet of this staging area. The closest educational facility is the City College of San Francisco's Evans Campus located at 1400 Evans Avenue, as close as 1,150 feet southwest of the Pier 94 staging area (refer to Figure 4.2-2 in Section 4.2, Land Use). There are no active parks in the vicinity of this staging area, but the Bay Trail is located as close as 300 feet south of the Pier 96 staging area, while picnic facilities at the Heron's Head Park, a natural recreation area, are located as close as about 250 feet south of this staging area (refer to Figure 4.2-2).

Quint Street, Jerrold Avenue, and Southeast Greenhouses

These staging areas are located adjacent to each other and to the BDFP site, and therefore have many of the same sensitive receptors located nearby but at slightly closer distances, so that the residential neighborhood generally south of Jerrold Avenue, west of Third Street, and north of Quesada Avenue is within 1,000 feet of these staging areas. There are a few more residences on each street between Hudson Avenue and Kirkwood Avenue that are located within 1,000 feet of the east end of the Jerrold Avenue staging area. The closest residences are located on the east side of Phelps Street (near its intersection with McKinnon Avenue), as close as 50 feet east of the Southeast Greenhouses staging area.

Just south of the Southeast Greenhouses staging area is the Southeast Community Facility; which includes the Wu Yee daycare facility (inclusive of its outdoor play area) located as close as approximately 100 feet to the southernmost greenhouse. The main building of the Southeast Community Facility is located a minimum of 140 feet from the southernmost greenhouse. No other schools or daycare facilities are located within 1,000 feet of these staging areas. In addition to the two churches identified above for the project site, the Faith Temple Church of God in Christ (1758 Oakdale Avenue) and Metropolitan Baptist Church (1682 Newcomb Avenue) are also located within 1,000 feet of the Southeast Greenhouses staging area. As with the BDFP site, there are no libraries, hospitals, or convalescent care facilities located within 1,000 feet of these staging areas, but there is a small assisted living facility (Mae Bea Andrews Boarding Care, 1739 Newcomb Avenue) located in a residence about 600 feet southeast of the Southeast Greenhouses staging area.

1550 Evans Avenue

Residential uses on Hudson Avenue are located as close as approximately 850 feet south of this staging area. The closest educational facility is the City College of San Francisco's Evans Campus at 1400 Evans Avenue, as close as about 325 feet east of this staging area (refer to Figure 4.2-1 in Section 4.2, Land Use). There are no libraries, religious facilities, hospitals, or convalescent care facilities located within 1,000 feet of this staging area.

Existing Noise Environment

Project Site

The project site is located in an urban area where noise from nearby industrial uses such as a scrap metal recycling company (Circosta Iron & Metal Company) to the northwest of the site and vehicular traffic (automobiles, trucks, and buses on the Interstate 280 [I-280] freeway, which is located as close as 0.1 mile to the west, and other major thoroughfares in the vicinity) dominate the existing ambient noise environment. In addition, intermittent sources of noise that contribute to ambient noise levels include commuter train traffic (Caltrain) adjacent to the project site's western boundary, industrial freight train traffic adjacent to the project site's western boundary, and nearby light rail trains (Muni Third Street line), approximately 1,000 feet east of the project site's eastern boundary.

Ambient Noise Levels at Project Site and SEP

The noise environment surrounding the project site is influenced primarily by truck and automobile traffic on the I-280 freeway (elevated in the site vicinity) and local streets, railroad operations along the Caltrain right-of-way, on-site wastewater treatment facilities/operations, and various industrial uses in the site vicinity. Noise measurements collected along the project site western boundary (Locations A and B, respectively, on **Figure 4.7-1**) range from 61 to 73 dBA (Leq) during the daytime hours (7:00 a.m. to 8:00 p.m.) and 54 to 66 dBA (Leq) during the evening and nighttime hours (8:00 p.m. to 7:00 a.m.), with lower noise levels occurring at the Asphalt Plant (no longer in operation) and higher noise levels occurring to the north with increasing proximity to the adjacent scrap metal recycling facility, I-280 freeway, and Evans Avenue. Existing noise levels along the eastern SEP boundary (Locations C and D, respectively, on Figure 4.7-1) range from 63 to 69 dBA (Leq) during the daytime hours and 58 to 59 dBA (Leq) during the evening and nighttime hours; nighttime levels are 5 to 10 dBA lower than daytime levels.[10]

Ambient Noise Levels at Nearby Sensitive Receptors

The project site and areas to the north and east are relatively level, sloping gently down to the Bay; the topography rises to the south in the vicinity of the Silver Terrace neighborhood. Long-term noise measurements were collected in September to October 2015 at six locations (numbered 1 through 6 on Figure 4.7-1) that correspond to nearby sensitive receptors that reflect a representative range of noise environments in the SEP vicinity, from the closest receptors to more distant receptors with uninterrupted lines-of-sight to the project site (i.e., where existing buildings and topography do not block noise generated on-site). **Table 4.7-2** presents the noise measurement results collected at adjacent and nearby sensitive receptors. In general, daytime noise levels in residential neighborhoods to the east range from 60 to 67 dBA (Leq), and nighttime noise levels are about the same (58 to 64 dBA, Leq). Residential neighborhoods to the south are subject to slightly lower daytime and nighttime noise levels than the neighborhood east of the SEP.

Noise Incidents at the SEP

SEP incident report records from June 2009 through October 2015 indicate that only one noise complaint was received during that time. According to the incident report, the complaint was received during the testing of the oxygen generation plant, a facility that had just been installed and was in the startup/testing stage. In response to the complaint, SEP staff shut down the oxygen generation plant on the fourth day of the five-day test. The noise remediation work has been completed and now the plant is operating without any additional noise incidents.[11]

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[10] Vibro-Acoustic Consultants, *Noise Data for EIR Team – SEP Fenceline,* September 2015. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2015.000644ENV.

[11] SFPUC, *SEP Noise Complaints, 2009 – 2015.* Data provided via email on October 30, 2015.

SFPUC Biosolids Digester Facilities

Figure 4.7-1
Noise Measurement Locations

SOURCE: Vibro-Acoustic Consultants, *Noise Data for EIR Team - SEP Fenceline*, September 2015.

Note: Locations indicated by letters are those where noise measurements were taken along the SEP and project site boundaries. Numbered noise measurement locations are nearby sensitive receptors reflecting a representative range of noise environments in the SEP vicinity and are evaluated in the impact analysis.

TABLE 4.7-2
SUMMARY OF NOISE MONITORING IN PROJECT VICINITY

Measurement/ Receptor Location	Location	Time Period	Noise Level (dBA)				
				Leq		L90	
			Ldn (24-hour)	Day (7:00 a.m. to 8:00 p.m.)	Night (8:00 p.m. to 7:00 a.m.)	Day (7:00 a.m. to 8:00 p.m.)	Night (8:00 p.m. to 7:00 a.m.)
Location 1	1796 La Salle Avenue (east side of Phelps Street) (representative of residential receptors on east side of Phelps Street)	9/25/15-9/30/15 (5 days)	71	67	64	57	55
Location 2	1663 Kirkwood Avenue (east of Phelps Street) (representative of residential receptors mid-block on streets such as Jerrold, Kirkwood, and La Salle on the east side of SEP)	9/25/15-9/28/15 (3 days)	64	61	58	54	51
Location 3	1200 Phelps Street (west side of Phelps Street) (representative of Wu Yee South East Child Development Center and Southeast Community Facility)	9/25/15-9/30/15 (5 days)	66	60	59	56	56
Location 4	1901 Palou Avenue (representative of Silver Terrace neighborhood located south of Oakdale Avenue, near lower elevations, about 0.2 to 0.25 mile south of BDFP site)		67	65	60	56	51
Location 5	2000 Revere Avenue (representative of Silver Terrace neighborhood near middle elevations, about 0.25 to 0.33 mile south of BDFP site)		65	63	57	54	51
Location 6	296 Bayview Circle (representative of Silver Terrace neighborhood near highest elevations with direct line-of-sight, about 0.33 mile or more south of BDFP site)		62	58	55	53	52
Location A	Southwestern Project Boundary - Asphalt Plant	9/14/15-9/20/15 (6 days)	64	62	57	54	50
Location B	Northwestern Project Boundary - Central Shops		75	70	68	58	61
Location C	Northeastern Project Boundary - Visitors Parking Lot	9/14/15-9/19/15 (5 days)	67	63	60	56	54
Location D	Southeastern Project Boundary - Anaerobic Digesters	9/14/15-9/20/15 (6 days)	71	66	62	65	61

NOTES:

dBA = A-weighted decibel; SEP = Southeast Water Pollution Control Plant; BDFP = Biosolids Digester Facilities Project

Average daytime, evening, and night Leq noise levels were calculated by Orion Environmental Associates based on noise measurement data collected by Vibro-Acoustics in 2015. Ldn was calculated by Vibro-Acoustics and the lowest L90 measured is based on noise measurement data collected by Vibro-Acoustics. Noise levels were calculated based on three to six continuous days of measurement data.

SOURCE: Vibro-Acoustic Consultants, *Noise Data for EIR Team – Receptors and SEP Fenceline,* September 2015. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2015.000644ENV

Potential Off-Site Staging Areas

Piers 94 and 96

The San Francisco Department of Public Health (SFDPH) has mapped noise levels along transportation corridors throughout the City and County of San Francisco (CCSF or "City"). SFDPH mapping indicates that traffic noise levels in the Piers 94 and 96 vicinity exceed 70 dBA (L_{dn}) on the east-west section of Amador Street (just east of Third Street) where there are industrial uses and high truck volumes. Noise levels along this street are estimated to decrease to less than 60 dBA (L_{dn}) where Amador Street turns south and extends in a southeasterly direction.

Quint Street and Jerrold Avenue

According to SFDPH traffic noise level mapping, traffic noise levels along Quint Street are estimated at 60 to 65 dBA (L_{dn}), while noise levels along Jerrold Avenue are slightly higher at 65 to 70 dBA (L_{dn}). Other sources of noise along these streets include existing SEP wastewater treatment facilities and Caltrain operations to the west.

Southeast Greenhouses

The Southeast Greenhouses are located along the east side of the Caltrain right-of-way. Quint Street is located near the northwest corner of this staging area and Phelps Street extends along the eastern boundary of this staging area. According to SFDPH traffic noise level mapping, traffic noise levels along this section of Phelps Street are as high as 65 to 70 dBA (L_{dn}). Existing SEP wastewater treatment facilities are located to the north of this staging area, and the Southeast Community Facility (including daycare facility) is located to the south of this staging area. Noise levels were measured at the daycare facility (see Table 4.7-2, Location 3, 1200 Phelps Street) to be 66 dBA (L_{dn}), with daytime (7:00 a.m. to 8:00 p.m.) noise levels of 60 dBA (L_{eq}) and evening (8:00 p.m. to 10:00 p.m.) levels of 59 dBA (L_{eq}).

1550 Evans Avenue

This staging area is located adjacent to Evans Avenue and Third Street (east of the SEP) and subject to relatively high traffic noise levels. SFDPH mapping indicates that traffic noise levels along both of these streets exceed 70 dBA (L_{dn}) and decrease to 60 to 70 dBA (L_{dn}) over most of this staging area with increasing distance from both streets.

Existing Groundborne Noise and Vibration

Groundborne noise is that which is experienced inside a building or structure from vibrations produced outside of the building and transmitted as ground vibration between the source and receiver. There are currently no major sources of groundborne noise or vibration on the project site.

Other sources of vibration in the project vicinity include Caltrain railroad operations, located as close as approximately 60 feet from the western project boundary, and railroad operations on the spur line between the Caltrain tracks and the western project boundary, located approximately 40 feet from the western project boundary. Locomotive passenger or freight trains generate a vibration level of

0.09 inches per second PPV at a distance of 40 feet[12] which is below the Federal Transit Administration's vibration damage criteria for all building types.[13]

4.7.2 Regulatory Framework

4.7.2.1 Federal Regulations

Motor Vehicle Noise Emissions Controls

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under Title 40 (Protection of Environment) of the Code of Federal Regulations, Part 205, Subpart B. The federal truck pass-by noise standard is 80 dBA at 50 feet from the vehicle pathway center line, under specified test procedures. These controls are implemented through regulatory controls on truck manufacturers. There are no comparable standards for vibration, which tend to be influenced by roadway surface, the vehicle load, and other factors.

Occupational Safety and Health Act of 1970

OSHA is the main federal agency that adopts laws and regulations for ensuring safe and healthful work environment to prevent injuries and protect the health of workers. All employers must follow OSHA regulations to ensure the health and well-being of their employees. OSHA's noise standard (29 Code of Federal Regulations [CFR] 1910.95) has a permissible exposure limit of 90 dBA (time-weighted average over an eight-hour work shift) and has an action level that requires employers to have a hearing conservation program in place if workers are exposed to a time-weighted average noise level of 85 decibels (dBA) or higher over an eight-hour work shift.

4.7.2.2 State Regulations

California Vehicle Code

Section 27204 of the California Vehicle Code establishes a noise limit of 80 dBA for trucks over 5 tons (gross vehicle weight rating) at 50 feet from the vehicle pathway center line, under specified test procedures. These controls are implemented through regulatory controls on truck manufacturers.

California Noise Control Act of 1973

Health and Safety Code Sections 46000-46002 declare that excessive noise is a serious hazard to the public health and welfare and exposure to certain levels of noise can result in physiological, psychological, and economic damage. The Office of Noise Control does not have the authority or responsibility to adopt or enforce noise emissions standards. Instead, this regulation gave cities and communities the power to set noise ordinances and enforce them as necessary.

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[12] U.S. Department of Transportation, Federal Transit Administration (FTA), Transit Noise and Vibration Impact Assessment, May 2006, page 10-3.

[13] Ibid. Page 12-13.

California Occupational Safety and Health Standards

The California Division of Occupational Safety and Health, known as Cal/OSHA, is the state agency that sets and enforces standards intended to protect the health and safety of workers, which includes protection from excessive noise. Cal/OSHA has the same permissible exposure limit (90 dBA time-weighted average over an eight-hour work shift and action level of 85 dBA) as federal OSHA standards. General Industry Safety Orders, Article 105, requires employers to provide personal protective equipment to workers when noise levels exceed 90 dBA for 8 hours per day, which is also equivalent to 91 dBA for 6.96 hours per day, 92 dBA for 6.06 hours per day and so forth, with the highest limit of 115 dBA for 0.25 hour per day.[14]

4.7.2.3 Local Regulations

San Francisco General Plan

The Environmental Protection Element of the *San Francisco General Plan* contains a "Land Use Compatibility Guidelines for Community Noise" figure for determining the compatibility of various new uses with different noise levels. These guidelines, which are similar to state guidelines set forth by the Governor's Office of Planning and Research, indicate maximum acceptable noise levels for various land uses. Although this figure presents a range of noise levels that are considered compatible or incompatible with new uses, the maximum "satisfactory" noise level is 60 dBA (L_{dn}) for residential and hotel uses; 65 dBA (L_{dn}) for school classrooms, libraries, churches, and hospitals; 70 dBA (L_{dn}) for playgrounds, parks, office uses, retail commercial uses, and noise-sensitive manufacturing/ communications uses; and 77 dBA (L_{dn}) for other commercial uses such as wholesale, some retail, industrial/manufacturing, transportation, communications, and utilities.

San Francisco Noise Ordinance

The City regulates noise through Article 29 (Sections 2901, 2907 through 2909, *et seq*) of the Police Code, referred to herein as the Noise Ordinance, which states that the City's policy is to prohibit unnecessary, excessive, and offensive noises from all sources subject to police power. The City (including the San Francisco Public Utilities Commission [SFPUC]) is exempt from the noise limits as specified in Article 29;[15] however, the City generally conducts construction consistent with the restrictions of the noise standards expressed in Sections 2907 in order to prevent significant noise impacts. Under the SFPUC Standard Construction Measures (discussed below), the SFPUC requires its contractors to comply with noise ordinances regulating construction noise.

Construction Noise

Section 2907(a) limits noise from construction equipment to 80 dBA when measured at a distance of 100 feet from such equipment, or an equivalent sound level at some other convenient distance. Exemptions from this requirement include impact tools with approved mufflers, pavement breakers

[14] Department of Industrial Relations, *Subchapter 7, General Industry Safety Orders, Group 15, Occupational Noise, Article 105, Control of Noise Exposure, Table N-1, Permissible Noise Exposure.* Available online at https://www.dir.ca.gov/title8/5096.html. Accessed on July 30, 2016.

[15] Section 2901(h) of Article 29.

and jackhammers with approved acoustic shields, and construction equipment used in connection with emergency work. Section 2908 prohibits nighttime construction (between 8:00 p.m. and 7:00 a.m.) that generates noise exceeding the ambient[16] noise level by 5 dBA at the nearest property line unless a special permit has been issued by the City. In granting such special permit, the Director of Public Works or the Director of Building Inspection must consider:

- If construction noise in the vicinity of the proposed work site would be less objectionable at night than during daytime because of different population levels or different neighboring activities, or if obstruction and interference with traffic, particularly on streets of major importance, would be less objectionable at night than during daytime;
- If the kind of work to be performed emits noises at such a low level as to not cause significant disturbance in the vicinity of the work site, or if the neighborhood of the proposed work site is primarily residential in character wherein sleep could be disturbed;
- If great economic hardship would occur if the work were spread over longer time;
- If the work will abate or prevent hazard to life or property; and
- If the proposed night work is in the general public interest.

Operational Noise

Section 2909(a) generally prohibits a person[17] from producing, or allowing to be produced (by any machine, device, etc.), noise levels exceeding 5 dBA above the ambient at any point outside of the property plane.[18] Section 2909(b) prohibits noise levels exceeding 8 dBA above the ambient from industrial and commercial sources at any point outside of the property plane. Section 2909(c) prohibits noise levels exceeding 10 dBA above the ambient on public property at a distance of 25 feet or more unless the machine or device is operated to serve or maintain the property. Section 2909(d) establishes maximum noise levels for fixed sources (e.g., mechanical equipment) such that the noise from such sources does not cause the noise level measured inside any residential living room or bedroom to exceed 55 dBA (7:00 a.m. to 10:00 p.m.) or 45 dBA (10:00 p.m. to 7:00 a.m.) with windows open.

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16 Section 2901 clarifies the definition of "ambient" as the L_{90} (the level of noise exceeded 90 percent of the time), and under most conditions this noise descriptor is considered to be a conservative representation of the ambient noise level. Ordinance compliance is determined by measuring the L90 for 10 minutes, with and without the noise source at issue, and the ambient is the lowest sound level repeating itself during the measurement period. Use of the L_{90} descriptor is appropriate when determining code compliance of a fixed noise source (such as mechanical equipment) but is not appropriate for other aspects of a California Environmental Quality Act (CEQA) noise impact analysis, which determines noise compatibility based on L_{dn} or CNEL. Therefore, L_{eq} is a more appropriate descriptor for evaluating CEQA noise impacts in traffic-dominated environments or where variable noise levels such as construction noise are being assessed.

17 Section 2901(h) of the Noise Ordinance defines a "person" as a "person, firm, association, copartnership, joint venture, corporation, or any entity, public or private in nature, but shall not include the City and County of San Francisco."

18 Property plane means a vertical plane including the property line that determines the property boundaries in space.

San Francisco Public Utilities Commission Standard Construction Measures and Safe Design Guidelines

The SFPUC would implement standard construction measures for the BDFP (described in **Appendix SCM**), including the following measure applicable to noise:

> 5. *Noise*: All projects will comply with local noise ordinances regulating construction noise. The SFPUC shall undertake measures to minimize noise disruption to nearby neighbors and sensitive receptors during construction. These efforts could include using best available noise control technologies on equipment (i.e., mufflers, ducts, and acoustically attenuating shields), locating stationary noise sources (i.e., pumps and generators) away from sensitive receptors, erecting temporary noise barriers, and other such measures.

Regarding design and operation, the SFPUC implements Safe Design Guidelines on all of its projects, including a design noise goal of 80 dBA within work areas; this goal is lower than the OSHA and Cal/OSHA standards of 85 dBA (action level) and 90 dBA (permissible exposure limit). If equipment is expected to expose the operator or other workers in the area to sound pressure levels of 80 dBA or higher, the Safe Design Guidelines recommend that quieter equipment be specified or noise controls be considered when quieter equipment is not feasible.

4.7.3 Impacts and Mitigation Measures

4.7.3.1 Significance Criteria

The project would have a significant impact related to noise if the project were to:

- Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Result in exposure of persons or structures to or generation of excessive groundborne vibration or groundborne noise levels;
- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- For a project located within an airport land use plan area, or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, expose people residing or working in the area to excessive noise levels;
- For a project located in the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels; or
- Be substantially affected by existing noise levels.

Due to the nature of the project, there would be no impact related to the following criteria for the reasons described below:

- ***Expose people residing or working in the area to excessive noise levels near airports or airstrips***. The project site is not within an airport land use plan area, nor is it in the vicinity of a private airstrip. Therefore, the BDFP would not result in the long-term exposure of workers to excessive airport-related noise levels, and these criteria are not discussed further in this environmental impact report (EIR).

- ***Be substantially affected by existing noise levels***. The BDFP is a wastewater utility project and would not be affected by existing noise levels. Since the project is not a noise-sensitive land use, this criterion would not apply to this project and is not discussed further in this EIR. Further, recent case law has clarified that impacts of the environment on a project are not significant impacts under CEQA.[19]

4.7.3.2 Approach to Analysis

Noise

Construction Noise Impact Methodology

The determination of impact significance for noise takes into account combined construction noise from simultaneous on-site equipment, Noise Ordinance standards, proximity of noise-sensitive uses, and the duration of exposure to noise impacts.

General Considerations

To assess potential short-term construction noise impacts, the analysis identifies and describes sensitive receptors and their relative exposure to estimated construction noise. The analysis considers the attenuation of noise with distance; the analysis does not consider attenuation potentially provided by barriers (e.g., intervening walls, buildings and other structures) due to variations in the height of such barriers; nor does the analysis take into account future demolition of some SEP structures. Therefore, this analysis provides conservative results by excluding the noise attenuation benefits that intervening structures may provide. Construction-related noise impacts were assessed in part using the U.S. Federal Transit Administration (FTA) methodology for general quantitative noise assessment.[20] This methodology considers operation of the two noisiest pieces of equipment and applies documented usage to account for the amount of time that equipment is in use. The distance between noise source and receptor was based on the distance between each construction area to the specified receptors.

Construction Equipment Noise Thresholds

Thresholds used in this EIR to determine the significance of construction-related noise increases are as follows:

- **Non-Impact Construction Equipment Threshold.** Section 2907(a) of the Noise Ordinance limits noise from any individual piece of construction equipment, except impact tools approved by San Francisco Public Works, to 80 dBA at 100 feet, which is equivalent to 86 dBA at 50 feet.

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[19] *California Building Industry Association v. Bay Area Air Quality Management District* (August 12, 2016) 2 Cal.App.5th 1057.

[20] U.S. Department of Transportation, Federal Transit Administration (FTA), *Transit Noise and Vibration Impact Assessment, Section 12.1.1 Quantitative Noise Assessment Methods*, May 2006, pp. 12-4 to 12-8. Available online at http://www.fta.dot.gov/12347_2233.html. Accessed on March 13, 2016.

- **Impact Construction Equipment Threshold.** For normal daytime operations (7:00 a.m. to 8:00 p.m.), there are no noise limits on the total construction noise generated by a project; construction is allowed during the daytime hours (7:00 a.m. to 8:00 p.m.) every day of the week. Since the Noise Ordinance does not identify a quantitative noise limit standard for impact equipment or combined noise impacts from simultaneous operation of multiple pieces of equipment, impacts are assessed relative to application of FTA construction noise criteria: 90 dBA (L_{eq}) during the day and 80 dBA during the night at residential uses, and 100 dBA (L_{eq}) at commercial/industrial uses.

- **Construction Noise Threshold for Daytime Hours.** The San Francisco Planning Department considers an increase of 10 dBA over existing noise levels from persistent construction to be a substantial temporary increase in noise levels.

- **Construction Noise Threshold for Nighttime Hours**. Construction work is proposed to extend into nighttime hours (8:00 p.m. to 11:00 p.m.). Section 2908 prohibits nighttime construction (between 8:00 p.m. and 7:00 a.m.) that generates noise exceeding the ambient noise level by 5 dBA at the nearest property line unless a special permit has been issued. If noise levels were expected to exceed this threshold, the contractor would be required to obtain a special permit for nighttime construction work under the SFPUC's standard construction measures. With a special permit, nighttime noise limits would be those specified in Section 2909(d) of the Noise Ordinance: 55 dBA between 7:00 a.m. and 10:00 p.m. and 45 dBA between 10:00 p.m. and 7:00 a.m. These interior limits are equivalent to a nighttime exterior limit of 70 dBA and daytime interior limit of 80 dBA with the windows closed, respectively, and they would be applied to the project's nighttime construction work as follows: 80 dBA between 8 p.m. and 10 p.m. and 70 dBA between 10 p.m. and 11 p.m.

Noise from Changes in Traffic Volumes (Worker Vehicles and Trucks)

Construction-related worker vehicles and trucks would operate during daytime construction hours. The significance of changes in traffic noise associated with the project is based on whether traffic noise increases would be noticeable to people. (Increases of less than 3 dB are barely noticeable, while increases of 5 dBA are readily noticeable.[21]) A noise increase of 5 dBA or more is considered significant regardless of the affected land uses because such an increase is readily noticeable. Where the existing or resulting noise environment exceeds acceptable levels for land uses located adjacent to affected road segments (as defined by Policy 11.1 of the *San Francisco General Plan* Environmental Protection Element's "Land Use Compatibility Guidelines for Community Noise" figure), noise increases of 3 dBA are considered significant.

Operational Noise Impact Methodology

General Considerations

To assess potential long-term noise impacts associated with BDFP process facilities, the analysis identifies and describes sensitive receptors and their relative noise exposure. Noise attenuation associated with distance was considered, but as in the construction impact analysis, this approach provides conservative results by excluding noise attenuation that intervening structures would provide.

[21] California Department of Transportation, Division of Environmental Analysis, "Technical Noise Supplement," November 2009, pp. 2-48 – 2-49. Available online at http://www.dot.ca.gov/hq/env/noise/pub/tens_complete.pdf. Accessed on March 13, 2016.

Combined operational noise levels from simultaneous operation of BDFP process equipment were estimated based on the SFPUC's equipment list presented in the project's Final Conceptual Engineering Report[22] and manufacturer's specifications,[23] and supplemented with noise data collected by the EIR consultant for pumps and air handling units[24] as part of other noise studies. Since most facilities are proposed to be enclosed and would be designed to maintain interior noise levels within buildings at or below 80 dBA (L_{eq}), the primary outlets for noise would be vent openings on process facility[25] buildings and rooftop air handling units. Based on the more conservative OSHA design interior noise level of 85 dBA (L_{eq}), the building shell is assumed to attenuate noise levels by at least 20 dB[26] at vent openings. With such attenuation, exterior noise levels are assumed to be 65 dBA (L_{eq}) at 25 feet from vent openings. Noise generated from exterior equipment such as rooftop air handling units was added to noise at vent openings by this analysis to estimate a combined reference noise level at 50 feet from each process facility. The minimum distances between each process facility and the identified sensitive receptors (coinciding with measurement locations presented in Table 4.7-2) were then calculated, and noise levels from each process facility as well as the combined noise level from operation of all process facilities that could operate simultaneously were estimated at these receptors.

Application of Noise Ordinance Limits[27]

Thresholds used in this EIR to determine the significance of operational noise increases are as follows:

- **Noise Limits at Property Boundary (Initial Screening).** The significance of estimated noise increases associated with operation of each proposed process facility is assessed by first comparing these increases to noise increase limits specified in Section 2909. Section 2909 generally prohibits noise produced by fixed noise sources (any machine or device) from resulting in noise levels that exceed the existing ambient (L_{90}) noise level by more than 5 dBA for residential uses, 8 dBA for commercial and industrial uses, and 10 dBA for public uses at any point outside the property plane. Operational noise from stationary sources such as process facilities is assessed first to determine whether noise increases of 8 dBA (for noise generated by industrial/commercial uses) over existing ambient (L_{90}) levels would occur at the closest property plane (Section 2909[b] ambient +8 dBA threshold).

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22 Biosolids Digester Facilities Project Consultant Team, Contract CS-235 Biosolids Digester Facilities Project, *Conceptual Engineering Report (Final), Appendix G-1, Operations Equipment List*, March 2016. Also see Tables 2-10 and 2-11 in Chapter 2, *Project Description*, for equipment list and estimated construction schedule.

23 Ibid., *Equipment List and Manufacturer's Specifications*, included in Noise Info Package, December 14, 2015.

24 An air handling unit is a device used to regulate and circulate air as part of a heating, ventilation, and air-conditioning system. Data from Vibro-Acoustic Consultants, *Noise Data for EIR Team – SEP Fenceline*, September 2015. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2015.000644ENV.

25 "Process facility" refers to specific processes in the wastewater treatment process such as digester gas treatment facility, energy recovery facility, pre-digestion solids processing facility, anaerobic digestion facility, biosolids dewatering facility, solids odor control facility, etc.

26 According to the USEPA, the national average for building attenuation is 15 dB with windows open and 25 dB with windows closed (USEPA, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, March 1974, p. B-6).

27 As stated above, although the SFPUC is not required to conform to Noise Ordinance requirements, time and noise limits in the ordinance are used in this EIR as criteria to determine the significance of project impacts under CEQA.

- **Noise Limits at Closest Sensitive Receptors (Secondary Screening).** In instances where there would be a noise increase of 8 dBA at this property plane, the significance of the project's operational noise impacts on nearby residential receptors is then evaluated by comparing estimated noise levels to interior noise limits specified in Section 2909(d) (45 dBA between 10:00 p.m. and 7:00 a.m. and 55 dBA between 7:00 a.m. and 10:00 p.m., which are equivalent to a nighttime exterior limit of 60 dBA and daytime interior limit of 70 dBA with the windows open, respectively). Because the daycare and training facilities at the Southeast Community Facility only operate during the daytime hours, the interior limit of 55 dBA between 7:00 a.m. and 10:00 p.m. specified in Section 2909(d) is applied to this noise-sensitive use, which is equivalent to an exterior limit of 70 dBA with the windows open. There are existing facilities at the SEP that contribute to existing ambient noise levels and are proposed to be decommissioned. Since noise decreases resulting from proposed decommissioning are not subtracted from project-related operational noise levels, this analysis is considered to be conservative.

Noise from Changes in Traffic Volumes (Trucks)

Project implementation would not substantially change the levels of worker traffic or trucking operations associated with the SEP but would change truck routes. Impact NO-4 evaluates the potential noise impacts from changes in traffic volumes due to changes in truck routes. The same thresholds described above under construction-related traffic noise changes are also applied to operational traffic noise increases.

Vibration

Both construction-related and operational vibration impacts are considered significant if they would either result in vibration levels substantial enough to cause damage to nearby structures or buildings or result in long-term vibration levels that could cause annoyance to sensitive land uses. Groundborne noise occurs when vibrations transmitted through the ground result in secondary radiation of noise. Groundborne noise is generally associated with transit trains through tunnels and underground blasting activities, neither of which is proposed as part of this project. Therefore, this analysis is focused on groundborne vibration.

Vibration Thresholds for Structures

Vibration impacts for structures are considered significant if vibration levels would be substantial enough to result in damage to nearby structures. There are no City regulations that address vibration. This evaluation uses the Caltrans-identified PPV thresholds for architectural (cosmetic) damage to buildings from vibration, as presented in **Table 4.7-3**. As indicated in this table, the threshold for continuous vibration sources is about half of the threshold for transient sources.

For this analysis, the 0.5 in/sec PPV threshold was used as a significance threshold level for construction-related vibration impacts on structures located on the SEP site as well as for industrial and commercial structures located off-site, but a 0.3 in/sec PPV threshold was applied to older residential structures, consistent with the Caltrans-recommended threshold levels listed in Table 4.7-3. In general, cosmetic or threshold damage to buildings can occur at these vibration levels from continuous/frequent intermittent sources. Caltrans recommends a threshold level of 0.25 in/sec PPV for historic and some old buildings, which are mostly represented as buildings with plastered walls and

TABLE 4.7-3
VIBRATION THRESHOLDS FOR POTENTIAL DAMAGE TO STRUCTURES

Structure Type and Condition	Maximum Peak Particle Velocity (in/sec, PPV)	
	Transient Sources[a]	Continuous/Frequent Intermittent Sources[b]
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5[c]

NOTES:
in/sec = inches per second; PPV = peak particle velocity
[a] Transient sources create a single isolated vibration event, such as blasting or drop balls.
[b] Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.
[c] The 0.5 in/sec PPV threshold is also applied by the Swiss Association of Standardization for Class I buildings, which are defined as "buildings in steel or reinforced concrete such as factories, retaining walls, bridges, steel towers, open channels, underground chambers, and tunnels with and without concrete alignment."

SOURCE: Caltrans, *Transportation and Construction Vibration Guidance Manual*, September 2013, Table 19, p. 38. Available online at http://www.dot.ca.gov/hq/env/noise/publications.htm. Accessed on March 11, 2016.

ceilings, wooden ceilings, or masonry walls. Although some SEP buildings are historic, this threshold was not applied to SEP buildings because despite their historic status, all SEP buildings have been engineered for industrial use and lack fragile construction elements, such as plastered or masonry walls, that could be subject to cosmetic damage. Instead, a threshold level of 0.5 in/sec PPV was applied to SEP buildings, which is consistent with the Caltrans-recommended threshold level listed in Table 4.7-3 for modern industrial or commercial buildings.

Vibration Thresholds for Human Annoyance

People are more sensitive to vibration during the nighttime hours when sleeping than during daytime waking hours. Numerous studies have been conducted to characterize the human response to vibration. As shown in **Table 4.7-4**, for steady-state (continuous) vibration, people typically find vibration "strongly perceptible" at 0.1 in/sec PPV, "distinctly perceptible" at 0.04 in/sec PPV, and "barely perceptible" at 0.01 in/sec PPV. While nighttime construction work could occur (up to 11:00 p.m.) continuous vibration sources such as pile driving would not occur during the evening hours. Consequently, this analysis applies the "strongly perceptible" threshold for transient sources (0.1 in/sec PPV) to evaluate the potential for human annoyance impacts associated with project-generated vibration.

TABLE 4.7-4
VIBRATION THRESHOLDS FOR ANNOYANCE

Human Response	Maximum Peak Particle Velocity (in/sec, PPV)	
	Transient Sources[a]	Continuous/Frequent Intermittent Sources[b]
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.90	0.10
Severe	2.00	0.40

NOTES:
in/sec = inches per second; PPV = peak particle velocity

a Transient sources create a single isolated vibration event, such as blasting or drop balls.
b Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

SOURCE: Caltrans, *Transportation and Construction Vibration Guidance Manual*, September 2013, Table 20, p. 38. Available online at http://www.dot.ca.gov/hq/env/noise/publications.htm. Accessed on March 11, 2016.

Cumulative Impacts

Section 4.1.3, Approach to Cumulative Impact Analysis and Cumulative Projects, describes the overall approach to the cumulative analysis for those topics using a list-based approach and summarizes probable future projects in the vicinity of the project that could contribute to a cumulative impact; please refer to Table 4.1-1 and Figure 4.1-1 for a description and location of potential cumulative projects in the vicinity of the BDFP and its staging areas.

The cumulative analysis for noise and vibration uses the list-based approach to analyze the effects of the project in combination with other past, present, and probable future projects in the immediate vicinity and assumes that construction and operations of other projects in the geographical area would be required to comply with the same regulatory requirements as the project, which would serve to avoid or reduce many impacts to less-than-significant levels on a project-by-project basis. The analysis then considers whether or not there would be a significant, adverse cumulative impact associated with project implementation in combination with past, present, and probable future projects in the geographical area, and if so, whether or not the project’s incremental contribution to the cumulative impact would be considerable. Both conditions must be met in order for a project’s contribution to significant cumulative effects to be deemed cumulatively considerable. If it is, then mitigation measures are identified to reduce the project's contribution to the extent feasible.

The geographic scope of the cumulative analysis includes areas close enough to the BDFP site and staging areas (i.e., within 1,000 feet) to noticeably contribute to project-specific construction and operational noise and vibration impacts on sensitive receptors. Cumulative construction and operational noise impacts are assessed by determining those cumulative projects that could be constructed and could operate at the same time as the BDFP. An approximation is made of cumulative construction and operational noise and vibration levels using the same methodologies and significance thresholds outlined above for construction-related and operational noise and vibration impacts.

4.7.3.3 Impact Evaluation

The impact analysis addresses both construction-related and operational impacts as follows:

- Impact NO-1: Construction-related noise (short-term)
- Impact NO-2: Construction-related groundborne noise and vibration (short-term)
- Impact NO-3: Operational facility noise (long-term)
- Impact NO-4: Operational traffic noise (long-term)
- Impact NO-5: Operational vibration (long-term)
- Impact C-NO-1: Cumulative construction-related noise and vibration (short-term)
- Impact C-NO-2: Cumulative operational noise and vibration (long-term)

Construction Impacts

Impact NO-1: Construction of the project could cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project and could expose people to or generate noise levels in excess of standards in the Noise Ordinance. (Less than Significant with Mitigation)

Consistency with Equipment Noise Limit

Section 2907 of the Noise Ordinance allows construction activities between 7:00 a.m. and 8:00 p.m. but limits noise from any individual piece of construction equipment, except impact tools approved by San Francisco Public Works, to 80 dBA at 100 feet, which is equivalent to 86 dBA at 50 feet. **Table 4.7-5** presents the average noise levels (L_{eq}) that would be generated by each piece of construction equipment during construction. All non-impact equipment would be consistent with the Noise Ordinance except for concrete saws, as shown in Table 4.7-5. Consequently, the project could generate noise levels in excess of daytime equipment noise level standards established in the local noise ordinance, a significant impact. With implementation of noise controls as specified in **Mitigation Measure M-NO-1a (Shielding of Concrete Saw Operations)**, noise levels from all construction equipment would be reduced to below the applicable ordinance limit (86 dBA at 50 feet, or 80 dBA at 100 feet), reducing this impact to a less-than-significant level.

Noise from Construction Activities at the Project Site

Estimating Noise Levels at Sensitive Receptors. Construction of the BDFP would result in the operation of heavy equipment on the project site. Construction activities on the project site would occur intermittently over the five-year construction period during daytime (7:00 a.m. to 8:00 p.m.) and early nighttime (8:00 p.m. to 11:00 p.m.) hours. These activities could expose nearby sensitive receptors to temporary increases in noise levels substantially in excess of ambient levels.

As explained in Section 4.7.3.2, the FTA methodology for evaluating construction noise impacts was applied to this project for both daytime and nighttime activities. The FTA recommends daytime and nighttime threshold levels of 90 dBA (L_{eq}) and 80 dBA (L_{eq}), respectively, for construction noise from combined equipment affecting residential uses and 100 dBA (L_{eq}) for combined construction noise affecting commercial/industrial uses. In addition, a 10-dBA increase over existing daytime and nighttime noise levels due to persistent construction was also applied in this analysis. Construction noise levels

TABLE 4.7-5
DAYTIME NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Level (L_{max}, dBA) at 50 feet	Does Project Equipment L_{max} Noise Level Exceed Section 2907 Limit (86 dBA at 50 Feet)?[a]	Usage Factor (%)	Noise Level (L_{eq}, dBA) at 50 Feet
Auger Drill Rig	85	No	50	82
Backhoe	80	No	40	76
Bar Bender	80	No	20	73
Boring Jack Power Unit	80	No	50	77
Chain Saw	85	No	20	78
Compactor	80	No	20	73
Compressor	80	No	40	76
Concrete Mixer Truck	85	No	40	81
Concrete Pump Truck	82	No	20	75
Concrete Saw	**90**	**Yes**	20	83
Tower Crane	85	No	16	77
Crawler Crane	85	No	16	77
Hydraulic Crane	85	No	16	77
Dozer	85	No	40	81
Drill Rig Truck	84	No	20	77
Dump Truck	84	No	40	80
Excavator w/4-Cubic-Yard Bucket	85	No	40	81
Flat Bed Truck	84	No	40	80
Front End Loader	80	No	40	76
Generator	82	No	50	79
Gradall	85	No	40	81
Grader	85	No	40	81
Demolition Hammer	95	Exempt[a]	20	88
Impact Hammer	95[b]	Exempt[a]	20	88
Horizontal Boring Hydr. Jack	80	No	25	74
Jackhammer (Pneumatic)	85	Exempt[a]	20	78
Man Lift	85	No	20	78
Excavator	85	No	40	81
Pickup Truck	55	No	40	51
Pneumatic Tools	85	No	50	82
Pumps	77	No	50	74
Roller	85	No	20	78
Scraper	85	No	40	81
Shears	85	No	40	81
Welder/Torch	73	No	40	69

NOTES*:* dBA = A-weighted decibel

[a] Noise impacts from impact equipment are assessed relative to FTA thresholds for construction noise since they are exempt. As specified in Section 2907(b) of Article 29, impact tools and equipment are exempt from the 86-dBA ordinance limit, provided impact tools and equipment are equipped with intake and exhaust mufflers recommended by the manufacturers as best accomplishing maximum noise attenuation. In addition, pavement breakers and jackhammers are required to be equipped with acoustically attenuating shields or shrouds recommended by the manufacturers as best accomplishing maximum noise attenuation.

[b] Piles could be driven or drilled and pile-driving or drilling equipment has not yet been specified. Therefore, representative examples of impact pile drivers are used in this analysis to evaluate maximum (worst-case) noise impacts associated with pile installation.

[c] Bolded values exceed Section 2907 construction noise limit.

SOURCE: U.S. Department of Transportation, Federal Highway Administration, *Construction Noise Handbook, 9.0 Construction Equipment Noise Levels and Ranges, Table 9.1, RCNM Default Noise Emission Reference Levels and Usage Factors*, August 2006. Available online at http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm. Accessed on March 13, 2016.

during the nighttime hours were also compared to noise limits specified in Section 2908 (ambient +5 dBA exterior limit at the property plane) and Section 2909(d) (45 dBA interior limit at sensitive receptors) of the Noise Ordinance.

A combined noise level resulting from simultaneous operation of the two noisiest pieces of equipment was estimated for the following seven construction phases because each of these phases would involve operation of different types of equipment, would have different noise characteristics and durations, would have the potential to affect nearby sensitive receptors differently, and thus are representative of the different noise levels that could occur during the project construction period:

1. Demolition of the below-ground portions of the decommissioned Asphalt Plant and other SEP structures, set up of site offices, and relocation of utilities (six months in 2018);
2. Installation of secant pile walls (which would be drilled and cast-in-place) and other piles using drilling or vibratory driving methods (multiple week periods in 2018 and in 2020);
3. Excavation (five months in 2018, two weeks in 2020), and construction of the pipe gallery and pipe chases including impact pile driving (six weeks in 2018 and nine months in 2020) and utilities (two months in 2018, 12 months in 2020-2021), and installation of electrical utilities (12 months in 2021-2023);
4. Construction of anaerobic digesters, thermal hydrolysis process (THP) facilities, and gravity belt thickener (GBT) (foundation, substructure, super structure, etc.) in 2018-2023;
5. Construction of utilities, roadways, parking lots, traffic control, fencing, and landscaping (2020-2023);
6. Use of construction staging areas (February 2018-January 2023); and
7. Construction activities after 8:00 p.m. related to late finish concrete placement, minor grading related to shutdowns, crane use for pipe/precast concrete placement, welding, pipefitting, electrical work, pumps for groundwater dewatering, and moving equipment/materials associated with indoor work (2018-2023).

Table 4.7-6 presents combined maximum noise levels from the two noisiest pieces of equipment for each of the above construction phases. These noise levels assume (1) no attenuation from intervening buildings/structures or ground surface, and (2) unmitigated L_{eq} noise levels (reflecting usage factors) presented in Table 4.7-5 pursuant to FTA guidelines for assessing construction noise effects. As indicated in Table 4.7-6, the maximum combined noise levels associated with the range of equipment proposed to be used during project construction would range from 81 to 85 dBA (L_{eq}) at 50 feet, and up to 88 dBA (L_{eq}) at 50 feet if impact hammers or impact pile drivers are employed. Demolition activities are estimated to generate a maximum combined noise level of 85 dBA (L_{eq}) over a six-month period. Maximum combined noise levels of 88 dBA (L_{eq}) and noise peaks of up to 95 dBA (L_{max}) at 50 feet would occur over a five-month period in 2018 and a two-week period in 2020 if piles are driven instead of drilled.

TABLE 4.7-6
MAXIMUM COMBINED NOISE LEVELS FROM PROJECT-RELATED CONSTRUCTION ACTIVITIES

Construction Phase, Equipment Used in Estimate	Noise Level (Leq) at 50 Feet
1. Demolition, Site Offices Setup, Utilities Relocation Work (Six Months in 2018)	
Excavator	81
Concrete Saw	83
Combined L_{eq}:	**85**
2. Piles (Drilled) and Excavation (2018-2020)	
Auger Drill Rig	82
Excavator	81
Combined L_{eq}:	**85**
3. Construction of Gallery and Pipe Chases (One Month in 2018 and Six Months in 2020)	
Impact Hammer	88
Crane	77
Combined L_{eq}:	**88**
4. Construction of Anaerobic Digesters, Pre-THP, and GBT (Foundation, Substructure, Super Structure, etc.) (2018-2022)	
Tower Crane	77
Concrete Mixer Truck	81
Combined L_{eq}:	**82**
5. Construction of Utilities and Roadways, Parking Lots, Traffic Control, Fencing, and Landscaping (2020-2022)	
Scraper	81
Concrete Mixer Truck	81
Combined L_{eq}:	**84**
6. Operation of Construction Staging Areas (2018-2023)	
Dump Truck	80
Backhoe, Front End Loader	76
Combined L_{eq}:	**81**
7. Construction Activities After 8:00 p.m. (2018-2022)	
Tower Crane	77
Concrete Mixer Truck	81
Combined L_{eq}:	**82**

NOTES:
dBA = A-weighted decibel; THP = thermal hydrolysis process; GBT = gravity belt thickener

SOURCE: Orion Environmental Associates, data developed in 2016 for BDFP.

The combined noise levels listed in Table 4.7-6 from the closest project activity locations were then applied to the two closest representative sensitive receptors (Measurement Locations 1 and 3, shown in Figure 4.7-1) and attenuated for distance (6-dB reduction per doubling of distance). **Table 4.7-7** presents the adjusted maximum combined daytime construction-related noise level at the closest residential, commercial, and daycare receptors, while **Table 4.7-8** presents the maximum combined nighttime construction-related noise levels at the closest sensitive receptors. These tables present information on noise from construction activities *at the project site* and noise from activities at *off-site staging areas* (presented below under the heading "Noise from Use of Off-Site Construction Areas").

TABLE 4.7-7
ESTIMATED COMBINED DAYTIME CONSTRUCTION-RELATED NOISE LEVELS AT NEARBY RECEPTORS

	Project Construction Activity/ Receptor Location	Combined Hourly L_{eq} in dBA at 50 Feet[a]	Minimum Distance between Receptor and Closest Equipment (feet)	Combined Noise Level (L_{eq}) Adjusted for Distance[b]	Does Noise Level Exceed FTA Threshold? 90 dBA (Residential)	Does Noise Level Exceed FTA Threshold? 100 dBA (Comm./Industrial)	Ambient +10 dBA Threshold[c] at Closest Receptor	Does Noise Level Exceed Ambient +10 dBA Threshold?
Measurement Location 1. Residential receptors on east side of Phelps Street (as represented by measurements collected at 1796 La Salle Avenue and distances measured from 1700 Kirkwood Avenue)[d]								
Project Site	1. Demolition, Site Offices Setup, Utilities Relocation Work (2018)	85	750	62	No	n/a	77	No
Project Site	2. Piles (Drilled) and Excavation (2018-2020)	85	575	63	No	n/a	77	No
Project Site	3. Gallery and Pipe Chases (2018, 2022)	88	900	63	No	n/a	77	No
Project Site	4. Anaerobic Digesters, Pre-THP, and GBT (2018-2023)	82	925	57	No	n/a	77	No
Project Site	5. Utilities, Roads, Parking Lots, Landscaping, etc. (2020-2022)	84	165	74	No	n/a	77	No
6. Construction Staging Areas (2018-2023)		81	70	**79**	No	n/a	77	**Yes**
Measurement Location 1. Commercial receptors on east side of Phelps Street (as represented by measurements collected at 1796 La Salle Avenue)[d]								
Project Site	1. Demolition, Site Offices Setup, Utilities Relocation Work (2018)	85	700	62	n/a	No	n/a	n/a
Project Site	2. Piles (Drilled) and Excavation (2018-2020)	85	450	65	n/a	No	n/a	n/a
Project Site	3. Gallery and Pipe Chases (2018, 2022)	88	700	65	n/a	No	n/a	n/a
Project Site	4. Anaerobic Digesters, Pre-THP, and GBT (2018-2023)	82	875	58	n/a	No	n/a	n/a
Project Site	5. Utilities, Roads, Parking Lots, Landscaping, etc. (2020-2022)	84	70	81	n/a	No	n/a	n/a
6. Construction Staging Areas (2018-2023)		81	125	74	n/a	No	n/a	n/a

TABLE 4.7-7 (Continued)
ESTIMATED COMBINED DAYTIME CONSTRUCTION-RELATED NOISE LEVELS AT NEARBY RECEPTORS

	Project Construction Activity/ Receptor Location	Combined Hourly Leq in dBA at 50 Feet[a]	Minimum Distance between Receptor and Closest Equipment (feet)	Combined Noise Level (Leq) Adjusted for Distance[b]	Does Noise Level Exceed FTA Threshold?		Ambient +10 dBA Threshold[c] at Closest Receptor	Does Noise Level Exceed Ambient +10 dBA Threshold?
					90 dBA (Residential)	100 dBA (Comm./Industrial)		
Measurement Location 3. Southeast Community Facility including training/education center and daycare facility (as represented by measurements collected at 1200 Phelps Street)								
Project Site	1. Demolition, Site Offices Setup, Utilities Relocation Work (2018)	85	850	61	No	n/a	70	No
Project Site	2. Piles (Drilled) and Excavation (2018-2020)	85	975	59	No	n/a	70	No
Project Site	3. Gallery and Pipe Chases (2018, 2022)	88	1,050	62	No	n/a	70	No
Project Site	4. Anaerobic Digesters, Pre-THP, and GBT (2018-2023)	82	1,500	53	No	n/a	70	No
Project Site	5. Utilities, Roads, Parking Lots, Landscaping, etc. (2020-2022)	84	700	61	No	n/a	70	No
6. Construction Staging Areas (2018-2023)		81	70	**79**	No	No	70	**Yes**

NOTES: dBA = A-weighted decibel; FTA = Federal Transit Administration; THP = thermal hydrolysis process; GBT = gravity belt thickener; n/a = not applicable (i.e., threshold is not applicable to receptor)

[a] See Table 4.7-6 for derivation of combined noise levels by construction activity, which are applied in this table to residential receptor locations.
[b] Combined hourly noise levels were attenuated for distance (6-dB reduction per doubling of distance) based on the minimum distances listed in the preceding column (to the left).
[c] As indicated in Table 4.7-2, the daytime ambient noise level is 67 dBA (Leq) at Measurement Location 1 and 60 dBA (Leq) at Measurement Location 3. The ambient +10 dBA threshold represents a substantial temporary noise increase.
[d] Measurement Location 1 is assumed to be representative of noise levels at the closest residence and the closest commercial building. Therefore, the same ambient noise level (measured on the east side of Phelps Street at 1796 La Salle Avenue) was applied to both locations.

SOURCE: Orion Environmental Associates, data developed in 2016 for BDFP.

TABLE 4.7-8
ESTIMATED COMBINED NIGHTTIME CONSTRUCTION-RELATED NOISE LEVELS AT CLOSEST SENSITIVE RECEPTORS

Project Construction Activity/ Receptor Location[a]	Combined Hourly Leq in dBA at 50 Feet[b]	Minimum Distance between Receptor Property Plane and Closest Equipment (feet)	Combined Noise Level (Leq) Adjusted for Distance[c]	Does Noise Level Exceed Threshold? FTA: 80 dBA at Closest Residential Receptor	Does Noise Level Exceed Threshold? Section 2909(d): 80/70-dBA Exterior (55/45-dBA Interior [d]	Ambient +10 dBA Threshold[e]	Does Noise Level Exceed Ambient +10 dBA Threshold?
Measurement Location 1. Residential receptors on the east side of Phelps Street (as represented by 1796 La Salle Avenue)							
7. Night Work (2018-2023)	82	650	60	No	No	74	No
Measurement Location 2. Residential receptors to the east, mid-block east of Phelps Street (1663 Kirkwood Avenue is representative receptor with possible direct lines-of-sight from upper floors)							
7. Night Work (2018-2023)	82	850	57	No	No	68	No
Measurement Location 4. Residential receptors to the south, south of Oakdale Avenue (1901 Palou Avenue is a representative receptor, no direct line-of-sight)							
7. Night Work (2018-2023)	82	1,250	54	No	No	70	No
Measurement Location 5. Residential receptors to the south, mid elevations to the south (2000 Revere Avenue is a representative receptor with direct line-of-sight)							
7. Night Work (2018-2023)	82	1,800	51	No	No	67	No
Measurement Location 6. Residential receptors to the south, higher elevations to the south (296 Bayview Circle is a representative receptor with direct line-of-sight)							
7. Night Work (2018-2023)	82	2,000	50	No	No	65	No

NOTES: dBA = A-weighted decibel; FTA = Federal Transit Administration

[a] Measurement Location 1, also on Phelps Street but adjacent to a commercial use rather than a residential use, is not included in this table because commercial use is not a use that is sensitive to nighttime noise. Measurement Location 3, Southeast Community Facility, is also a daytime use, and therefore night work is not expected to adversely affect this receptor.
[b] See Table 4.7-6 for derivation of combined noise levels by construction activity, which are applied in this table to residential receptor locations.
[c] Combined hourly noise levels were attenuated for distance (6-dB reduction per doubling of distance) based on the minimum distances listed in the preceding column (to the left).
[d] Section 2909(d) specifies residential interior limits of 55 dBA between 7:00 a.m. and 10:00 p.m., and 45 dBA between 10:00 p.m. and 7:00 a.m., which are equivalent to exterior limits of 80 dBA and 70 dBA, respectively, with the windows closed. Since nighttime construction activities are proposed between 8:00 p.m. and 11:00 p.m., the following ordinance interior noise limits are applied: 55 dBA with windows closed between 8:00 p.m. and 10:00 p.m. (equivalent to an exterior limit of 80 dBA) and 45 dBA with windows closed between 10:00 p.m. and 11:00 p.m. (equivalent to an exterior limit of 70 dBA).
[e] The San Francisco Planning Department considers an increase of 10 dBA over existing noise levels from persistent construction to be a substantial temporary increase in noise levels.
[f] As indicated in Table 4.7-2, the nighttime ambient noise level is 64 dBA (Leq) at Measurement Location 1. The ambient +10 dBA threshold (74 dBA) represents a substantial temporary noise increase.

SOURCE: Orion Environmental Associates, data developed in 2016 for BDFP.

Maximum Combined Daytime Noise Levels at Closest Receptors. Maximum combined daytime noise levels from noise generated at the project site (not staging areas) would range from 57 to 74 dBA (L_{eq}) at the closest residential receptors on the east side of Phelps Street (see noise levels at Measurement Location 1). Commercial uses on the east side of Phelps Street (at Jerrold Avenue) are slightly closer to project-related construction activities (also assumed to be represented by noise levels at Measurement Location 1) and would be subject to combined noise levels of 58 to 81 dBA (L_{eq}). The educational and daycare uses at the Southeast Community Facility (Measurement Location 3) would be subject to combined noise levels of 53 to 62 dBA (L_{eq}). Maximum combined noise levels at more distant residential receptors would be relatively lower (48 to 60 dBA, L_{eq}).[28]

As indicated in Table 4.7-7, these estimated daytime construction-related noise levels, even at high noise levels, would not exceed the FTA-recommended threshold levels of 90 dBA (L_{eq}) for daytime construction affecting residential uses and 100 dBA (L_{eq}) at commercial/industrial uses. In addition, combined noise levels would not exceed the City's ambient +10 dBA threshold at the closest sensitive receptors except at the daycare center and residences located adjacent to or near the Southeast Greenhouses staging area (see discussion below under *Use of Off-Site Staging Areas*). Since construction-related noise increases from on-site daytime construction activities would not exceed the FTA's daytime or City's ambient +10 dBA significance thresholds, construction-related noise would be less than significant for all locations except at the daycare and residences located near the Southeast Greenhouses staging area (as discussed below). It should be noted, however, that if impact hammers are used to drive piles to support large diameter pipes (including the pipe gallery and pipe chases, currently proposed for construction during one month in 2018 and six months in 2020), peak noise levels (when the hammer hits the pile) could be noticeable at the daycare and residences located near the SEP (with a direct line-of-sight) during the daytime hours, even though they would not exceed the City's ambient +10 dBA significance thresholds.

Maximum Combined Nighttime Noise Levels at Sensitive Receptors. Table 4.7-8 presents a comparison of estimated nighttime combined noise levels at the property plane of the closest residential receptors to the 80-dBA FTA nighttime threshold, the Section 2909(d) 45-dBA interior (70 dBA exterior) threshold, and the City's ambient +10 dBA threshold (substantial temporary or periodic noise increase). As indicated in the table, none of these thresholds would be exceeded. Therefore, noise impacts on nearby sensitive receptors from proposed nighttime construction activities would be less than significant.

Noise from Use of Off-Site Staging Areas

Proposed off-site staging areas would be used for equipment and materials storage as well as worker parking. During the project's five-year construction period, noise generated in off-site staging areas would be associated with parking cars as well as trucks and equipment (i.e., loaders, backhoes) loading and unloading materials. Although construction equipment could be stored in these areas, noise associated with equipment storage would primarily involve periodic, temporary increases as the equipment arrives and leaves these areas (not by sustained operation of such equipment). Noise impacts at proposed off-site staging areas would be as follows:

[28] See Table 1 in Appendix NOI for combined construction-related noise levels at more distant receptors.

- **Piers 94 and 96.** There are no sensitive receptors within 1,000 feet of these staging areas; thus, short-term increases in ambient noise levels associated with operation of trucks and equipment at these staging areas would not adversely affect any noise-sensitive receptors and noise impacts associated with use of Piers 94 and 96 for staging would be less than significant.

  Shuttle Bus. If Piers 94 and 96 are used for construction worker parking, shuttle buses with seating for up to 50 passengers would transport workers between the staging areas and the project site. There could be up to 17 shuttle bus round trips at the beginning and end of each work shift; during periods when there are two work shifts, there would be morning, mid-day, and evening round trips for a maximum of 51 round trips per day, or 17 round trips per hour during each work shift change. The proposed shuttle bus loop route (shown on Figure 2-14 in Chapter 2, *Project Description*) follows Phelps Street, Jerrold Avenue, Third Street, Cargo Way, and Amador Street. There are three or four residences located on Jerrold Avenue between Phelps and Third Streets; these are the only sensitive receptors along the proposed shuttle bus route. A daily volume of 51 shuttle bus round trips per day would generate a noise level of 50 dBA (L_{dn}). Since shuttles would operate just before and after a shift change and the loop route would result in one shuttle passing these residences for each shuttle round trip, the hourly volume of 17 shuttles per hour would result in a noise level of 56 dBA (L_{eq}). Noise levels along all streets along this route would increase by less than 1 dBA.[29] When compared to the above 5-dBA threshold for evaluating the significance of permanent traffic noise increases (or a 3-dBA increase if noise levels exceed the City's land use compatibility guidelines), such short-term increases in traffic would have a less-than-significant noise impact on existing residential receptors located on Jerrold Avenue as well as on existing commercial and industrial receptors located along this route.

- **Quint Street and Jerrold Avenue, and Southeast Greenhouses.** These staging areas adjoin the project site and are located near one another. The closest sensitive receptors to these staging areas are residential receptors (located as close as 70 feet from the Southeast Greenhouses staging area's southeastern boundary, directly across Phelps Street, where the daytime ambient is 70 dBA, L_{eq}, as indicated in Table 4.7-2) and the daycare facility at the Southeast Community Facility (located approximately 70 feet from the Southeast Greenhouses staging area's southern boundary, where the daytime ambient is 60 dBA, L_{eq}, as indicated in Table 4.7-2). The Southeast Community Facility is the closest non-residential receptor, and the City College of San Francisco education/training center and Wu Yee South East Child Development Center daycare facility are located within this facility. The daycare facility is considered to be a sensitive receptor.

  As indicated in Table 4.7-7 (the rows titled "6. Construction Staging Areas" for Measurement Locations 1 and 3), when measured from the edge of the greenhouse area, operation of on-site trucks and stationary equipment within the staging area near the southern and southeastern boundaries would generate an average combined noise level of 79 dBA (L_{eq}) at the daycare facility and closest residences on the east side of Phelps Street. Such levels would exceed the City's ambient +10 dBA threshold by up to 9 dBA, a significant, temporary noise impact, but would not exceed FTA thresholds listed in Table 4.7-7. **Mitigation Measure M-NO-1b (Construction Noise Control Measures at Southeast Greenhouses Staging Area)** would ensure that equipment operation in this staging area would be managed to reduce this impact to a less-than-significant level at the daycare facility and the closest residences on Phelps

29 Traffic noise levels were estimated by the SFDPH for roads on this route to range from 60 to 70 dBA (L_{dn}) adjacent to Phelps Street and Jerrold Avenue and over 70 dBA (L_{dn}) adjacent to Third Street. Addition of project-related shuttle bus noise levels of 50 dBA (L_{dn}) or 56 dBA (L_{eq}) to such background noise levels would increase these levels by approximately 1 dBA or less (estimated by Orion Environmental Associates, 2016).

Street. In addition, trucks would access this staging area via Phelps Street, and residents located along this street (between Jerrold and the access driveway near McKinnon Avenue) could be subject to noise increases of up to 1.3 dBA from worker vehicles and trucks.[30] When compared to the significance thresholds for traffic noise increases (see Section 4.7.3.2, Approach to Analysis), a 3-dBA noise increase along this section of Phelps Street would be considered significant. Therefore, the estimated increase of less than 2 dBA would be less than significant.

- **1550 Evans Avenue.** As indicated in Table 4.7-6, operation of trucks and equipment at staging areas (Construction Activity #6) would generate a combined noise level of 81 dBA (L_{eq}) at 50 feet. Since the closest sensitive receptor is 400 feet away (City College of San Francisco Evans Campus), this combined noise level would decrease to 63 dBA (L_{eq}) at this receptor, and 57 dBA (L_{eq}) at residential receptors located 850 feet away. Such levels would not exceed the 90-dBA FTA threshold or the City's ambient +10 dBA threshold.[31] If demolition also occurs at this staging area, estimated noise levels would be approximately 4 to 7 dBA higher depending on whether demolition hammers are used, and also would not exceed the applicable thresholds. Therefore, operation of this staging area would have a less-than-significant noise impact on the closest sensitive receptors.

Construction Truck Traffic

Most construction-related haul truck traffic on roads would be generated at the beginning of the construction period (2018) when demolition debris as well as excavated soils would be transported off-site (see Table 4.6-12 in Section 4.6, Transportation and Circulation, for information on construction-related travel demand). Most site excavation would occur over about five months in 2018 and would not overlap with demolition-related haul truck traffic. At the peak of the soil excavation period (corresponding to the maximum rate of construction trucks accessing the site), up to an average of 142 truck trips (71 trucks loads) per day would occur. During the remainder of project construction, much lower daily truck trips would occur. Construction-related truck trips generated during the estimated five-year project construction period would be required to travel on truck routes identified in the Traffic Control Plan (refer to Section 2.6.1.3 in Chapter 2, *Project Description,* and Section 4.6). The Traffic Control Plan would identify routes that minimize truck traffic in residential areas, and which are anticipated to be similar to the routes shown in Figure 2-14 (vehicular access in the vicinity of the SEP and Southeast Greenhouses staging area) and Figure 2-15 in Chapter 2. Streets used for access to the I-280 and U.S. Highway 101 (Highway 101) freeways would include Evans Avenue and Jerrold Avenue west of the SEP, Third Street between Cesar Chavez Street and Evans Avenue, and Cesar Chavez Street[32], where there are no residential uses located along the routes. While there are residential uses along the section of Phelps Street between Jerrold and McKinnon Avenues (the route by which worker vehicles would access the Southeast

[30] Traffic noise levels of approximately 49 dBA (L_{dn}) and 63 dBA (L_{eq}) adjacent to Phelps Street south of Jerrold Avenue (estimated based on the addition of up to 386 worker vehicles and 10 trucks during the daytime hours [7:00 a.m. to 8:00 p.m.], as listed in Table 4.6-14 in Section 4.6, Transportation and Circulation) would increase ambient noise levels of 71 dBA (L_{dn}) and 67 dBA (daytime L_{eq}) at Measurement Location 1 by up to 1.3 dBA (no change in the L_{dn} since all trucks would operate during the daytime hours).

[31] Fenceline noise measurements collected on Evans Street (approximately 800 feet west of this staging area) indicate that daytime noise levels (7:00 a.m. to 8:00 p.m.) range from 70 to 72 dBA (L_{eq}; Wilson Ihrig, *Noise and Vibration Technical Memo Southeast Plant New Headworks (Grit) Replacement Project,* August 19, 2016).

[32] San Francisco Municipal Transportation Agency, *San Francisco Truck Traffic Routes*, 2009. Trucks are expected to use truck routes, arterials, or freeways except for local deliveries.

Greenhouses staging area), this staging area would only generate an estimated 10 truck trips per day, which would not result in significant increases in traffic noise. Therefore, with proposed use of the haul routes designated in the Traffic Control Plan, potential construction-related truck noise impacts would be less than significant.

During project construction, trucks related to SEP existing operations would use Jerrold Avenue (west of the site), Phelps Street (north of Jerrold Avenue), Evans Avenue, Third Street, and Cesar Chavez Street for access to the Highway 101 and I-280 freeways. (Refer to Figure 2-12 in Chapter 2 for operational truck routes.) There are no residential uses located along these routes. Since the project's construction-related traffic noise increases on these streets would not adversely affect any sensitive receptors, off-site construction-related traffic noise increases would be less than significant.

Summary of Impact NO-1

Of all the various types of non-impact construction equipment proposed to be used, only concrete saws would exceed the 86-dBA (at 50 feet) noise limit of Section 2907. Implementation of noise controls, as specified in Mitigation Measure M-NO-1a (Shielding of Concrete Saw Operations), would reduce the impact to a less-than-significant level. During the five-year period when the Southeast Greenhouses staging area would be used, the City's ambient +10 dBA threshold at sensitive receptors would be exceeded at the daycare facility to the south and some of the closest residential receptors to the east, a significant, temporary noise impact. With implementation of the noise controls specified in Mitigation Measure M-NO-1b (Construction Noise Control Measures at Southeast Greenhouses Staging Area), the potential for noise disturbance of affected sensitive receptors would be reduced to a less-than-significant level. These project construction impacts would therefore be ***less than significant with mitigation***.

Mitigation Measure M-NO-1a. Shielding of Concrete Saw Operations

Project contractors shall erect temporary shielding when concrete saw operations are conducted within 100 feet of a sensitive receptor. Shielding shall be sufficient to reduce noise levels to 80 dBA at a distance of 100 feet (an approximate 5 dBA reduction), consistent with the noise limit specified in Section 2907 of the Noise Ordinance.

Mitigation Measure M-NO-1b. Construction Noise Control Measures at Southeast Greenhouses Staging Area

Project contractors shall implement noise control measures at the Southeast Greenhouses staging area, such as one of the following strategies, to ensure that construction-related noise does not exceed 77 dBA at the closest residences located across Phelps Street or 70 dBA at the daycare center (including its outdoor play area) at the Southeast Community Facility (this performance standard is based on the City's ambient +10 dBA noise limit):

- ***Restrict Use of Heavy Equipment***. Restrict operation of heavy equipment and trucks in the southern portion of the Southeast Greenhouses staging area within approximately 200 feet of the daycare center (including the outdoor play area) and residences across Phelps Street such that noise levels are maintained below this performance standard.
- ***Temporary Noise Barrier***. Erect temporary noise barrier(s) along the southern and eastern boundaries of the Southeast Greenhouses staging area to shield the daycare

facility and residences from noise generated by staging area activities necessary to achieve this performance standard.

The SFPUC shall also post a sign on-site describing permitted construction days and hours, noise complaint procedures, and a complaint hotline number (available during construction hours).

Impact NO-2: Construction of the project would not expose structures or persons to excessive groundborne vibration levels. (Less than Significant)

The project would include construction activities that could produce excessive groundborne vibration. An impact hammer may be used for demolition of some existing structures (such as concrete structures). Other types of construction equipment used for demolition, site preparation, and shoring activities, such as jackhammers, pavement breakers, and drills, could generate varying levels of temporary groundborne vibration, with the highest levels expected during demolition, excavation, and below-grade construction for partially buried structures (i.e., buildings with basements, odor control facilities, and utility tunnels). Project construction would also entail the use of heavy trucks for material deliveries and for off-site hauling of excavated materials and demolition debris that could generate groundborne vibration along the haul routes.

Building or Structural Damage

If groundborne vibration generated by project-related demolition and construction activities were to exceed 0.5 in/sec PPV, it could cause damage to nearby structures, which may include adjacent buildings. Impact pile driving associated with installation of large-diameter pipes (including construction of the pipe gallery and pipe chases) could occur as close as approximately 90 feet from Building 040, a historic building considered to be a contributor to the Southeast Treatment Plant Streamline Moderne Industrial Historic District that is eligible for listing on the National Register of Historic Places (see Section 4.5, Cultural Resources, for more detailed description of this building). **Table 4.7-9** lists typical vibration levels associated with the operation of various types of construction equipment at specified distances, some of which are similar to those proposed to be used for this project. Vibration levels at the closest adjacent structures are also indicated in the footnotes to this table; these include Building 040, as well as buildings to the east and south.

While vibration attenuation with distance can vary depending on subsoils, maximum vibration levels generated by vibratory or impact pile drivers could exceed the 0.5 in/sec PPV threshold at adjacent structures if the pile drivers are operated within 75 feet of a structure.

Proposed pile-driving activities on the project site would occur within the *Southeast Treatment Plant Streamline Moderne Industrial Historic District* (see Section 4.5, Cultural Resources) and as close as approximately 80 feet from the nearest structure that is a contributor to that district: Building 040 (Primary Sedimentation Building No. 1). Building 040 is an engineered, reinforced concrete building with no fragile architectural features. At a distance of 80 feet, vibration from impact or vibratory pile driving would range between <0.1 and 0.4 in/sec PPV, which would not exceed the 0.5 in/sec PPV threshold; this would be a less-than-significant vibration impact and no additional mitigation would be required.

TABLE 4.7-9
TYPICAL VIBRATION LEVELS FROM CONSTRUCTION EQUIPMENT

Equipment	Peak Particle Velocity (PPV) (in/sec)[a] at Specified Distances			
	35 Feet[b]	**90 Feet[c]**	**700 Feet[d]**	**900 Feet[e]**
Impact or Vibratory Pile Driver				
• Range	n/a	<0.1 – 0.4	<0.1	<0.1
• Typical	n/a	0.2	<0.1	<0.1
Vibratory Roller/Compactor	0.1	<0.1	<0.1	<0.1
Large Bulldozer, Caisson Drilling, Loaded Trucks, Jackhammer, Small Vibratory Compactor, Small Bulldozer	0.1	<0.1	<0.1	<0.1
Vibration Threshold for Damage to Reinforced Structures	0.5	0.5	0.5	0.5
Strongly Perceptible Threshold for Vibration	n/a	n/a	0.1	0.1

NOTES:
Vibration levels in **bold** exceed the 0.5 in/sec PPV threshold limit for cosmetic damage to structures.
in/sec = inches per second; PPV = peak particle velocity

[a] Vibration amplitudes for construction equipment assume normal propagation conditions and are calculated using the following formula:
PPV equip = PPVref x (25/D)1.1 where:
- PPV (equip) = the peak particle velocity in in/sec of the equipment adjusted for the distance
- PPV (ref) = the reference vibration level in in/sec from pages 30-37 and Table 18 of the Caltrans Vibration Guidance Manual
- D = the distance from the equipment to the receiver

[b] Minimum distance between the No. 2 Water Pump Station and Building 040, the closest historic building to project facilities. (Figure 2-3 in Chapter 2, *Project Description*, shows the location of Building 040, Primary Sedimentation Building No. 1.)
[c] Minimum distance between the proposed pipe gallery located east of solids pretreatment facility (piles may be driven or drilled at this location) and Building 040, the closest historic building to project facilities. (Figure 2-3 in Chapter 2, *Project Description*, shows the location of Building 040, Primary Sedimentation Building No. 1.)
[d] Minimum distance between the proposed pipe gallery located east of solids pretreatment facility (piles may be driven or drilled at this location) and the closest structures to the east (east side of Phelps Street).
[e] Minimum distance between the proposed pipe gallery located east of solids pretreatment facility (piles may be driven or drilled at this location) and the closest residential receptor to the east (1700 Kirkwood Avenue).

SOURCE: Caltrans, *Transportation and Construction Vibration Guidance Manual*, September 2013, pp. 30-37. Available online at http://www.dot.ca.gov/hq/env/noise/publications.htm. Accessed on March 11, 2016.

Proposed pile driving (for a pipe chase east of the Solids Pretreatment Facility) could occur as close as 700 feet from the nearest off-site buildings, located on the east side of Phelps Street. As indicated in Table 4.7-9, vibration levels 700 feet from operation of the pile drivers and other construction equipment more than 700 feet away would remain well below the 0.5 in/sec PPV threshold and even the Caltrans recommended threshold for older residential structures of 0.3 in/sec PPV (see Table 4.7-3), indicating a less-than-significant vibration impact on structures to the east. Existing off-site buildings to the south are located at least 1,000 feet or more from proposed pile-driving activities. Therefore, piledriving activities would also have a less-than-significant vibration impact on structures to the south.

Human Annoyance

Vibration levels could also result in interference or annoyance impacts at nearby residential receptors. As shown in Table 4.7-4, vibration levels of 0.1 in/sec PPV are strongly perceptible, while vibration levels below this are distinctly perceptible at 0.04 in/sec PPV and barely perceptible at 0.01 in/sec PPV. The closest residential receptor to proposed impact pile driving activity (which would be conducted during daytime hours) is located approximately 900 feet from the pipe chase located east of the Solids Pretreatment Facility**.** As shown in Table 4.7-9, vibration levels from pile driving and other construction activities would be below the strongly perceptible threshold, the threshold for assessing daytime vibration impacts. The distance between the existing Southeast Community Facility (including the daycare facility) to the south and the closest location where pile driving could occur (a pipe chase located east of the Energy Recovery Facility) would be even farther away (approximately 1,075 feet), and vibration levels would be even lower than at the closest residential receptor. Therefore, due to the distance of receptors from the project construction activities, impacts from vibration with respect to human annoyance would be less than significant.

Summary of Impact NO-2

Proposed construction activities including pile-driving would generate vibration, but vibration levels would not exceed the 0.5 in/sec PPV threshold for structural damage at the nearest buildings nor the 0.1 in/sec PPV threshold for human annoyance at the nearest sensitive receptor. The impact would therefore be ***less than significant***.

Mitigation: None required.

Operational Impacts

Impact NO-3: Operation of the project would not result in a substantial permanent increase in ambient noise levels in the project vicinity and permanently expose persons to noise levels in excess of standards in the Noise Ordinance (Article 29 of the Police Code). (Less than Significant)

Project operation would increase ambient noise levels in the immediate vicinity of the project site, primarily as a result of new equipment installed at the site.

On-Site Stationary Equipment

Project implementation would result in the installation of new facilities to upgrade the digestion, solids treatment, and odor handling processes as well as new digester gas treatment and energy recovery facilities. While most facilities would be enclosed within structures, some equipment would be located outdoors. In addition, all facilities located inside buildings would have vent openings, which would be new sources of noise at the SEP. All project buildings would have air handling units on roofs, and these would also be new sources of noise.

Estimated noise levels at vent openings, from equipment not enclosed, and from rooftop air handling units were combined into a single estimated noise level for each process facility, since this equipment could operate simultaneously. These reference noise levels by facility at a distance of 50 feet are included in Table 2 of Appendix NOI. As an initial screening review, the combined operational noise levels for each process facility were then adjusted for the minimum distance between each facility and the closest property plane on Jerrold Avenue (facility locations are shown on Figure 2-5 in Chapter 2, *Project Description*). **Table 4.7-10** presents the combined noise level associated with each process facility as well as the combined noise level from simultaneous operation of all process facilities at the closest property plane, which is the property boundary along Jerrold Avenue. Assessments of impacts at the property plane are used as a preliminary screening analysis to determine whether and where a more refined analysis for given receptors is warranted. The estimated

TABLE 4.7-10
ESTIMATED OPERATIONAL NOISE LEVELS AT CLOSEST PROPERTY PLANE

Project Component/Receptor Location		Outdoor or Enclosed	Reference Noise Level (L_{eq}) in dBA at 50 Feet[a]	Minimum Distance to Jerrold Avenue Property Plane (feet)	Distance Adjustment (dBA)[b]	Adjusted Noise Level (L_{eq}) at Jerrold (Closest Property Plane) (dBA)	Section 2909(b) Review – Initial Screening at Closest Property Plane[d]: Ambient Noise Level at Jerrold (L_{90}[c])	Section 2909(b) Review – Initial Screening at Closest Property Plane[d]: Lowest Applicable Ordinance Limit (Lowest Ambient at Jerrold +8 dBA)	Section 2909(b) Review – Initial Screening at Closest Property Plane[d]: Does Project Noise Exceed Ordinance Limit)?	Exceedance[d] (dBA)
SEP Closest Property Plane on Jerrold Avenue										
Energy Recovery	Digester Gas Treatment	Outdoor	70	30	4	75	57	65	**Yes**	10
	Waste Gas Burners[e]	Outdoor	64	725	-23	41	57	65	No	
	OR	OR	OR	OR	OR	OR	OR	OR	OR	
	Energy Recovery Facility[e]	Enclosed	67	200	-12	55	57	65	No	
Thermally Hydrolyzed Sludge Cooling		Outdoor	77	150	-10	68	57	65	**Yes**	3
Anaerobic Digestion		Enclosed	68	150	-10	59	57	65	No	
Biosolids Dewatering		Enclosed	68	850	-25	44	57	65	No	
Pipe Gallery/Chase		Enclosed	69	225	-13	56	57	65	No	
Solids Odor Control		Mostly Outdoor	85	375	-18	68	57	65	**Yes**	3
Pre-Digestion Solids Processing	Pre-THP Dewatering[f]	Enclosed	65	300	-16	50	57	65	No	
	Sludge Screening[f]	Enclosed	66	300	-16	51	57	65	No	
	Thickening[f]	Enclosed	64	300	-16	48	57	65	No	
	THP	Outdoor	59	225	-13	46	57	65	No	
Pumped Plant Recycled Water Pumping		Enclosed	64	50	0	64	57	65	No	
Combined Noise Level at Closest Property Plane						77	57	65	**Yes**	*12*

dBA = A-weighted decibel; SEP = Southeast Water Pollution Control Plant; THP = thermal hydrolysis process

NOTES: Because the adjusted noise levels have been rounded to the nearest whole number, the difference may vary by up to 1 dBA. The combined noise levels that exceed threshold levels may not occur because this model applies very conservative assumptions. The model does not account for noise reductions from intervening buildings or topographic changes, and it assumes all noise sources for each project component are located at the closest distance between source and receptor. Noise sources within each component would actually be distributed over the entire footprint of that component and there are intervening structures that would partially or completely shield some receptors. Therefore, the combined noise level at each project facility component would likely be lower than these estimates.

a See Table 2 in Appendix NOI for derivation of reference noise levels.

b Reference noise levels are at 50 feet. These levels are adjusted for distance (at a rate of 6 dBA per doubling of distance) such that the adjusted noise level *increases* (reflected as a positive value) at distances closer than 50 feet and *decreases* (reflected as a negative value) at distances greater than 50 feet.

c Section 2901(a) states that under most conditions, the L90 (the level of noise exceeded 90 percent of the time) is a conservative representation of the ambient. In this case, L90 was applied and then the lowest (nighttime) measured L90 (50 dBA at Measurement Location A, which is 180 feet from the centerline of Jerrold Avenue; refer to Table 4.7-2 and Figure 4.7-1) was adjusted for distance (+6.5 dBA or 57 dBA, rounded) to reflect the noise level at 40 feet from the center line of Jerrold Avenue, which is the nearest property plane.

d Section 2909(b) limits noise increases associated with industrial uses to 8 dB over the ambient at the closest property plane. As indicated in Section 2901(h), "Person" means a person, firm, association, copartnership, joint venture, corporation, or any entity, public or private in nature, but shall not include the City and County of San Francisco." Since noise limits specified in Section 2909 apply to a "person" generating noise, the City is exempt from these ordinance limits. Nevertheless, for purposes of the CEQA, the project is reviewed for consistency with Noise Ordinance limits including those specified in Section 2909(b), which allows an increase of up to 8 dB over the ambient level. This limit is first applied to the closest property plane, which is the project boundary on Jerrold Avenue (initial screening review). In this case, since this initial screening threshold is exceeded, the ordinance limit specified in Section 2909(d) is then applied at the closest property boundary with a sensitive receptor to determine impact significance (secondary screening review). The CEQA impact significance determination is made after the second tier of review since CEQA significance criteria are defined as a "substantial permanent increase in ambient noise levels" and "exposure of persons to "exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies."

e Noise levels generated by the Energy Recovery Facility and waste gas burners (called emergency flares in Appendix NOI) are both listed, but since they would not operate simultaneously, only the highest noise level is added into the combined noise level at specified receptor locations.

f The same distance is applied to all of these facilities and based on the closest location of the Pre-THP facility and receptor.

SOURCE: Orion Environmental Associates, data developed in 2016 for BDFP.

noise levels are conservatively high as they reflect worst-case, maximum noise levels that do not account for noise reductions from intervening buildings or structures between sources and receptors or parapets around rooftop equipment, which can serve as effective noise barriers. The estimates also assume all equipment within all process facilities could be operating at the same time.

As indicated in Table 4.7-10, the combined noise level from all process facilities at the Jerrold Avenue property plane would be 77 dBA. The ordinance noise limit specified in Section 2909(b) (ambient +8 dBA) at this location is 65 dBA (L_{90}; 57 dBA ambient +8 dBA). Consequently, the combined operation of all process facilities at the Jerrold Avenue property plane would exceed the ordinance limit by approximately 12 dBA. This exceedance is attributable to the process facilities that would not be enclosed, as indicated in Table 4.7-10, and mostly attributable to the pumps and blowers at the digester gas treatment process facility, which is the closest facility to the Jerrold Avenue property plane (30 feet away). Other outdoor process facilities contributing to this exceedance include the cooling tower and large fans at the Solids Odor Control Facility. Based on the results of this initial screening, a secondary analysis of noise levels at the closest sensitive receptor was conducted to determine the severity of the impact.

For the secondary analysis, estimated noise levels associated with each proposed process facility and combined noise levels associated with simultaneous operation of all project facilities were estimated at the closest sensitive receptor (residence at the northeast corner of Phelps Street and Kirkwood Avenue, 1700 Kirkwood Avenue, shown on Figure 4.7-1) by attenuating the reference noise levels for distance (see Table 3 in Appendix NOI for derivation of adjusted noise levels at representative sensitive receptors). Estimated noise levels at this receptor are also representative of noise impacts at all residential receptors located on the east side of Phelps Street. Estimated project-related operational noise levels were then compared to Section 2909(d) limits. Section 2909(d) establishes maximum noise levels for fixed noise sources (e.g., mechanical equipment) of 45 dBA (10:00 p.m. to 7:00 a.m.) and 55 dBA (7:00 a.m. to 10:00 p.m.) inside any sleeping or living room in any dwelling unit located on residential property, which is equivalent to an *exterior* nighttime limit of 60 dBA and daytime limit of 70 dBA with windows open (see Section 4.7.3.2, Approach to Analysis, Operational Noise Impact Methodology, above). The adjusted maximum combined noise level at the closest sensitive receptor is presented in **Table 4.7-11**. As shown in this table, combined maximum noise levels at this closest receptor are estimated to be as high as 59 dBA (L_{eq} or L_{90}), which would not exceed the minimum 60-dBA nighttime exterior noise limit at the closest sensitive receptor applicable under Section 2909(d). Maximum combined operational noise levels at more distant residential receptors would be relatively lower (51 to 58 dBA, L_{eq} below the 60-dBA nighttime noise limit).[33] Estimated noise levels are considered to be conservatively high because attenuation benefits from intervening topography and structures, which would further reduce project noise levels at these receptors, have not been included. Additionally, the estimated noise levels assume simultaneous operation of all equipment sources which would be an infrequent, if not unlikely occurrence. Consequently, the operation of the proposed project equipment would not result in a substantial permanent increase in ambient noise levels in the project vicinity or expose persons to noise levels in excess of standards in the Noise Ordinance even under the conservative assumptions employed in this analysis which likely overstate resultant noise levels. Therefore, the operational noise impact would be less than significant.

33 See Table 3 in Appendix NOI for combined operational noise levels at more distant receptors.

TABLE 4.7-11
ESTIMATED OPERATIONAL NOISE LEVELS AT CLOSEST SENSITIVE RECEPTORS[a]

Project Component/Receptor Location		Outdoor or Enclosed	Reference Noise Level (L_{eq}) in dBA at 50 Feet[b]	Minimum Distance between Receptor and Specified Source (feet)	Distance Adjustment (dBA)[c]	Adjusted Noise Level (L_{eq}) at Receptor (dBA)	Section 2909(d) Review – Secondary Screening at Closest Residential Receptor[d]	
							Lowest Exterior Noise Limit in dBA (8:00 p.m. to 10:00 p.m./After 10:00 p.m.)	Does Project Noise Exceed Limit at Receptor?
Residential receptor at 1700 Kirkwood (as represented by noise levels measured at 1796 La Salle Avenue)								
Energy Recovery	Digester Gas Treatment	Outdoor	70	775	-24	47	60	No
	Waste Gas Burners[e]	Outdoor	64	1,500	-30	35	60	No
	OR		OR	OR	OR	OR	OR	OR
	Energy Recovery Facility[e]	Enclosed	67	775	-24	43	60	No
Thermally Hydrolyzed Sludge Cooling		Outdoor	77	1,125	-27	50	60	No
Anaerobic Digestion		Enclosed	68	1,200	-28	41	60	No
Biosolids Dewatering		Enclosed	68	1,800	-31	37	60	No
Pipe Gallery and Chases		Enclosed	69	1,025	-26	43	60	No
Solids Odor Control		Mostly Outdoor	85	1,250	-28	57	60	No
Pre-Digestion Solids Processing	Pre-THP Dewatering[f]	Enclosed	65	1,100	-27	38	60	No
	Sludge Screening[f]	Enclosed	66	1,100	-27	40	60	No
	Thickening[f]	Enclosed	64	1,100	-27	37	60	No
	THP	Outdoor	59	1,150	-27	32	60	No
Pumped Plant Recycled Water Pumping		Enclosed	64	1,225	-28	36	60	No
Combined Noise Level at Closest Property Plane						59	60	No

NOTES: Sensitive Receptor Locations 1 through 6 correlate to noise Measurement Locations 1 through 6 shown on Figure 4.7-1. Because the adjusted noise levels have been rounded to the nearest whole number, the difference may vary by up to 1 dBA.

dBA = A-weighted decibel; SEP = Southeast Water Pollution Control Plant; THP = thermal hydrolysis process

a See Figure 4.7-1 for location of closest nighttime sensitive receptor at 1700 Kirkwood Avenue. Noise levels at this receptor are represented by noise levels measured at Measurement Location 1,
b See Table 1 in Appendix NOI for derivation of reference noise levels.
c Reference noise levels are at 50 feet. These levels are adjusted for distance (at a rate of 6 dBA per doubling of distance) such that the adjusted noise level *increases* (reflected as a positive value) at distances closer than 50 feet and *decreases* (reflected as a negative value) at distances greater than 50 feet.
b The Noise Ordinance (Police Code Section 2909[d]) interior noise limits from fixed noise sources are 45 dBA between 10:00 p.m. and 7:00 a.m. and 55 dBA between 7:00 a.m. and 10:00 p.m. Assuming the building would attenuate exterior noise levels by 15 dBA with the windows open (World Health Organization [WHO], *Guidelines for Community Noise, Section 4.3.1. Dwellings,* page 61, 1999. Available online at http://www.who.int/docstore/peh/noise/guidelines2.html), these interior noise limits are equivalent to exterior noise limits of 60 dBA between 10:00 p.m. and 7:00 a.m. and 70 dBA between 7:00 a.m. and 10:00 p.m. at the closest residential receptors.
e Noise levels generated by the Energy Recovery Facility and waste gas burners (called emergency flares in Appendix NOI) are both listed, but since they would not operate simultaneously, only the highest noise level is added into the combined noise level at specified receptor locations.
f The same distance is applied to all of these facilities and based on the closest location of the Pre-THP facility and receptor.

SOURCE: Orion Environmental Associates, data developed in 2016 for BDFP.

Summary of Impact NO-3

Estimated worst-case combined maximum operational noise levels at nearby residential receptors would not exceed the 60-dBA nighttime noise limit applicable under Section 2909(d), and the operational noise impact would be ***less than significant***.

Mitigation: None required.

Impact NO-4: The project would not result in substantial permanent increases in traffic-related ambient noise levels in the project vicinity. (Less than Significant)

As explained in Section 4.7.3.2 under *Operational Noise Impact Methodology*, the following thresholds are applied to determine the significance of project-related traffic noise increases: (1) a noise increase of more than 5 dBA is considered a significant traffic noise increase, and (2) if the resulting noise environment on the affected road segment is not acceptable for adjacent land uses when compared to the "Land Use Compatibility Guidelines for Community Noise,"[34] an increase of more than 3 dBA is considered to be significant. Vehicle traffic associated with operation of the SEP includes trucks hauling biosolids product away from the facility, vendor trips delivering treatment chemicals, and worker trips. As indicated in the Section 4.6, Transportation and Circulation, operation of the BDFP would result in a minimal increase in truck trips, from fewer than 33 delivery and haul trucks per day (existing) to fewer than 36 delivery and haul trucks per day in 2045. There would be no increase in worker-related vehicular traffic because there would be no increase in SEP staff levels. Such a small change in truck trips on local roadways would result in truck noise increases that are well below 1 dBA. Therefore, this small increase in truck trips associated with the project would have a less-than-significant noise impact.

Proposed changes in vehicle entrances and exits and to on-site circulation roads (refer to Figure 2-5 in Chapter 2, *Project Description*) would alter traffic patterns associated with the SEP's operations, shifting some truck traffic off of Jerrold Avenue and onto Rankin Street at Evans Avenue. Since there are no residential receptors or noise-sensitive uses located along these streets, no significant operational traffic noise impacts would occur as a result of changes in project-related operational truck traffic distribution on local streets, given the low number of trucks that would be added to the new routes (up to three trucks per day). Overall, operational noise impacts associated with long-term changes in truck traffic would be ***less than significant***.

Mitigation: None required.

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[34] This chart is included in Policy 11.1 of the Environmental Protection Element of the *San Francisco General Plan*. Available online at http://generalplan.sfplanning.org/I6_Environmental_Protection.htm. Accessed on March 28, 2016.

Impact NO-5: Operation of the project would not expose any people or off-site structures to excessive groundborne vibration levels. (Less than Significant)

Operation of some proposed process facility equipment would have the potential to generate vibration. However, project-related process equipment that is vibration-sensitive would be located in closer proximity to existing SEP equipment than nearby sensitive receptors. The closest residences to the east are located a minimum of 700 feet from proposed digester gas treatment and energy recovery facilities, while the Southeast Community Facility to the south is located over 1,000 feet from these facilities. The primary concern with vibration generated by operating process equipment would be sleep disturbance at the closest residential receptors during the more sensitive nighttime hours. Sleep disturbance can occur at very low levels, but would not occur because the 700-foot separation between the closest project facilities and closest residences would be sufficient to attenuate vibration levels to below perceptible levels.

Relatively higher vibration levels (i.e., on the order of 0.2 to 0.3 in/sec PPV[35]) can be tolerated by process equipment. However, if vibration generated by operation of proposed facilities is high enough, vibration effects could adversely affect existing equipment operations at the SEP (resulting in more rapid wear). The SFPUC would design facilities to control vibration levels associated with project equipment as necessary so as to avoid adverse effects on not only project equipment (including the equipment itself and connections as well as other process equipment and piping), but also existing SEP structures and staff. If necessary, design measures that can be employed to isolate or control vibration include using passive techniques (i.e., rubber pads, mechanical springs) or active control systems such as sensors and actuators. Since existing equipment at the SEP is located closer to proposed BDFP equipment than off-site structures (including nearby residential receptors), vibration controls that would be implemented to ensure that much closer existing SEP facilities and proposed BDFP facilities would not be damaged would be sufficient to maintain vibration levels at more distant off-site receptors to below levels that could cause sleep disturbance.[36] Therefore, operational vibration effects would be ***less than significant.***

Mitigation: None required.

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[35] LaRocque, Tom et al., *Continuous Vibration Monitoring of Wastewater Pump Stations*, Pumps and Systems, page 3, August 2008. Available online at http://www.pumpsandsystems.com/topics/pumps/continuous-vibration-monitoring-wastewater-pump-stations?page=3. Accessed on August 17, 2016.

[36] For example, if the 0.5 in/sec PPV vibration threshold for damage to structures is conservatively applied to the proposed digester gas treatment facility, vibration levels at the closest residence (700 feet to the east) would be 0.001 in/sec PPV, which is well below the 0.01 in/sec PPV threshold for being barely perceptible (as indicated in Table 4.7-4).

Cumulative Impacts

Impact C-NO-1: Construction activities of the project combined with cumulative construction noise in the project vicinity could cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity or result in excessive groundborne vibration levels during construction. (Less than Significant with Mitigation)

Noise

In general, cumulative construction-related noise increases would occur if any nearby cumulative projects are constructed at the same time as the BDFP and affect the same sensitive receptors (i.e., receptors located near both the BDFP site and cumulative project sites). Among the projects identified in Table 4.1-1 and Figure 4.1-1 (in Section 4.1, Overview), only the following could result in cumulative impacts due to their location (adjacent to the BDFP site) and construction schedule:[37]

- **Southeast Plant Headworks Replacement Project.** Construction activities associated with this project would include demolition of existing facilities, pile installation for foundations, and earthwork/grading. These activities would require the use of heavy equipment. While piles would be installed to support foundations, they would be drilled and cast-in-place and impact pile drivers would not be used. This project is located north of the BDFP site, farther from residential receptors located east of Phelps Street and south of Jerrold Avenue, but construction is scheduled to occur from 2017 to 2021, concurrent with the BDFP construction. This project would have the potential to contribute to cumulative noise increases at the closest residential receptors.

- **Southeast Greenhouses Demolition Project.** This project would demolish the greenhouses, administrative building, and exhibit gallery located on the Southeast Greenhouses site. There would be no grading, excavation, or other ground disturbance at the site as part of the demolition activities, but demolition debris would be hauled off-site. The Southeast Greenhouses site is located south of the BDFP site, and its boundaries are contiguous with the Southeast Community Facility (and daycare facility) to the south and Phelps Street to the east. Residential receptors are located directly across Phelps Street from this staging area (approximately 65 feet from the eastern staging area boundary). Demolition of these structures is scheduled to begin in 2017 and end prior to BDFP construction. Since construction schedules would not overlap, this project would not contribute to cumulative construction-related noise increases, but would extend the overall duration of construction-related noise exposure at adjacent and nearby sensitive receptors.

- **Existing Digester Gas Handling Improvements.** This project would involve replacement of existing equipment in kind, and heavy equipment use would be limited to one excavator, one crane, one paver and paving equipment, one roller, five dump trucks, one loader, one trencher, and one concrete truck. No impact pile driving would occur as part of this project. This project is located closer to residential receptors to the east than the BDFP, but construction is scheduled to

[37] With respect to staging areas, three projects (Pier 90-94 Backlands Improvement Project, Asphalt and Concrete Recycling and Production Plant at Pier 94, and Pier 96 Bulk Export Terminal) are located adjacent to the Piers 94 and 96 staging area, while the Southeast Community Facility Revitalization project is located adjacent to the Southeast Greenhouses staging area and on the 1550 Evans Avenue staging area. Construction schedules for these projects have not yet been determined and they are still in the planning stages. If construction of any of these projects were to overlap with the BDFP, the three projects in the vicinity of Piers 94 and 96 are not expected to contribute to cumulative noise impacts due to the absence of nearby sensitive receptors. Since the Southeast Community Facility Revitalization project would use the staging areas being used as part of the BDFP, construction of that project could not proceed until after the BDFP is constructed and staging areas vacated.

occur from May 2016 to March 2018, predominantly prior to BDFP construction. Since this project would not use impact pile drivers and would only overlap with the BDFP by about one month, this project's contribution to cumulative noise increases would be minimal.

- **Building 521 Replacement/522 Disinfection Upgrade.** This project would involve installation of new equipment (pumps and a standby emergency generator), and construction work would occur mostly along the northern SEP boundary (east of Headworks). With only one forklift, one backhoe, and one dump truck, this project is not expected to contribute substantially to construction noise increases typically associated with operation of heavy equipment or impact pile drivers. In addition, this project is located farther away from residential receptors that are located closest to the BDFP site (south of Jerrold Avenue and east of Phelps Street). Construction is scheduled to occur 2016 to mid-2018, predominantly prior to BDFP construction. For these reasons, this project's contribution to cumulative noise increases would be minimal.

- **Power Feed and Primary Switchgear Upgrades.** This project would involve electrical upgrades, construction of a new primary switchgear station, and installation of an electrical duct bank within the northern portion of the SEP and outside the plant to connect to the Bruce Flynn Pump Station (BFS) and Islais Creek Booster Pump Station and is not expected to contribute construction noise increases related to operation of heavy equipment or pile drivers, even though construction is scheduled to be concurrent with BDFP (late 2017 to early 2020). Therefore, this project's contribution to cumulative noise increases would be minimal.

- **Seismic Reliability and Condition Assessment Improvements – All Phases.** This project would consist of seismic retrofit work at various existing facilities at the SEP. Activities could include rehabilitation (such as concrete spalling or breaking up and crack repair) as well as seismic retrofit of process tanks and buildings. The project would be conducted in two phases: retrofit and rehabilitate the channel under the post-chlorination building and SEP 530 channel and the remaining channel structures, and retrofit SEP 042. Proposed staging areas could include 2 Rankin Street and lot adjacent to the BFS. Seismic retrofit work would include the use of heavy equipment including cranes, rollers, excavators, bobcats, backhoes, and a drill rig (for drilled pier foundations). This work would occur at locations that are farther from the closest residential receptor to the BDFP (1700 Kirkwood Avenue). The closest location of the SEP 530 channel is approximately 800 feet from this receptor, while the closest BDFP facility (No. 2 Water pump station) is located approximately 625 feet from this receptor. SEP 042 is located north of the BDFP site and would be located farther away from this receptor. Given this project's location farther away from sensitive receptors and its avoidance of impact pile-driving activities, this project is not expected to contribute substantially to construction noise increases at the closest sensitive receptors. Construction is scheduled to occur from 2016 to mid-2019, overlapping only during the initial years of BDFP construction. Therefore, this project's contribution to cumulative noise increases would be minimal.

- **Quint-Jerrold Connector Road.** This project would involve construction of a new roadway along the west side of the railroad embankment to provide access between existing Quint Street and Jerrold Avenue. This project would be located west of the BDFP site. Construction activities (scheduled for late 2018 to 2019) would overlap with the initial years of BDFP construction. The existing railroad embankment separates the connector road project from the BDFP site and would buffer sensitive receptors to the east of this embankment from roadway construction noise. Given this barrier separating the project, no cumulative noise increases from these two overlapping construction projects are expected to occur at sensitive receptors located south and east of the BDFP site.

With the exception of the first project, none of the above-listed SEP projects are expected to contribute substantially to cumulative construction-related noise impacts at the closest noise-sensitive receptors because they would replace/upgrade existing facilities, avoid impact pile driving, be located farther from the sensitive receptors located closest to the BDFP, and/or involve construction that would occur inside existing building enclosures. The only cumulative project located at the SEP that would be constructed at the same time as the BDFP and would have the potential to contribute to the BDFP's cumulative construction-related noise impacts would be the Southeast Plant Headworks Replacement project.

The Headworks site is located north of the BDFP site and would be farther away from sensitive receptors to the south and southeast. The closest receptors to the Headworks site are located east of Phelps Street and south of Jerrold Avenue and are the same receptors that would be most affected by the BDFP. The closest residential receptor to both the BDFP and Headworks sites is at 1700 Kirkwood Avenue, the northernmost residence on Phelps Street. During demolition, excavation, and construction of the Headworks project, estimated noise levels at the 1700 Kirkwood Avenue residence would be 55 to 58 dBA (L_{eq})[38] and approximately 3 dBA lower at the more distant daycare center and residences directly across from the Southeast Greenhouses staging area. When these noise levels are added to 79 dBA (Leq) estimated for the BDFP at these receptors (see Table 4.7-7), there would be no incremental noise increase. Therefore, the combined or cumulative impact from construction of both of these projects would be ***less than significant.***

Construction activities associated with the BDFP in combination with construction of these SEP projects and other cumulative projects in the vicinity (identified on Figure 4.1-1 in Section 4.1, Overview) could result in cumulative increases in construction-related traffic on construction routes that are proposed to be used by the BDFP, such as Evans Avenue, Cesar Chavez Street, and Third Street (north of Evans Avenue), which provide access to and from the I-280 and Highway 101 freeways. Since these streets already serve as truck routes, and there is no residential development along these street segments that would be used by BDFP-related trucks, cumulative truck traffic noise impacts on sensitive receptors would not occur. In addition, truck routes already have higher ambient noise levels than other local streets. Therefore this cumulative impact relative to traffic noise increases would be ***less than significant***.

Vibration

As indicated above in Impact NO-2, vibration effects associated with pile-driving activities could exceed the 0.5 in/sec PPV threshold level for damage within approximately 70 feet. Therefore, the potential for cumulative vibration effects would occur if simultaneous construction activities from different projects generated substantial vibration within 70 feet of the BDFP site. Of the above-listed projects, only the Headworks project is anticipated to generate substantial construction-related vibration. The Headworks project is located north of the BDFP where there is no off-site structure located within 70 feet of both projects. Therefore, with regard to vibration, ***no cumulative impact*** would occur.

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[38] Wilson Ihrig Associates (WIA), *Southeast Plant New Headworks (Grit) Replacement Project, Noise and Vibration Technical Memo,* August 19, 2016.

Mitigation Measure M-NO-1b: Construction Noise Control Measures at Southeast Greenhouses Staging Area (see Impact NO-1)

Impact C-NO-2: Operation of the project when considered with other cumulative development would not cause a substantial permanent increase in ambient noise levels or result in excessive groundborne vibration levels in the project vicinity. (Less than Significant)

Noise

In general, cumulative operational noise increases could occur if operational noise from cumulative projects would affect the same receptors as the BDFP. Among the projects identified in Table 4.1-1 and Figure 4.1-1, the following projects have the potential to contribute to cumulative operational noise increases at the same receptors due to their proximity to the BDFP site:

- **Southeast Plant Headworks Replacement Project.** This project would involve installation of various pumps, fans, filters, and grit screening equipment, and some have noise ratings of up to 85 to 100 dBA. However, all pumps and exhaust fans would be enclosed and buildings would have acoustical louvers to limit noise levels at vent openings. Rooftop ventilation equipment is estimated to generate 65 dBA at the SEP property plane along Phelps Street (east of the Headworks site). Noise levels would be lower at the more distant residential receptors farther south on Phelps Street. An emergency generator is also proposed and would be located outdoors, operating only during testing and emergencies. Trucks associated with this project would use Rankin Street and Evans Avenue for access to the freeways. There are no sensitive receptors located along these routes.
- **Chemical System Relocation and Facilities Upgrade.** This project would upgrade the odor control system (adding two fans) and add a new 200-kilowatt (kW) emergency generator. Fans are rated to generate noise levels of 68 dBA at 3 meters (about 10 feet). The project would relocate facilities to just east of SEP 042.
- **Existing Digester Roof Repairs.** This project would include repair or replacement of the roofs on the existing digesters and associated appurtenances. No operational noise increase would be expected to result from proposed roof repair or replacement.
- **Existing Digester Gas Handling Improvements.** This project would involve replacement of existing equipment (upgrade ventilation, boiler, and cooling system) in kind. Operation of equipment would not differ substantially from the previous condition because the equipment would be replaced in kind.
- **Building 521 Replacement/522 Disinfection Upgrade.** This project would add new pumps and a standby generator, which would be new sources of noise. There are currently two pumps operating four hours per day during peak demand periods. With this project, up to four to six pumps could operate four hours per day. Pumps are rated to generate noise levels of up to 85 dBA at 3 feet. The 80-kW standby generator would be located outdoors and would generate noise levels of 81 dBA at 23 feet, operating only during testing and emergencies. There is an existing wall located approximately 10 to 15 feet north of these pumps along Evans Avenue, and there are no residential receptors in the vicinity of this project.
- **Power Feed and Primary Switchgear Upgrades.** No new noise sources would be added because this project involves electrical upgrades only.

- **Primary/Secondary Clarifier Upgrades.** This project would consist of a new odor control system, which would include the addition of two 27,000-cubic-foot-per-minute dilution fans. While only one fan would operate at any given time, the fans would be enclosed and required to meet noise limits specified in Sections 2909(b) and 2909(d) of the Police Code.

- **Seismic Reliability and Condition Assessment Improvements – All Phases.** This project would consist of seismic retrofit work of existing facilities only, and no new noise sources would be added.

- **Northside Reliability Project.** This project replaced a variety of existing equipment in kind (e.g., an electric-powered compressor, pumps, air blowers, and included an emergency generator). Because equipment was installed mostly in 2011 to 2012, it is part of the existing (baseline) noise environment.

- **Oxygen Generation Plant Replacement.** The first part of this project (the plant replacement) added two blowers, which were enclosed to reduce noise levels to 85 dBA at 3 feet. The second part consists of installing new liquid storage tanks and vaporizers, and no new noise sources (i.e., pumps or motors) would be added.

Of the above-listed projects, five would add new equipment that could contribute to cumulative operational noise increases (Southeast Plant Headworks Replacement Project, Chemical System Relocation and Facilities Upgrade, Building 521 Replacement/522 Disinfection Upgrade, Primary/Secondary Clarifier Upgrades, Oxygen Generation Plant Replacement). As indicated in Impact NO-3, operation of the BDFP would result in combined maximum operational noise levels that would not exceed applicable ordinance noise limits at nearby residential receptors. Although addition of new pumps, standby generators, fans, blowers, or rooftop air handling units as a result of other cumulative projects would have the potential to contribute to cumulative operational noise increases at the closest sensitive receptors to the SEP, such cumulative noise increases are expected to be less than significant because each project would be required to comply with the noise limits specified in Sections 2909(b) and 2909(d) of the Police Code. Since each project would be required to meet the nighttime 45-dBA interior noise limit specified in Section 2909(d) at the closest residential receptors, and ambient noise levels occurring at the time each project undergoes review (which presumably account for noise from all existing sources) are reflected in the noise limit specified in Section 2909(b), it is expected that cumulative noise increases from these projects would remain below these ordinance threshold levels. Therefore, this cumulative operational noise impact would be ***less than significant***.

As stated in Impact NO-4, project operation would result in a minimal increase in truck trips and associated truck noise increases on truck routes. Truck routes that would be used by BDFP-related trucks for access to nearby freeways (shown in Figure 2-12 in Chapter 2, *Project Description*) include Rankin Street, Evans Avenue, Cesar Chavez Street, and Jerrold Avenue west of the SEP. Since these streets already serve as truck routes and lack residential development, cumulative noise impacts from truck traffic (combined with BDFP truck trips) on sensitive receptors would not occur. In addition, truck routes already have higher ambient noise levels than other local streets. Cumulative projects at the SEP or in the SEP vicinity could contribute to cumulative truck noise increases on these same streets, but for the same reasons (i.e., absence of noise-sensitive receptors and existing background noise levels), cumulative truck traffic increases on these routes would not result in a significant adverse, cumulative noise impact. Therefore, the cumulative operational noise impact related to noise increases from truck noise would be ***less than significant***.

Operation of cumulative SEP projects would not increase the number of workers at the SEP (refer to Section 4.6, Transportation and Circulation). Therefore, no cumulative increases in operational noise due to worker-related vehicular traffic on roadways in and around the SEP would occur.

Vibration

As stated in Impact NO-5, vibration levels associated with operation of the BDFP would be well below the 0.5 in/sec PPV vibration threshold for cosmetic damage and the 0.010 in/sec PPV threshold for sleep disturbance at the closest residential receptors. Most of the SEP cumulative projects listed above would involve replacement of equipment in kind, and vibration levels generated by replacement (new) equipment are expected to be similar to or less than levels generated by existing equipment. Five of the above-listed SEP cumulative projects (Southeast Plant Headworks Replacement Project, Chemical System Relocation and Facilities Upgrade, Building 521 Replacement/522 Disinfection Upgrade, Primary/Secondary Clarifier Upgrades, and Oxygen Generation Plant Replacement) would include addition of new equipment, and vibration generated by operation of new equipment at these project sites could contribute to cumulative vibration levels at nearby residential receptors. As indicated in Figure 4.1-1 in Section 4.1, Overview, all of these SEP projects would be located farther from the closest residential receptors to the east (south of Jerrold Avenue), and therefore operational vibration contributions from these cumulative projects at these receptor locations would be less than the levels estimated for the BDFP. Since BDFP-related vibration would be well below the threshold level for barely perceptible vibration, there would be sufficient buffer to accommodate any additional vibration from the relatively small amount of added equipment (four fans, four pumps, two blowers, and two standby generators) at more distant locations and still remain below the 0.01 in/sec PPV threshold for being barely perceptible (as indicated in Table 4.7-4). Therefore, cumulative operational vibration levels would be ***less than significant***.

Mitigation: None required.

4.8 Air Quality

This section describes the existing air quality conditions in the project area, evaluates the potential air quality and health risks and hazards impacts that would result from construction-related and operational emissions associated with implementation of the Biosolids Digesters Facility Project (BDFP or project), and identifies mitigation measures to reduce or avoid significant adverse impacts. The potential for the BDFP to result in odor impacts is also addressed in this section. Section 4.9, Greenhouse Gas Emissions, addresses greenhouse gas emissions (GHGs) associated with the project's potential impacts on climate change and the state's goals for GHGs pursuant to Assembly Bill 32.

4.8.1 Setting

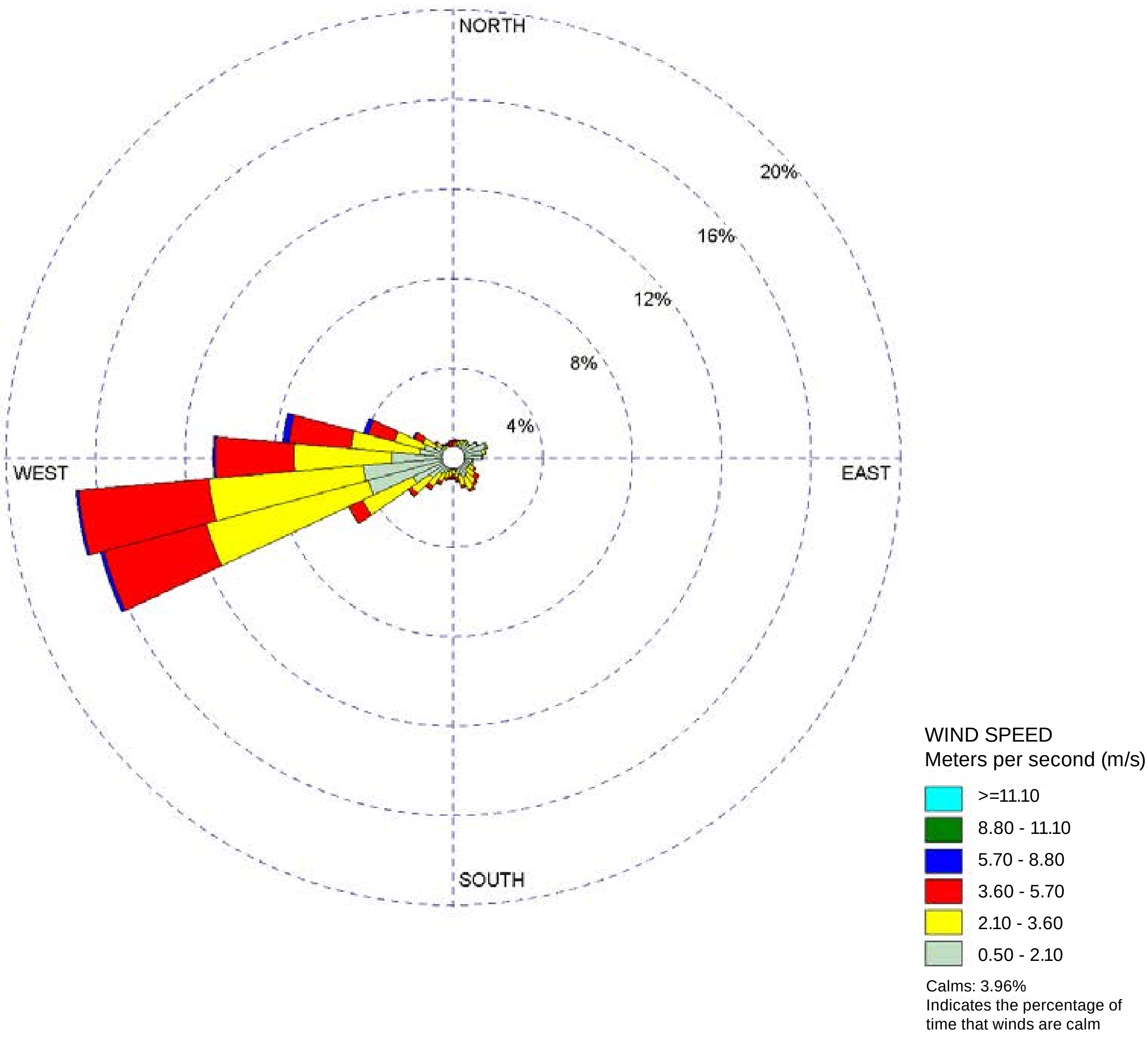
4.8.1.1 Climate and Meteorology

The project area is located within the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB has moderate climate for much of the year, although storms generally affect the region from November through April. San Francisco's proximity to the onshore breezes stimulated by the Pacific Ocean provide for generally very good air quality within San Francisco.

Temperatures in the project area average in the mid-50s annually, generally ranging from the low 40s on winter mornings to mid-70s during summer afternoons. Daily and seasonal oscillations of temperature are small because of the moderating effects of nearby San Francisco Bay. In contrast to the steady temperature regime, rainfall is highly variable and confined almost exclusively to the "rainy" period from November through April. Precipitation may vary widely from year to year, as a shift in the annual storm track of a few hundred miles can mean the difference between a very wet year and drought conditions.

Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants regionally and odors locally. Higher temperatures create the conditions in which ozone formation can increase and generally result in greater potential for odor generation. Precipitation can suppress ozone formation and migration of air pollutants and odor. Wind magnitude and direction have a profound effect on off-site odor incidents. A strong wind can disperse odors because of turbulence and mixing; the result is that odors are diluted and less noticeable off-site. Conversely, a light wind or stable meteorological condition (inversion) will tend to reduce dispersion and therefore increase the potential for off-site odor incidents. In the vicinity of the Southeast Water Pollution Control Plant (SEP or Southeast Plant) and the greater Bayview-Hunters Point area, winds can be complex and shift direction. Therefore, odor dispersion is not easily predictable. Winds in the vicinity are predominantly from the west to southwest, and average wind speeds are light (5 to 6 miles per hour [mph]). **Figure 4.8-1** presents a wind rose for the SEP's meteorological station (years 2007 to 2011).[1]

[1] A wind rose is a figure that is used to display how wind speed and direction are typically distributed at a particular location. The length of each spoke is related to the frequency of time that the wind blows from each direction, while the colored segments within the spoke correspond to different wind speed ranges.



NOTE: A windrose is a figure that is used to display how wind speed and direction are typically distributed at a particular location (in this case, the SEP). The length of each spoke is related to the frequency of time that the wind blows from each direction, while the colored segments within the spoke correspond to different wind speed ranges.

SOURCE: CH2M Hill and Brown and Caldwell, Final Southeast Plant Odor Characterization Report, December 2015, *in* SFPUC, Final Biosolids Digester Facilities Project Conceptual Engineering Report, March 2016

SFPUC Biosolids Digester Facilities

Figure 4.8-1
SEP Wind Rose

4.8.1.2 Sensitive Receptors

Air pollution does not affect every individual in the population in the same way, and some groups are more sensitive to adverse health effects than others. Population subgroups with greater sensitivity to the health effects of air pollutants include the elderly and the young; population subgroups with higher rates of respiratory disease, such as asthma and chronic obstructive pulmonary disease; and populations with other environmental or occupational health exposures (e.g., indoor air pollution) that affect cardiovascular or respiratory diseases. The Bay Area Air Quality Management District (BAAQMD) defines sensitive receptors as members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Uses typically associated with sensitive receptors (referred to as sensitive uses or sensitive receptor locations) include residential dwellings, schools, day care centers, hospitals, and senior care facilities. Workers are not considered sensitive receptors under the California Environmental Quality Act (CEQA) because all employers must follow regulations set forth by California Division of Occupational Safety and Health (Cal/OSHA) to ensure the health and well-being of their employees.[2]

Sensitive uses within 1,000 feet of the BDFP facilities and staging areas include residences to the east and south of the BDFP site as well as a day care facility located to the south (refer to Figure 4.2-1 in Section 4.2, Land Use). The closest residential uses are located to the east (about 600 to 700 feet from the closest BDFP facilities) on the east side of Phelps Street directly across the street from the SEP and along Jerrold Avenue on the block east of Phelps Street. Approximately 750 feet south of proposed BDFP facilities, the Southeast Community Facility (1800 Oakdale Avenue) provides services that include a day care facility (Wu Yee South East Child Development Center, 1300 Phelps Street). There are no schools or other licensed day care centers, nor are there any hospitals or senior care facilities, within 1,000 feet of BDFP facilities.[3]

4.8.1.3 Ambient Air Quality

Criteria Air Pollutants

As required by the 1970 federal Clean Air Act (CAA), the United States Environmental Protection Agency (USEPA) initially identified six criteria air pollutants that are pervasive in urban environments and for which state and federal health-based ambient air quality standards have been established. The USEPA calls these pollutants "criteria air pollutants" because the agency has regulated them by developing specific public-health-based and welfare-based criteria as the basis for setting permissible levels. The six criteria air pollutants originally identified by the USEPA are ozone, carbon monoxide (CO), particulate matter (PM), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. Since that time, subsets of particulate matter have been identified for which permissible levels

2 BAAQMD, *Recommended Methods for Screening and Modeling Local Risks and Hazards,* May 2011, page 12.
3 Other than the Wu Yee South East Child Development Center, the California Department of Social Services records (http://www.ccld.ca.gov/PG3581.htm) indicate there are no licensed child care or elderly assisted living facilities located within 1,000 feet of BDFP facilities. The San Francisco Children's Council's online child care records (http://www.childrenscouncil.org/families/find-child-care/child-care-referrals/child-care-search/) indicate there are a few permitted in-home child care providers located within 1,000 feet of the BDFP facilities.

have been established. These include particulate matter of 10 microns in diameter or less (PM_{10}) and particulate matter of 2.5 microns in diameter or less ($PM_{2.5}$). In accordance with the California Clean Air Act (CCAA) and federal CAA, air pollutant standards are identified for the six criteria air pollutants: ozone, CO, PM, NO_2, SO_2, and lead.

The BAAQMD is the regional agency with jurisdiction for regulating air quality within the nine-county SFBAAB. The region's air quality monitoring network provides information on ambient concentrations of criteria air pollutants at various locations in the San Francisco Bay Area. **Table 4.8-1** presents a five-year (2011-2015) summary of the highest annual criteria air pollutant concentrations, collected at the air quality monitoring station operated and maintained by the BAAQMD at 16th and Arkansas Streets (Potrero Hill), approximately 1.6 miles north of the project site. Table 4.8-1 also compares measured pollutant concentrations with the most stringent applicable ambient air quality standards (state or federal). Concentrations shown in bold indicate an exceedance of a standard.

In general, the SFBAAB experiences low concentrations of most pollutants when compared to federal or state standards. The SFBAAB is designated as either in attainment[4] or unclassified for most criteria pollutants with the exception of ozone, $PM_{2.5}$, and PM_{10}, for which the SFBAAB is designated as non-attainment for either the state or federal standards.

Ozone Precursors

Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG, also sometimes referred to as volatile organic compounds or VOCs by some regulating agencies) and nitrogen oxides (NOx). The main sources of ROG and NOx, often referred to as ozone precursors, are combustion processes (including motor vehicle engines) and the evaporation of solvents, paints, and fuels. In the Bay Area, automobiles are the single largest source of ozone precursors. Ozone is referred to as a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production through the photochemical reaction process. Ozone causes eye irritation, airway constriction, and shortness of breath and can aggravate existing respiratory diseases, such as asthma, bronchitis, and emphysema.

Table 4.8-1 shows that, according to published data, the most stringent applicable standards for ozone (state 1-hour standard of 0.090 parts per million [ppm] and the state/federal 8-hour standard of 0.070 ppm) were not exceeded in San Francisco between 2011 and 2015. However the air basin remains listed as non-attainment for ozone.

[4] "Attainment" means the region is meeting federal and/or state standards for a specified criteria pollutant. "Non-attainment" means the region does not meet federal and/or state standards for a specified criteria pollutant. "Unclassified" means there are not enough data to determine the region's attainment status for a specified criteria air pollutant.

TABLE 4.8-1
SUMMARY OF SAN FRANCISCO AIR QUALITY MONITORING DATA (2011–2015)
AT BAAQMD MONITORING STATION, 10 ARKANSAS STREET, SAN FRANCISCO

Pollutant	Most Stringent Applicable Standard	Number of Days Standards Were Exceeded and Maximum Concentrations Measured[a]				
		2011	2012	2013	2014	2015
Ozone						
- Days 1-Hour Standard Exceeded		0	0	0	0	0
- Maximum 1-Hour Concentration (ppm)	>0.090 ppm[b]	0.070	0.069	0.069	0.079	0.085
- Days 8-Hour Standard Exceeded		0	0	0	0	0
- Maximum 8-Hour Concentration (ppm)	>0.070 ppm[c, d]	0.054	0.048	0.059	0.069	0.067
Carbon Monoxide (CO)						
- Days 1-Hour Standard Exceeded		0	0	0	0	0
- Maximum 1-Hour Concentration (ppm)	>20 ppm[b]	1.8	2.0	1.8	1.6	1.8
- Days 8-Hour Standard Exceeded		0	0	0	0	0
- Maximum 8-Hour Concentration (ppm)	>9 ppm[b, c]	1.2	1.2	1.4	1.2	1.3
Suspended Particulates (PM_{10})						
- Days 24-Hour Standard Exceeded[d]		0	1	0	0	0
- Maximum 24-Hour Concentration ($\mu g/m^3$)	>50 $\mu g/m^3$ [b]	46	**51**	44	36	47
Suspended Particulates ($PM_{2.5}$)						
- Days 24-Hour Standard Exceeded[e]		2	1	2	0	0
- Maximum 24-Hour Concentration ($\mu g/m^3$)	>35 $\mu g/m^3$ [c]	**47.5**	**35.7**	**48.5**	33.2	35.4[e]
- Annual Average ($\mu g/m^3$)	>12 $\mu g/m^3$ [b, c]	9.5	8.2	10.1	7.7	7.6
Nitrogen Dioxide (NO_2)						
- Days 1-Hour Standard Exceeded		0	1	0	0	0
- Maximum 1-Hour Concentration (ppm)	>0.10 ppm[c]	0.09	**0.12**	0.07	0.08	0.07

NOTES:
Bold values are in excess of applicable standard.
BAAQMD = Bay Area Air Quality Management District; ppm = parts per million; PM_{10} = particulate matter of 10 microns in diameter or less; $PM_{2.5}$ = particulate matter of 2.5 microns in diameter or less; $\mu g/m^3$ = micrograms per cubic meter
All values from BAAQMD Potrero Hill air quality monitoring station on Arkansas Street (approximately 1.6 miles from project site).

[a] Number of days exceeded is for all days in a given year, except for particulate matter of 10 microns in diameter or less. PM_{10} was monitored every six days prior to 2013 and has been monitored every 12 days effective January 2013. Therefore, the number of days exceeded is out of approximately 60 annual samples for 2011 and 2012 and out of approximately 30 annual samples afterward. $PM_{2.5}$ is monitored continuously (hourly, 365 days per year).
[b] State standard, not to be exceeded.
[c] Federal standard, not to be exceeded.
[d] In October 2015, the United States Environmental Protection Agency (USEPA) implemented a new 8-hour ozone standard of 70 parts per billion (equivalent to 0.070 ppm), which is the same as the California standard.
[e] For an exceedance of a federal standard to occur, the monitored value rounded to the whole integer must be greater than the standard. Therefore, this highest monitored value in 2015 does not represent an exceedance of the federal standard.

SOURCE: BAAQMD, Annual Bay Area Air Quality Summaries, 2011–2015. Available online at: http://www.baaqmd.gov/about-air-quality/air-quality-summaries. Accessed on August 30, 2016.

Carbon Monoxide

CO is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels. The single largest source of CO is motor vehicles; the highest emissions occur during low travel speeds, stop-and-go driving, cold starts, and hard acceleration. Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, and fatigue; impair central nervous system function; and induce angina (chest pain) in persons with serious heart disease. Very high levels of CO can be fatal. As shown in Table 4.8-1, the most stringent applicable standards for CO (state 1-hour standard of 20 ppm and the state/federal 8-hour standard of 9 ppm) were not exceeded in San Francisco between 2011 and 2015.

Particulate Matter (PM_{10} and $PM_{2.5}$)

Particulate matter (PM) is a class of air pollutants that consists of heterogeneous solid and liquid airborne particles from man-made and natural sources. Particulate matter is measured in two size ranges: PM_{10} for particles 10 microns in diameter or less, and $PM_{2.5}$ for particles 2.5 microns in diameter or less.[5] In the Bay Area, motor vehicles generate about one-half of the air basin's particulates, through tailpipe emissions as well as brake pad and tire wear. Wood burning in fireplaces and stoves, industrial facilities, and ground-disturbing activities such as construction are other sources of particulates. One component of these particulate emissions is fine particulates, $PM_{2.5}$, which are small enough to be inhaled into the deepest parts of the human lung and can cause adverse health effects. (For more discussion, see Section 4.8.1.4 below.)

Table 4.8-1 shows that an exceedance of the state PM_{10} standard occurred on one monitored occasion between 2011 and 2015 in San Francisco. It is estimated that the state 24-hour PM_{10} standard of 50 micrograms per cubic meter ($\mu g/m^3$) was exceeded on up to six days between 2011 and 2015.[6] The state 24-hour $PM_{2.5}$ standard was exceeded on five days between 2011 and 2015.[7] The federal and state annual average $PM_{2.5}$ standard was not exceeded between 2011 and 2015.

Nitrogen Dioxide

NO2 is a reddish-brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are the main sources of NO2. Aside from its contribution to ozone formation, NO2 can increase the risk of acute and chronic respiratory disease and reduce visibility. NO2 may be visible as a coloring component of the air on high pollution days, especially in conjunction with high ozone levels.

In 2010, the USEPA implemented a new 1-hour NO_2 standard (presented in Table 4.8-1). Currently, the California Air Resources Board (CARB) is recommending that the SFBAAB be designated as an attainment area for the new standard.[8] This new federal standard was exceeded on one day at the San Francisco station between 2011 and 2015.

The USEPA has also established requirements for a new monitoring network to measure NO_2 concentrations near major roadways in urban areas with a population of 500,000 or more. Sixteen new near-roadway monitoring sites are required in California, three of which will be in the Bay Area. These monitors are planned for Berkeley, Oakland, and San Jose. The Oakland station commenced operation in February 2014, the San Jose station commenced operation in March 2015, and the Berkeley station is not yet operational. The new monitoring data may result in a need to change area designations in the

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5 PM10 is often called "coarse" particulate matter. PM2.5 is often called "fine" particulate matter.

6 PM_{10} concentrations were sampled every sixth day prior to 2013; therefore, actual days over the standard can be estimated to be six times the numbers listed in the table.

7 PM2.5 concentrations are continuously monitored.

8 California Air Resources Board (CARB), *Recommended Area Designations for the 2010 Federal Nitrogen Dioxide Standards, Technical Support Document,* January 2011. Available online at http://www.arb.ca.gov/desig/NO2_Enclosure_1.pdf. Accessed on January 19, 2016.

future. The CARB will revise the area designation recommendations, as appropriate, once the new monitoring data become available.

Sulfur Dioxide

SO_2 is a colorless, acidic gas with a strong odor. It is produced by the combustion of sulfur-containing fuels such as oil, coal, and diesel. SO_2 has the potential to damage materials and can cause health effects at high concentrations. It can irritate lung tissue and increase the risk of acute and chronic respiratory disease.[9] Pollutant trends suggest that the SFBAAB currently meets and will continue to meet the state standard for SO_2 for the foreseeable future.

The USEPA has designated the SFBAAB as an attainment area for SO_2. Similar to the new federal standard for NO_2, the USEPA has established requirements for a new monitoring network to measure SO_2 concentrations beginning in January 2013.[10] No additional SO_2 monitors are required for the Bay Area, because the BAAQMD jurisdiction has never been designated as non-attainment for SO_2, and no state implementation plans or maintenance plans have been prepared for SO_2.[11]

Lead

Leaded gasoline (phased out in the United States beginning in 1973), paint (on older houses, cars), smelters (metal refineries), and manufacture of lead storage batteries have been the primary sources of lead released into the atmosphere. Lead has a range of adverse neurotoxic health effects, which put children at special risk. Some lead-containing chemicals cause cancer in animals. Lead levels in the air have decreased substantially since leaded gasoline was eliminated. Ambient lead concentrations are only monitored on an as-warranted, site-specific basis in California.

On October 15, 2008, the USEPA strengthened the national ambient air quality standard for lead by lowering it from 1.5 $\mu g/m^3$ to 0.15 $\mu g/m^3$. The USEPA revised the monitoring requirements for lead in December 2010.[12] These requirements focus on airports and large urban areas, resulting in an increase in 76 monitors nationally. Lead monitoring stations in the Bay Area are located at Palo Alto Airport, Reid-Hillview Airport (San Jose), and San Carlos Airport. Non-airport locations for lead monitoring are in Redwood City and San Jose.

Fugitive Dust

Fugitive dust is PM suspended in the air by wind action and human activities. Fugitive dust does not come out of a vent or a stack; instead, fugitive dust particles are mainly composed of soil minerals

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9 BAAQMD, *CEQA Air Quality Guidelines*, May 2011, p. C-16. Available online at http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines%20May%202011.ashx?la=en. Accessed on January 19, 2016.

10 USEPA, Fact Sheet: Revisions to the Primary National Ambient Air Quality Standard, Monitoring Network, and Data Reporting Requirements for Sulfur Dioxide, June 2, 2010. Available online at https://www.epa.gov/sites/production/files/2016-05/documents/final_primary_naaqs_factsheet.pdf. Accessed on January 19, 2016.

11 BAAQMD, *2013 Air Monitoring Network Plan*, July 1, 2014, p. 27. Available online at http://www.baaqmd.gov/~/media/Files/Technical%20Services/2013_Network_Plan.ashx?la=en. Accessed on January 19, 2016.

12 USEPA, *Fact Sheet Revisions to Lead Ambient Air Quality Monitoring Requirements*, 2010. Available online at https://www.epa.gov/lead-air-pollution/2010-lead-pb-air-monitoring-requirements-2013-method-determination-lead-pb-total. Accessed on August 24, 2016.

suspended in the air by wind action and human activities (e.g., demolition, excavation, grading, and other construction activities). Dust can be an irritant causing watering eyes or irritation to the lungs, nose, and throat. Depending on exposure, adverse health effects can occur due to this PM in general and also due to specific contaminants such as lead or asbestos that may be constituents of soil.

Air Quality Index

The USEPA developed the Air Quality Index (AQI) scale to make the public health impacts of air pollution concentrations easily understandable. The AQI, much like an air quality "thermometer," translates daily air pollution concentrations into a number on a scale between 0 and 500. The numbers in the scale are divided into six color-coded ranges, as described below:

- Green (0-50) indicates "good" air quality. No health impacts are expected when air quality is in the green range.
- Yellow (51-100) indicates air quality is "moderate." Unusually sensitive people should consider limited prolonged outdoor exertion.
- Orange (101-150) indicates air quality is "unhealthy for sensitive groups." Active children and adults, and people with respiratory disease, such as asthma, should limit outdoor exertion.
- Red (151-200) indicates air quality is "unhealthy." Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit prolonged outdoor exertion.
- Purple (201-300) indicates air quality is "very unhealthy." Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit outdoor exertion.

The AQI numbers refer to specific amounts of pollution in the air. They are based on the federal air quality standards for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, PM_{10}, and $PM_{2.5}$. In most cases, the federal standard for these air pollutants corresponds to the number 100 on the AQI chart. If the concentration of any of these pollutants rises above its respective standard, it can be unhealthy for the public. In determining the air quality forecast, local air districts, including the BAAQMD, use the anticipated concentration measurements for each of the major pollutants, convert them into AQI numbers, and determine the highest AQI for each zone in a district.

Readings below 100 on the AQI scale would not typically affect the health of the general public (although readings in the moderate range of 50 to 100 may affect unusually sensitive people). Levels above 300 rarely occur in the United States, and readings above 200 have not occurred in the Bay Area in decades.[13] AQI statistics over recent years indicate that air quality in the Bay Area is predominantly in the "Good" or Moderate" categories and healthy on most days for most people. As shown in **Table 4.8-2**, historical BAAQMD data indicate that the SFBAAB experienced air quality in the Red level ("Unhealthy") on three days between the years 2010 and 2015. As also shown in

[13] Bay Area Air Quality Management District, Spare the Air, Air Quality Index. Available online at sparetheair.org/Stay-Informed/Todays-Air-Quality/Air-Quality-Index.aspx. Accessed on January 25, 2017.

Table 4.8-2, the SFBAAB had a total of 14 Orange-level ("Unhealthy for Sensitive Groups") days in 2010, 12 days in 2011, 8 days in 2012, 15 days in 2013, 11 days in 2014, and 17 days in 2015.

TABLE 4.8-2
AIR QUALITY INDEX STATISTICS FOR THE SAN FRANCISCO BAY AREA AIR BASIN

Air Quality Index (AQI) Statistics for City of San Francisco	Number of Days by Year for Ozone					
	2010	2011	2012	2013	2014	2015
Unhealthy for Sensitive Groups (Orange)	14	12	8	15	11	17
Unhealthy (Red)	1	0	0	1	1	0

SOURCE: Bay Area Air Quality Management District, Emails from Duc Nguyen, Senior Air Quality Meteorologist (dated January 19, 2016) and Daniel M. Alrick, Air Quality Meteorologist (dated November 15, 2016) to Chris Sanchez, Environmental Science Associates, providing updated AQI information for the San Francisco Bay Area Air Basin.

4.8.1.4 Local Health Risks and Hazards

In addition to criteria air pollutants, individual projects may emit toxic air contaminants (TACs). TACs collectively refer to a diverse group of air pollutants that are capable of causing carcinogenic effects as well as chronic (i.e., of long duration) and/or acute (i.e., severe but short-term) adverse effects on human health. Human health effects of TACs include birth defects, neurological damage, cancer, and mortality. There are hundreds of different types of TACs with varying degrees of toxicity. Individual TACs vary greatly in the health risk they present; at a given level of exposure, one TAC may pose a hazard that is many times greater than another.

Unlike criteria air pollutants, TACs do not have ambient air quality standards but are regulated by the BAAQMD using a risk-based approach to determine which sources and pollutants to control as well as the degree of control. A health risk assessment (HRA) is an analysis in which human health exposure to toxic substances is estimated, and considered together with information regarding the toxic potency of the substances, to provide quantitative estimates of health risks.[14] As part of the Air Quality Technical Report (AQTR) for the BDFP, Ramboll Environ conducted an HRA for the project, which evaluated cancer risks from TACs, including diesel and gasoline speciated total organic gases (TOG) and diesel particulate matter (DPM), and plant operational TAC emissions, in addition to $PM_{2.5}$ concentrations.[15] Refer to Section 4.8.3.2, below, for additional information on the HRA conducted for the BDFP.

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[14] In general, a Health Risk Screening Analysis is required to receive an operating permit from the BAAQMD for a new or modified source if that source has projected emissions of TACs above trigger levels that would suggest a potential public health risk. The applicant is then subject to a health risk assessment. However, for California Environmental Quality Act (CEQA) analyses, the BAAQMD recommends evaluation of not only stationary sources, which would be subject to permitting, but other sources, such as construction equipment or project traffic, that are not subject to BAAQMD permitting. As such, all sources associated with the project are evaluated for a CEQA health risk assessment. Both permitting and CEQA health risk assessments generally evaluate chronic, long-term effects, estimating the increased risk of cancer as a result of exposure to one or more TACs.

[15] Ramboll Environ, *Air Quality Technical Report, Biosolids Digester Facilities Project Draft EIR*, March 2017. Refer to Table 11 for a listing of existing operational TACs and Tables 16a –16c for proposed operational TACs. A copy of the Air Quality Technical Report (AQTR) is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2015.000644ENV.

Air pollution does not affect every individual in the population in the same way, and some groups are more sensitive to adverse health effects than others. Residential areas, schools, day care centers, hospitals and senior care facilities are considered to be the most sensitive uses to poor air quality because the population groups associated with these uses have increased susceptibility to respiratory distress or, as in the case of residential receptors, their exposure time is greater than that for other land uses. The BAAQMD's draft exposure assessment guidance typically assumes that residents would be exposed to air pollution 24 hours per day, 350[16] days per year, for 30 years. Therefore, assessments of air pollutant exposure typically find that, of all population groups, residential receptors experience the greatest adverse health outcomes.

In addition to $PM_{2.5}$ being a criteria air pollutant, exposures to fine particulate matter ($PM_{2.5}$) are strongly associated with impaired lung function, exacerbation of acute and chronic respiratory ailments including bronchitis and asthma, excess emergency room visits and hospital admissions, pre-mature arteriosclerosis, and premature death.[17]

DPM is also of concern. The CARB identified DPM as a TAC in 1998, primarily based on evidence demonstrating cancer effects in humans.[18] The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic. Mobile sources such as trucks and buses are among the primary sources of diesel emissions, and concentrations of DPM are higher near heavily travelled highways. The CARB estimated that average Bay Area cancer risk from exposure to diesel particulate, based on a population-weighted average ambient diesel particulate concentration, is about 480 in one million, as of 2000, which is much higher than the risk associated with any other toxic air pollutant routinely measured in the region. The statewide risk from DPM as determined by the CARB declined from 750 in one million in 1990 to 570 in one million in 1995; the CARB estimated the average statewide cancer risk from DPM in 2000 at 540 in one million.[19,20]

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16 The California Office of Environmental Health Hazard Assessment Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (February 2015) assumes a 2-week annual vacation away from exposure (thus 350 days instead of 365 days per year).

17 San Francisco Department of Public Health (SFDPH), *Assessment and Mitigation of Air Pollutant Health Effects from Intra-Urban Roadways: Guidance for Land Use Planning and Environmental Review*, May 2008, page 6. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2015.000644ENV.

18 California Air Resources Board (CARB), Fact Sheet, *The Toxic Air Contaminant Identification Process: Toxic Air Contaminant Emissions from Diesel-fueled Engines*, October 1998.

19 California Air Resources Board (CARB), *California Almanac of Emissions and Air Quality - 2009 Edition*, Table 5-44 and Figure 5-12. Available online at http://www.arb.ca.gov/aqd/almanac/almanac09/chap509.htm. Accessed on January 25, 2017.

20 This calculated cancer risk value from ambient air exposure in the Bay Area can be compared against the lifetime probability of being diagnosed with cancer in the United States, from all causes, which for men is more than 40 percent (based on a sampling of 17 regions nationwide), or greater than 400,000 in one million, according to the American Cancer Society. (American Cancer Society, Lifetime Risk of Developing or Dying from Cancer, last revised March 23, 2016. Available online at http://www.cancer.org/cancer/cancer-basics/lifetime-probability-of-developing-or-dying-from-cancer.html. Accessed on January 25, 2017.)

San Francisco Modeling of Air Pollution Exposure Zones

In an effort to identify areas of San Francisco most adversely affected by sources of TACs, the City and County of San Francisco (CCSF or City) partnered with the BAAQMD to conduct a citywide health risk assessment based on an inventory and assessment of air pollution and exposures from mobile, stationary, and area sources within San Francisco. Citywide dispersion modeling was conducted using AERMOD[21] to assess emissions from the following primary sources: roadways, permitted stationary sources, port and maritime sources, and Caltrain. Emissions of DPM (which represent PM_{10} exhaust emissions from diesel-fueled engines), $PM_{2.5}$ (including brake and tire wear), TOG, and other TACs from stationary sources were modeled on a 20-by-20-meter receptor grid covering the entire city. The results represent a comprehensive assessment of existing cumulative exposures to air pollution throughout the city. The methodology and technical documentation for modeling citywide air pollution are available in the document entitled *The San Francisco Community Risk Reduction Plan: Technical Support Documentation*.[22]

Model results were used to identify areas in the city at the lot level with poor air quality, termed the Air Pollutant Exposure Zone (APEZ), based on the following health-protective criteria:

- ***Excess Cancer Risk.*** The 100 per one million persons (100 excess cancer risk) criterion is based on USEPA guidance for conducting air toxic analyses and making risk management decisions at the facility- and community-scale level.[23] As described by the BAAQMD, the USEPA considers a cancer risk of 100 per million to be within the "acceptable" range of cancer risk. In the 1989 preamble to the benzene National Emissions Standards for Hazardous Air Pollutants (NESHAP) rulemaking,[24] the USEPA states that it "…strives to provide maximum feasible protection against risks to health from hazardous air pollutants by (1) protecting the greatest number of persons possible to an individual lifetime risk level no higher than approximately one in one million and (2) limiting to no higher than approximately one in ten thousand [100 in one million] the estimated risk that a person living near a stationary source would have if he or she were exposed to the maximum pollutant concentrations for 70 years."[25] The 100 per one million excess cancer cases criterion is also consistent with the ambient cancer risk in the most pristine portions of the Bay Area based on BAAQMD regional modeling.[26]

- ***Fine Particulate Matter.*** In April 2011, the USEPA published *Policy Assessment for the Particulate Matter Review of the National Ambient Air Quality Standards*. In this document, USEPA staff concludes that the then-current federal annual $PM_{2.5}$ standard of 15 $\mu g/m^3$ should be revised to a level within the range of 13 to 11 $\mu g/m^3$, with evidence strongly supporting a

21 AERMOD is the USEPA's preferred or recommended steady state air dispersion plume model. For more information on AERMOD and to download the AERMOD Implementation Guide, see https://www3.epa.gov/ttn/scram/7thconf/aermod/aermod_implmtn_guide_3August2015.pdf. Accessed on January 25, 2017.

22 BAAQMD, San Francisco Department of Public Health, and San Francisco Planning Department, *The San Francisco Community Risk Reduction Plan: Technical Support Documentation*, December 2012.

23 BAAQMD, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance,* October 2009, page 67.

24 54 Federal Register 38044, September 14, 1989.

25 The air quality technical analysis was conducted in accordance with the 2015 California Office of Environmental Health Hazard Assessment (OEHHA) Guidance, which recommends using a 30-year exposure duration. Despite a lower exposure duration, other exposure parameters were also changed to make the overall impacts on human health more conservative (e.g., higher) than using the 70-year exposure in the 2003 OEHHA Guidance.

26 BAAQMD, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance,* October 2009, page 67.

standard within the range of 12 to 11 μg/m^3. APEZ designations within San Francisco are based on the health-protective $PM_{2.5}$ standard of 11 μg/m^3, as supported by the USEPA's Particulate Matter Policy Assessment, but then the standard is lowered further to 10 μg/m^3 to account for uncertainty in accurately predicting air pollutant concentrations using emissions modeling programs.

- ***Health Vulnerable Locations.*** Also included in the APEZ were lots within San Francisco zip codes that were in the lowest 20 percent of Bay Area Health Vulnerability scores (zip codes 94102, 94103, 94105, 94124, and 94130). For lots within both an APEZ and Health Vulnerability zip code, the standard for identifying areas as being within the zone was lowered to (1) excess cancer risk from the contribution of emissions from all modeled sources greater than 90 per one million persons, and/or (2) cumulative $PM_{2.5}$ concentrations greater than 9 μg/m^3.[27]

The BDFP site is within the APEZ (as mapped by the San Francisco Planning Department) and is also in a Health Vulnerability zone (zip code 94124). **Figure 4.8-2** shows the existing APEZ (shaded blue) and the Health Vulnerability zip code (shaded beige) in relation to the project site, SEP, and nearby staging areas (Southeast Greenhouses and 1550 Evans).

Community Risk Reduction Plan

The City is currently preparing a Community Risk Reduction Plan. Extensive modeling has been conducted and is documented in *The San Francisco Community Risk Reduction Plan: Technical Support Documentation.*[28] That report identifies the SEP as a contributor to cancer risk due to volatilized gases emitted from wastewater.

4.8.1.5 Existing Sources of Air Pollution in Project Site Vicinity

Existing Stationary Sources of Air Pollution

The BAAQMD's inventory of permitted stationary sources of emissions show nine permitted stationary emission facilities present within or near the 1,000-foot zone of influence of the BDFP site in addition to sources at the SEP itself. The sources at these permitted facilities are made up of four industrial uses (coffee roasting company, sign company, printer, pan-glo services), four auto body shops, and one site at the Southeast Community Facility (diesel-fueled emergency generator). Stationary sources associated with existing solids processing identified in the SEP's Permit to Operate include a cogeneration engine (in Building 810, shown on Figure 2-3 in Chapter 2, *Project Description*), sludge handling process unit (comprised of two gravity belt thickeners [GBTs] in Building 785), the active anaerobic digesters (Buildings 630 through 730), two waste gas burners (flares, Building 821), a sludge dewatering facility (Building 840), and three hot water boilers (Building 820). Other stationary sources identified in the site's Permit to Operate include the emergency generators (Building 990).

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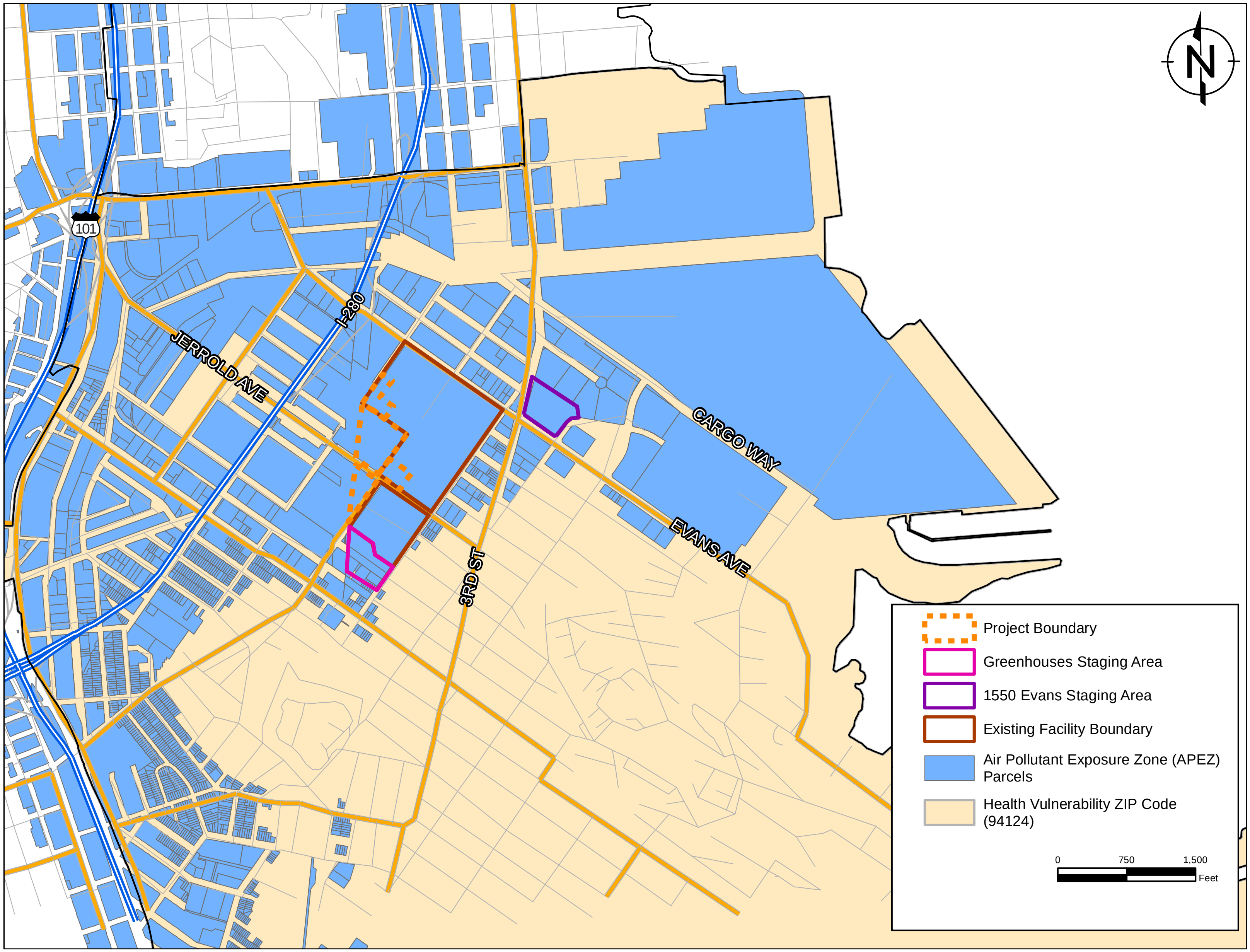
27 San Francisco Planning Department and San Francisco Department of Public Health, *2014 Air Pollutant Exposure Zone Map (Memo and Map)*, April 9, 2014. These documents are part of San Francisco Board of Supervisors File No. 14806, Ordinance No. 224-14, Amendment to Health Code Article 38.

28 Bay Area Air Quality Management District, San Francisco Department of Public Health, San Francisco Planning Department, *The San Francisco Community Risk Reduction Plan: Technical Support Documentation*, December 2012, p. 45. Available online at http://www.gsweventcenter.com/Appeal_Response_References%5C2012_1201_BAAQMD.pdf. Accessed on March 31, 2016.



SOURCE: BAAQMD, San Francisco Department of Public Health, and San Francisco Planning Department,The San Francisco Community Risk Reduction Plan: Technical Support Documentation, December 2012; Ramboll-Environ consulting analysis for the BDFP, 2017.

SFPUC Biosolids Digester Facilities

Figure 4.8-2
APEZ and Health Vulnerability Zip Code in Project Vicinity

Roadway and Rail-Related Pollutants

Motor vehicles are responsible for a large share of air pollution, especially in California. Vehicle tailpipe emissions contain diverse forms of particles and gases, and vehicles also contribute to particulates by generating road dust through tire wear. Epidemiologic studies have demonstrated that people living close to freeways or busy roadways have poorer health outcomes, including increased asthma symptoms and respiratory infections and decreased pulmonary function and lung development in children. Air pollution monitoring conducted in conjunction with epidemiologic studies has confirmed that roadway-related health effects vary with modeled exposure to PM and NO_2. In traffic-related studies, the additional non-cancer health risk attributable to roadway proximity was seen within 1,000 feet of the roadway and was strongest within 300 feet.[29] As a result, the CARB recommends that new sensitive land uses not be located within 500 feet of a freeway or urban road carrying 100,000 or more vehicles per day. As evidence shows that sensitive uses in an area within a 500-foot buffer of any freeway are at an increased health risk from air pollution,[30] lots that are within 500 feet of freeways are included in the APEZ.

Major roadway sources (defined by the BAAQMD as carrying more than 10,000 vehicles in annual average daily traffic) within 1,000 feet of the BDFP site include the Interstate 280 (I-280) freeway (located approximately 550 to 3,700 feet west of the BDFP site) and Evans Avenue.[31] This traffic contributes to concentrations of $PM_{2.5}$, DPM, and other air contaminants emitted from motor vehicles near the street level. There are approximately five to ten residences located within 1,000 feet of the I-280 freeway that are also within 1,000 feet of the BDFP site. There are no residences on Evans Avenue within 1,000 feet of the BDFP site. No other areas of mobile-source activity or otherwise "non-permitted" stationary sources related to mobile sources (e.g., railyards, trucking distribution facilities, and high-volume fueling stations) are located within 1,000 feet of the project site.

In addition to these roadway sources, existing railroad emission sources include Caltrain, a diesel-powered locomotive passenger rail service that runs along the western boundary of the BDFP site. There are no maritime sources of emissions (i.e., ocean-going marine vessels, harbor craft, cargo handling equipment) located within 1,000 feet of BDFP facilities.[32]

4.8.1.6 Odors

Odors are generally regarded as an annoyance rather than a health hazard. Manifestations of a person's reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache). Odor characterization can depend on a number of variables, including:

- Nature of the odor source (e.g., wastewater treatment plant, food processing plant);
- Frequency and duration of odor generation (e.g., daily, seasonal, activity-specific);

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29 California Air Resources Board (CARB), *Air Quality and Land Use Handbook: A Community Health Perspective,* April 2005. Available at http://www.arb.ca.gov/ch/handbook.pdf. Accessed on October 22, 2015.
30 Ibid.
31 San Francisco Municipal Transportation Agency, *Traffic Count Data, 1993-2015*, July 5, 2016. Available online at https://www.sfmta.com/about-sfmta/reports/sfmta-traffic-count-data-1995-2015. Accessed on January 25, 2017.
32 Ibid. pp. 14-21.

- Intensity of odor (e.g., concentration);
- Distance of odor source to sensitive receptors;
- Physical barriers (e.g., walls, buildings, trees);
- Wind direction (e.g., upwind or downwind); and
- Sensitivity of the receptor.

Measurement of Odor: Dilution to Threshold Ratio

The measurement of odor concentration is the most common method used to quantify odors. To measure an odor, an odorous sample of air is diluted with odor-free air until 50 percent of a population cannot detect the odor. The number of equivalent units of odor-free air required to dilute the odorous sample to 50 percent detectability (the threshold value) determines the dilution to threshold ratio (D/T). The term "dilution to threshold" refers to the amount of pure air that must be added to a known volume of odorous air in order to dilute the sample to the concentration at which the odor can just be detected.[33]

Odor Associated with Wastewater Treatment

Odors can be generated and released from virtually all phases of wastewater collection, treatment, and disposal. Most odor-producing compounds found in domestic wastewater and in the removed solids result from anaerobic biological activity that consumes organic material, sulfur, and nitrogen found in wastewater. These odor-producing compounds can be organic or inorganic molecules. The two major inorganic odors are hydrogen sulfide and ammonia. Organic odors are usually the result of biological activity that decomposes organic matter and forms a variety of odors.

Hydrogen sulfide (H_2S), which has a characteristic rotten-egg odor, is the most common odorous compound found in wastewater collection and treatment systems. H_2S monitoring can be considered a surrogate for D/T measurements and thus provides useful information on the performance of odor control systems. H_2S is corrosive, toxic, and soluble in water. H_2S results from the reduction of sulfate to H_2S by bacteria under anaerobic (or septic) conditions. Other wastewater odorants that contribute to odor are organic sulfur compounds (e.g., methyl mercaptan and dimethyl sulfide), ammonia and nitrogen compounds (e.g., amines - dimethylamine and trimethylamine), volatile fatty acids (VFA), aldehydes, musty odorants (e.g., 2-Methylisoborneol), fecal odorants (e.g., skatole), and ketones. As these latter constituents are more costly and difficult to monitor, H_2S has become the key compound targeted for removal and for monitoring. Ammonia and organic odors are also common. Odors from wastewater and its residuals become significantly more intense and develop much higher concentrations of odorous compounds when the oxygen in the waste is consumed and anaerobic conditions develop. For this reason, most of the odor generated in wastewater collection and treatment is due to the anaerobic conditions that can develop in wastewater collection systems as well as treatment plant unit processes where anaerobic conditions are likely to develop (e.g., clarifiers, gravity thickeners, and sludge storage tanks). Odor problems can be controlled by proper

33 For example, an odor is assigned a D/T of 7 if six units of odor-free air must be added to one unit of odorous air in order to make the odor undetectable by 50 percent of the population ([6+1]/1). The greater the dilution necessary to render an odorant undetectable, the greater the strength of the odor. Source: USEPA, *Regulatory Options for the Control of Odors*, February 1980.

design, adequate ventilation, vapor phase treatment, operational practices including process control and chemical treatment, and facility maintenance.

SEP Existing Odor Conditions

The SEP is an existing source of odor in the area. Odor emissions around the SEP have historically been detected by the public and City staff, and have been confirmed emanating from both liquids treatment and solids treatment systems.[34] **Figure 4.8-3** depicts odor sources at the SEP, as well as odor control units, and includes the facility numbers referenced in this section.

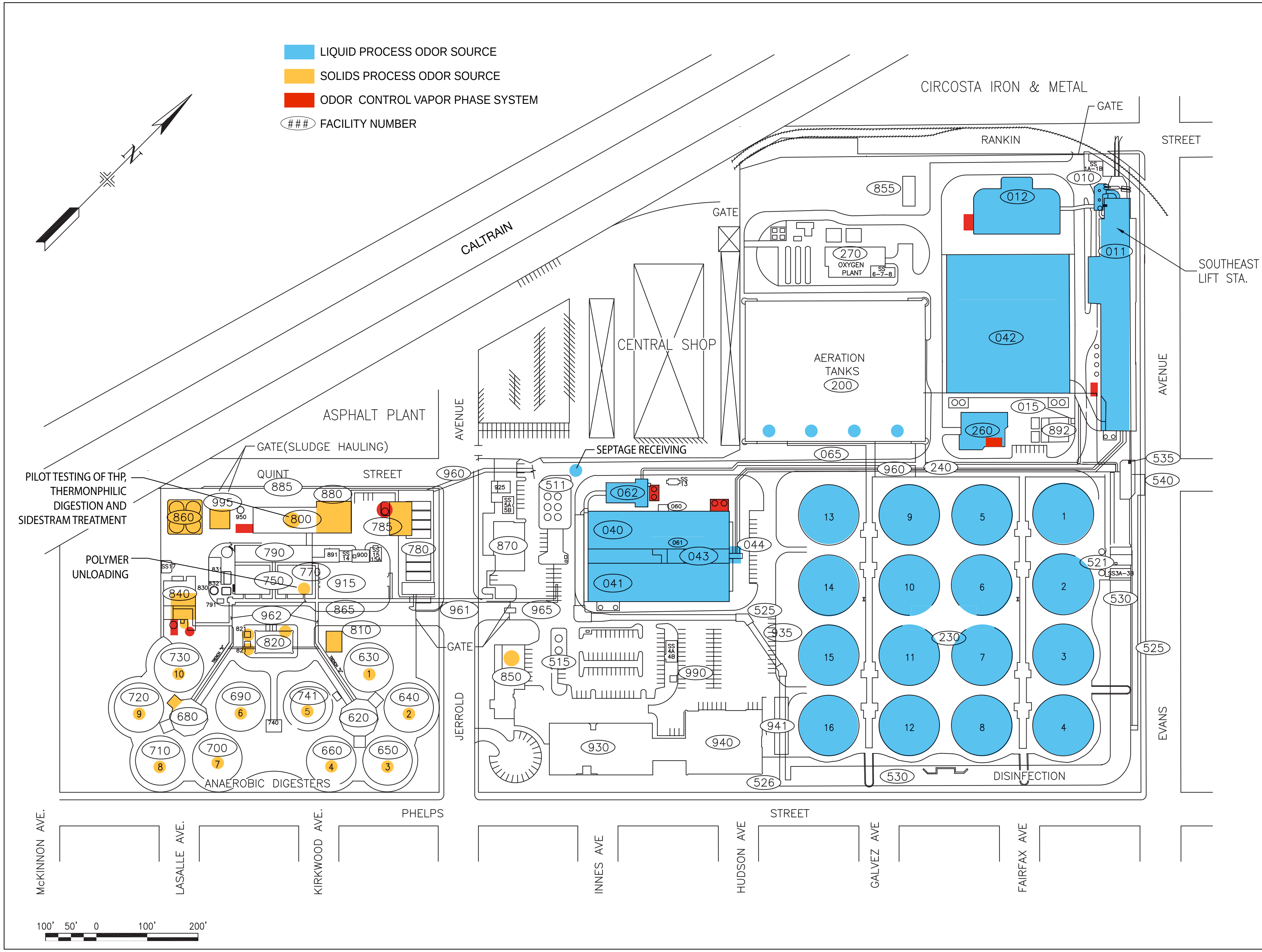
Odor Characterization Report

In 2015 the San Francisco Public Utilities Commission (SFPUC) conducted a study to evaluate SEP-related odor emissions.[35] The Odor Characterization Report includes the results of a site assessment to identify all existing odor sources and odor history, determine and quantify odor concentration inputs for dispersion modeling, estimate the potential effects on the surrounding community, and validate modeling results. Odor sources at the SEP were identified and ranked by relative contribution to overall odor emissions, and associated emissions were quantified with regard to predicted off-site odor effects. The relative contributions of odor sources at the SEP to off-site odor emissions were determined by considering the strength of the sources (measured in D/T) as well as the volumetric emission rates, and then applying dispersion modeling to reflect the effects of other parameters such as meteorological conditions and the height of odor sources.

Existing Odor Sources Identified in Odor Characterization Report

Table 4.8-3 summarizes the existing odor sources at the SEP identified in the Odor Characterization Report. The right-hand column reflects the ranking of odor sources; the number 1 indicates the highest maximum 1-hour off-site odor concentration. The odor sources that ranked the highest for summer included the GBT facility bypass louver (SEP Building 785),[36] the septage receiving unit (near SEP Building 511), Headworks (SEP Building 012), sedimentation basins (SEP Building 042), grease delivery facility (SEP Building 880), and biosolids cake loadout (SEP Building 860). Other sources for solids processing identified in the report include the cogeneration facility (when biogas cleaning underperforms), and initial start-up of flares and boilers.[37] Refer to Figure 4.8-3 for locations of existing odor sources.

[34] SFPUC, Odor Incident Data 2010-2015, revised November 9, 2015.
[35] CH2M Hill and Brown and Caldwell, Final Southeast Plant Odor Characterization Report *in* SFPUC, Final Biosolids Digester Facilities Project Conceptual Engineering Report, March 2016.
[36] The GBT louver is a vent used to bypass an odor control unit if that unit is out of service. Under normal operating conditions the odor control unit is in service.
[37] CH2M Hill and Brown and Caldwell, Final Southeast Plant Odor Characterization Report, December 2015, page ES-14 and Section 5.2.2 Solid Process Sources *in* SFPUC, Final Biosolids Digester Facilities Project Conceptual Engineering Report, March 2016.



Building Numbers

010	INFLUENT CONTROL STRUCTURE
011	OLD HEADWORKS
012	NEW HEADWORKS
015	PRIMARY INFLUENT CHANNEL DEWATER PUMP VAULT
040	SEDIMENTATION BUILDING NO.1
041	SEDIMENTATION BUILDING NO.2
042	SEDIMENTATION BUILDING NO.3
043	SEDIMENTATION CONTROL ROOM
044	PRIMARY INFLUENT CONTROL STRUCTURE
060	WEST PUMP ROOM
061	CENTRAL PUMP ROOM
062	PRIMARY EFFLUENT PUMP STATION
065	MAG METER ACCESS VAULT
200	AERATION TANKS
230	SECONDARY SEDIMENTATION TANKS
240	SECONDARY BYPASS JUNCTION STRUCTURE
260	SECONDARY SLUDGE CONTROL BUILDING
270	OXYGEN GENERATION BUILDING
511	SODIUM HYPOCHLORITE STORAGE TANKS
515	SODIUM BISULFITE STORAGE TANKS
521	POSTCHLORINATION BUILDING
525	PRIMARY EFFLUENT CHANNEL & DISINFECTION FACILITY
526	JUNCTION STRUCTURE
530	CHLORINE CONTACT CHANNELS
535	BIOASSAY BUILDING
540	PLANT EFFLUENT CONTROL STRUCTURE
550	ISLAIS CREEK BOOSTER STATION
620	DIGESTION GROUP NO.1 CONTROL
680	DIGESTION GROUP NO.2 CONTROL
740	GAS BOOSTER STATION
741	GAS STORAGE FACILITY
750	DIGESTED SLUDGE THICKENING TANKS
770	SLUDGE BLEND TANK
780	SECONDARY SLUDGE THICKENING
785	INTERIM GRAVITY BELT THICKENER
790	SLUDGE FILTRATION BUILDING
791	PLANT RECYCLE PUMP STATION
800	DRYER BUILDING
810	COGENERATION BLDG
820	DIGESTER HEATING BOILERS
821	WASTE GAS BURNERS
830	DRY LIME STORAGE FACILITY
831	LIME SLAKING & FEED FACILITY
832	LIME SYSTEM CONTROL BUILDING
840	CENTRIFUGE BUILDING
850	OPERATORS BUILDING & ENGINEERING OFFICES
855	ENGINEERING OFFICES ANNEX
860	BIN HOPPERS
865	TRUCK SCALE (TEMPORARY)
870	SERVICE BUILDING
880	GREASE HANDLING FACILITY
885	#3 WATER LOADING STATION
891	SOUTHSIDE SUB STATION
892	PRIMARY POWER SWITCHING STATION
900	MAINTENANCE SHOP–SOUTH SIDE
915	TRAILER OFFICE AND STORAGE BOX
925	NO.1 & NO.2 WATER PUMP STATION
930	MASTER CONTROL AND LABORATORY
935	TEMPRORARY OFFICES
940	MAINTENANCE BUILDING
941	MAINTENANCE OFFICES (TRAILERS)
950	CHIMNEY
960	GALLERY
961	JERROLD STREET UNDERCROSSING
962	PIPE TRENCHES
965	ENTRANCE CONTROL BUILDING
990	EMERGENCY GENERATOR BUILDING
995	SEWER DEBRIS UNLOADING STATION

SOURCE: CH2M Hill and Brown and Caldwell, Final Southeast Plant Odor Characterization Report, December 2015, *in* SFPUC, Final Biosolids Digester Facilities Project Conceptual Engineering Report, March 2016

Figure 4.8-3
Existing Odor Sources and Odor Control Units at the SEP

NOTE: The digesters are covered. Sources at the digesters include pressure relief valves atop each digester as well as digester mixing compressors adjacent to Buildings 620 and 680. Sources at Aeration Tanks are vents.

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TABLE 4.8-3
EXISTING ODOR SOURCES AT SEP REPORTED IN ODOR CHARACTERIZATION REPORT

	SEP Building Number [a]	Ranking of Select Odor Sources [b]
Liquid Treatment Process Odor Sources		
Septage Receiving	Near Building 511	2
Headworks	012	3, 8, 10[c]
New Primary Sedimentation Basins	042	4
Old Primary Sedimentation Basins	040, 041	7
Influent Control Structure Old Headworks	010, 011	11, 13[c]
Secondary Sedimentation	230	15
Primary Effluent Pump Station	060	Not in top 15
Aeration Tanks	200	
Bruce Flynn Pump Station	n/a[d]	
Solids Treatment Process Odor Sources		
Gravity Belt Thickening Facility (Bypass Louver) [e]	785	1
Grease Handling Facility	880	5
Cake Loadout	860	6
Polymer Unloading	750	9
Combustion Sources	810, 820, 821, 850	12
Dewatering Facility	840	14
Return Activated Sludge and Secondary Scum/Dewatering Wet Wells	260	Not in top 15
Digester Pressure/Vacuum Relief Valves and Covers	630, 640, 650, 660, 690, 700, 710, 720, 730, 741	
Pilot Testing of Thermal Hydrolysis Process (THP), Thermophilic Digestion, & Sidestream Treatment[f]	800	
Digester Mixing Compressors	620, 680	
Vactor Truck Decanting	995	

NOTES: SEP = Southeast Water Pollution Control Plant, n/a = not applicable.

a SEP Building numbers shown in Figure 4.8-3.
b Reflects summer odor source rankings identified in Table ES-4 of the *Odor Characterization Report* (page ES-16). Number 1 indicates the source contributing the highest maximum one-hour offsite odor concentration.
c Reflects multiple odor emissions sources associated with this SEP building.
d The Bruce Flynn Pump Station, located at the intersection of Rankin Street and Evans Avenue (less than 100 feet from the SEP), is primarily a wet weather pump station that pumps wastewater to the SEP Influent Control Structure (SEP 010).
e Odor from the bypass louver of the gravity belt thickener (GBT) facility was due to an inoperable Odor Control Unit and is considered atypical.
f SEP staff has a pilot testing facility set up in SEP 800 (Dryer Building) for pilot testing a THP, a temperature-based anaerobic digestion process, and a sidestream process. These technologies were tested on a small scale during the winter and summer sampling events in 2014.

SOURCE: CH2M Hill and Brown and Caldwell, Final Southeast Plant Odor Characterization Report, December 2015, *in* SFPUC, Final Biosolids Digester Facilities Project Conceptual Engineering Report, March 2016.

Site Odor Assessment and Dispersion Modeling

The site odor assessment included winter and summer site odor surveys, a winter and summer sampling event, and comprehensive sample analysis. Dispersion modeling was then conducted using the CALPUFF[38] model to understand the current overall odor footprint at the SEP, and specifically to:

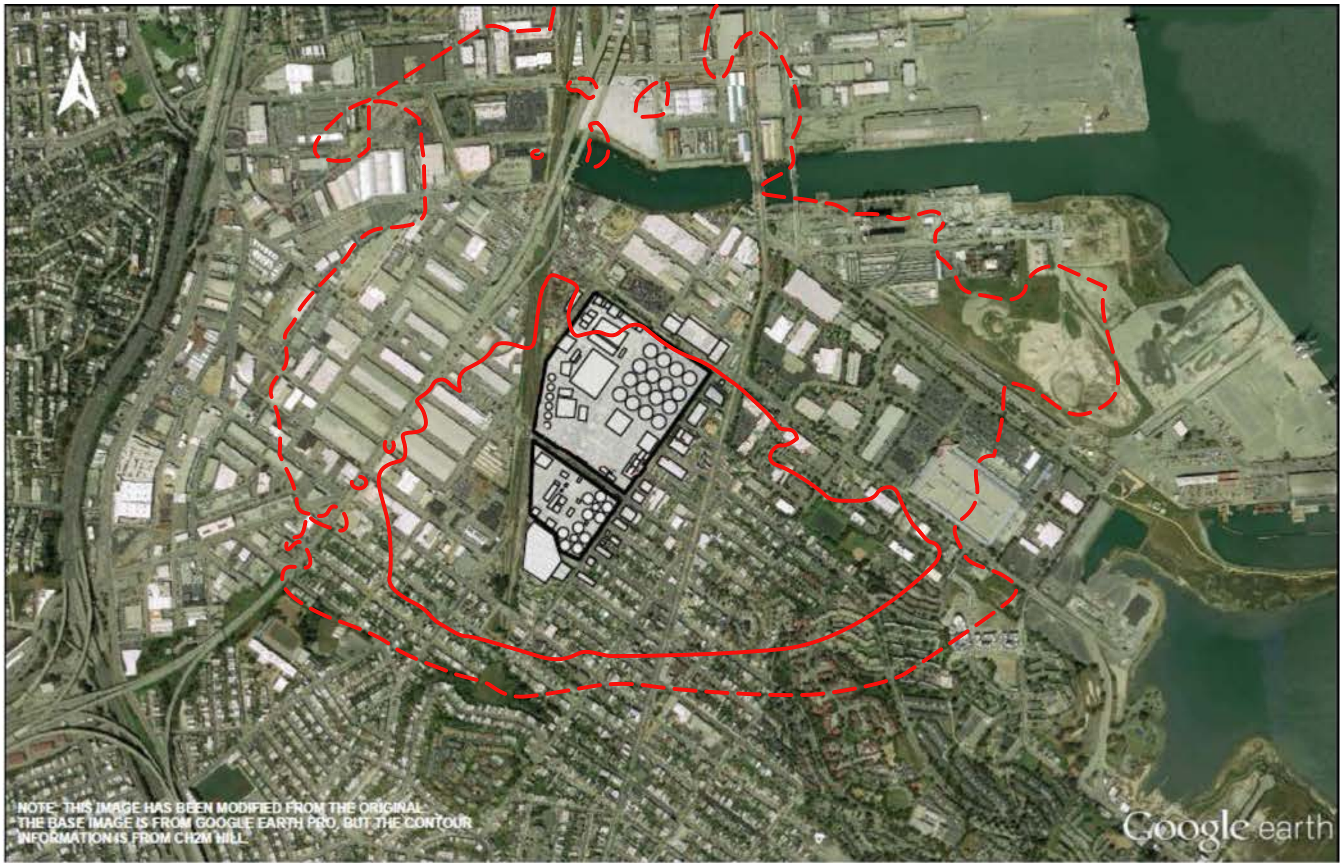
- Determine the area affected by individual, combined, and overall plant odor emissions for the current baseline for both summer and winter;
- Determine the frequency (number of hours per year) of emissions that are greater than 5 D/T beyond the plant boundary for both summer and winter based on one hour average;
- Determine strength (D/T) of emissions beyond the plant boundary for both summer and winter based on 1-hour average;
- Rank individual and combined odor sources for both summer and winter; and
- Conduct sensitivity analyses for specific sources to further evaluate and quantify effects.

Dispersion modeling was conducted using meteorological data from 2007 through 2011 to establish an accurate representation of the odor footprint at the SEP by quantifying the number of hourly exceedances above 5 D/T (the design criterion for the BDFP[39]) and identifying the greatest off-site odor concentrations for baseline conditions. Modeling was conducted for both H_2S concentrations and D/T. Isopleths were generated to show the maximum D/T and maximum number of D/T exceedances greater than 5 D/T over the five-year modeling period. An isopleth is a graphical plot with equal concentration lines or equal lines of exceedances drawn on a map. In this case, odor concentration isopleths were superimposed over a Google Earth aerial photograph of the modeled area (i.e., the SEP and neighboring areas). The purpose of mapping odor concentrations was to illustrate odor effects, areas affected, and plume trajectory, among other things.

Figure 4.8-4 shows the summer baseline isopleths representing exceedance of the 5 D/T, 99 percent, 1-hour average compliance goal (discussed in Section 4.8.3.2, below) for both the existing overall SEP (i.e., liquids and solids processing) and existing solids processing only over the five-year modeling period. For the overall SEP, the maximum off-site D/T value is 672. The maximum number of hours of exceedance over the entire five-year modeling period is 26,061 hours. This means that the odor concentration was greater than 5 D/T approximately 60 percent of the time over the five-year period. Results were found to be mostly influenced by odor from operation of the bypass louver at the GBT facility on the solids processing side. Figure 4.8-4 also shows the exceedance plot for the 5 D/T, 99 percent compliance goal, 1-hour average for the existing solids processing sources alone.

[38] CALPUFF is an advanced non-steady-state meteorological and air quality monitoring system adopted by the USEPA as the preferred model for assessing long-range transport of pollutants in certain circumstances and on a case-by-case basis for certain near-field applications involving complex meteorological conditions. (Exponent Engineering and Scientific Consulting, *Official CALPUFF Modeling System*, 2016. Available online at http://www.src.com/. Accessed on April 8, 2016.)

[39] Section 4.8.3.2, Approach to Analysis, below, provides more information about the BDFP's 5 D/T design criterion.



Existing Overall SEP (Liquids and Solids), Summer Conditions

Existing Solids Processing Sources Only, Summer Conditions

SEP Fenceline

NOTE: This figure illustrates the modeled geographic extent of existing source odors exceeding the 5 D/T, 99 percent (5 D/T exceedance occurring for 88 hours per year), 1-hour average compliance goal over the five year modeling period.
D/T (dilution to threshold ratio) refers to the amount of pure air that must be added to a known volume of odorous air in order to dilute the sample to the concentration at which the odor can just be detected.

SOURCE: CH2M Hill and Brown and Caldwell, Final Southeast Plant Odor Characterization Report, December 2015, *in* SFPUC, Final Biosolids Digester Facilities Project Conceptual Engineering Report, March 2016

SFPUC Biosolids Digester Facilities

Figure 4.8-4
Existing Odor Concentration Isopleths at SEP

Existing Odor Control Systems and Practices at SEP

Odor Control Systems

The majority of odor control systems at the SEP involve treating odorous air through adsorption[40] units with activated carbon[41] or activated carbon and potassium permanganate[42]-impregnated media. Odor control systems associated with liquids treatment include units at the Influent Control Structure (010), existing Headworks buildings (011 and 012), Secondary Sludge Control Building (260), and Primary Effluent Pump Station (062). Additionally, sodium hypochlorite is injected at the Influent Control Structure to oxidize sulfide in the influent. A biofilter with seashell media was recently installed at one of the existing Headworks buildings (012). Primary Sedimentation Buildings 1 and 2 (040 and 041) are equipped with odorous air dispersion fans and induction air stacks. With respect to solids treatment, the following facilities have odor control systems: Gravity Belt Thickeners (785), Centrifuge Building (840), and Cake Loadout (860). The existing digesters rely on floating covers for odor control. Three of the digesters have covers designed to control odors even under elevated pressure conditions (greater than 8 inches water column[43]); however, because the remaining covers are not designed for these elevated pressures, digester gas is vented through relief valves if the gas pressure rises to levels in excess of 3 to 5 inches water column.

Existing SEP Operational Practices Related to Odor Control

Operational practices related to odor control include the following:

- ***Operational Practices Upstream of the SEP***. Chemicals that reduce odors (ferrous chloride, sodium hypochlorite, and hydrogen peroxide) are added to wastewater upstream of the SEP. Generally, addition of these chemicals is initiated during warmer months and, depending on conditions, is temporarily halted during cooler months. Another practice involves using the Bruce Flynn Pump Station to pump treated plant effluent back into the collection system upstream of the SEP for flow equalization during low flow conditions as well as "freshening" of the influent wastewater to the plant. This operation has a direct effect on the odor loading to the SEP by reducing sulfides in the main sewer line serving the plant.

- ***Operational Practices at the SEP.*** When necessary to "freshen" sewage flows (generally early mornings seasonally or in response to an odor complaint), hypochlorite is added to No. 3 water[44] at the chlorination channel followed by pumping to the Phelps Street wastewater pipeline. While reducing wastewater odors, this operation can cause chlorine odors within the treatment plant at the dosing location. The diverted flow reduces the potential for odor emissions by diluting sewage strength as well as allowing residual chlorine to oxidize dissolved sulfides. In addition, during maintenance of open tanks (such as clarifiers and dissolved air flotation tanks), SEP operators reduce odors by partially filling the tanks with No. 3 water (sometimes called a "water pad").

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[40] Adsorption occurs when a molecule is held physically on the surface of an adsorbent material, as opposed to absorption, in which a molecule chemically reacts with the absorbing material. Adsorbed molecules can also be desorbed (i.e., removed) from the material.

[41] Activated carbon is carbon that has been treated to increase the surface area available for adsorption, typically through pyrolysis (burning) or other types of oxidation.

[42] A strong oxidizing agent widely used to treat odor causing contaminants in air and water.

[43] Inch of water column is a way of measuring pressure, and refers to the amount of pressure equivalent to the weight of a column of water of certain height.

[44] No. 3 water is non-potable, chlorinated secondary effluent, in this case produced by the SEP.

- ***Monitoring Performance of Media in Odor Control Units.*** Pressure drop across odor control unit media, as well as H_2S removal performance (consistent with requirements in the SEP's Permit to Operate, discussed below), are generally measured at least once per month to monitor and record odor control unit operation. Increased pressure drop can be associated with media caking or excessive moisture or condensation, which decreases the porosity of the media. Early detection of reduced odor removal performance can identify spent media and the need for media replacement.

Odor Monitoring

The SFPUC monitors odors to maintain compliance with the SEP's BAAQMD Permit to Operate and monitors odor control units to assess their performance. The permit requires the SFPUC to employ all measures, practices, or modifications that would abate any public nuisance odors from the sludge handling process unit (consisting of GBTs and their associated odor control unit) and other odor control units. Maintenance intervals are specified for the odor control units to limit durations of unit downtime. A maintenance log must be kept, and emissions from the odor control units must be monitored in order to identify whether replacement of the odor control media is required. In addition, SEP staff monitor H_2S concentrations at 14 perimeter locations and 33 locations within the plant boundary. Weekly H_2S concentrations are also measured at the inlet and outlet of vapor-phase odor control equipment (i.e., carbon and carbon/permanganate media scrubbers) to monitor the effectiveness of odor control equipment.

Odor Incidents

Not all of the process facilities with odor emission potential have odor control units, and the configurations of some (particularly older) facilities make odor containment challenging. Because of these factors, and the proximity of residences and businesses to the SEP, existing odor control systems and operational practices do not always contain odors within the SEP fenceline. The SFPUC logs odor incidents reported by City staff, the public, and the BAAQMD as part of ongoing efforts to reduce off-site odors.[45] As shown in **Table 4.8-4**, between 2010 and 2015 the SEP recorded 73 odor incidents, 36 of which were reported by the public (this includes two odor incidents reported to the BAAQMD), and 37 of which were reported by City staff. During 2012, 27 odor incidents were reported, which were primarily associated with odor from digester gas (an equipment failure in July 2012 resulted in the venting of untreated digester gas until the equipment was repaired). Odor incidents reported by the public occurred most often along Phelps Street southeast of the existing digesters (between Jerrold Avenue and McKinnon Avenue) and along Phelps Street southeast of the clarifiers (between Evans Avenue and Galvez Avenue).[46] The BAAQMD has received two confirmed[47] odor complaints regarding odor at the SEP over the six-year period from January 1, 2009 through October 22, 2015.[48] The two complaints were reported in 2012. Both were associated with equipment failure in secondary clarifiers and were remedied by maintenance activities. There were no odor violation notices issued for the SEP by the BAAQMD during this period.

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[45] SFPUC, Odor Incident Data 2010-2015, revised November 9, 2015. This total includes incidents both confirmed and unconfirmed by SEP staff.
[46] Ibid.
[47] BAAQMD confirmed complaints are complaints that were confirmed by a BAAQMD inspector.
[48] Odor Incident Data for San Francisco Southeast Treatment Plant, 1700 Jerrold Avenue, San Francisco, CA 94124, for January 1, 2009, through October 22, 2015, obtained from BAAQMD Public Records Section via electronic mail on October 22, 2015.

TABLE 4.8-4
ODOR INCIDENTS REPORTED FOR SEP, 2010 TO 2015[a]

Odor Source	Facility Name	Process Area	2010	2011	2012	2013	2014	2015
SEP 040/041	Old Primary Sedimentation Basins (SEP 040/041)	Liquids	2	7	0	1	0	0
Secondary Clarifier	Secondary Sedimentation (SEP 230)	Liquids	1	0	4	2	1	2
SEP - Septage receiving	Septage Receiving	Liquids	1	0	1	0	0	0
SEP 011/Evans	Influent Control Structure (SEP 010) and Old Headworks (SEP 011)	Liquids	0	1	0	0	0	0
SEP 011 - Bar Screen Room	Old Headworks (SEP 011)	Liquids	0	0	1	0	0	0
Digester gas	Anaerobic Digesters	Solids	0	1	16[b]	0	0	2
Incomplete digester gas combustion	Anaerobic Digesters	Solids	0	1	2	3	5	0
SEP 780	Secondary Sludge Thickening	Solids	0	0	0	1	0	0
SEP - Phelps Street	Unknown	Unknown	0	3	3	0	0	0
Unknown	Unknown	Unknown	3	1	0	0	2	0
SEP - Evans Avenue	Unknown	Unknown	1	4	0	0	0	0
Area Near SEP 925	Sewage truck unloading	Unknown	0	0	0	1	0	0
Total Annual SEP Odor Incidents			**8**	**18**	**27**	**8**	**8**	**4**

NOTES:
SEP = Southeast Water Pollution Control Plant
Includes confirmed odor incidents (i.e., where SEP staff were able to confirm odors) and unconfirmed odor incidents.

[a] Includes incidents reported by City and County of San Francisco (City) staff (which can include on- and off-site odors at the SEP) as well as the public.
[b] Includes 15 incidents reported by the public and 1 incident reported by City staff.

SOURCE: SFPUC, Odor Complaint Data 2010 – 2015, revised November 9, 2015 and July 20, 2016.

4.8.2 Regulatory Framework

4.8.2.1 Federal Regulations

The 1970 federal CAA (last amended in 1990) requires that regional planning and air pollution control agencies prepare a regional air quality plan to outline the measures by which both stationary and mobile sources of pollutants will be controlled in order to achieve all standards by the deadlines specified in the CAA. These ambient air quality standards are intended to protect the public health and welfare, and they specify the concentration of pollutants (with an adequate margin of safety) to which the public can be exposed without adverse health effects. They are designed to protect those segments of the public most susceptible to respiratory distress, including asthmatics, the very young, the elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels that are somewhat above ambient air quality standards before adverse health effects are observed.

The current attainment status for the SFBAAB, with respect to federal standards, is summarized in **Table 4.8-5**. In general, the SFBAAB experiences low concentrations of most pollutants when compared to federal standards (in attainment), except for ozone and particulate matter (PM_{10} and $PM_{2.5}$), for which standards are exceeded periodically (see Table 4.8-1). In summary, the SFBAAB is designated as a marginal non-attainment area of the national 8-hour ozone standard.[49] The SFBAAB is in attainment for other criteria pollutants, with the exception of the 24-hour standards for PM_{10} and $PM_{2.5}$, for which the Bay Area is designated as "unclassified." Under the CAA definition, the "unclassified" designation applies to any area that cannot be classified, on the basis of available information, as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

4.8.2.2 State Regulations

California Clean Air Act

While the federal CAA established national ambient air quality standards, individual states retained the option to adopt more stringent standards and to include other pollution sources. The State of California had already established its own air quality standards when federal standards were established, and because of the unique meteorological conditions in California, there is considerable diversity between the state and national ambient air quality standards, as shown in Table 4.8-5. California ambient standards tend to be at least as protective as national ambient standards and are often more stringent.

In 1988, the State of California passed the CCAA (California Health and Safety Code Sections 39600 et seq.), which, like its federal counterpart, called for the designation of areas as attainment or non-attainment, but based on state ambient air quality standards rather than the federal standards. As indicated in Table 4.8-5, the SFBAAB is designated as "non-attainment" for state ozone, PM_{10}, and $PM_{2.5}$ standards. The SFBAAB is designated as "attainment" for other pollutants.

Regulation of Toxic Air Contaminants

For TACs, both the USEPA and the CARB recognized that air pollution affects the public's health, especially sensitive groups, and can result in respiratory and cardiovascular effects. Section 41700(a) of the California Health and Safety Code prohibits the discharge, from any source, of quantities of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or that endanger the comfort, repose, health, or safety of any of those persons or the public, or that cause, or have a natural tendency to cause, injury or damage to business or property.

[49] Non-attainment designations range from Marginal (lowest) to Extreme (highest). "Marginal non-attainment area" means an area that is above the air quality standard of 0.070 ppm and ranges from 0.076 up to but not including 0.086 ppm.

TABLE 4.8-5
STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS AND SAN FRANCISCO BAY AREA AIR BASIN (SFBAAB) ATTAINMENT STATUS

Pollutant	Averaging Time	State (SAAQS[a]) Standard	State (SAAQS[a]) Attainment Status	Federal (NAAQS[b]) Standard	Federal (NAAQS[b]) Attainment Status
Ozone	1 hour	0.09 ppm	**N**	None	n/a
	8 hour	0.070 ppm	**N**	0.070 ppm[c]	**N**
Carbon Monoxide (CO)	1 hour	20 ppm	A	35 ppm	A
	8 hour	9.0 ppm	A	9 ppm	A
Nitrogen Dioxide (NO_2)	1 hour	0.18 ppm	A	0.100 ppm	U
	Annual	0.030 ppm	n/a	0.053 ppm	A
Sulfur Dioxide (SO_2)	1 hour	0.25 ppm	A	0.075	A
	24 hour	0.04 ppm	A	0.14	A
	Annual	n/a	n/a	0.03 ppm	A
Particulate Matter (PM_{10})	24 hour	50 μg/m³	**N**	150 μg/m³	U
	Annual[d]	20 μg/m³	**N**	n/a	n/a
Fine Particulate Matter ($PM_{2.5}$)	24 hour	n/a	n/a	35 μg/m³	**N**
	Annual	12 μg/m³	**N**	12 μg/m³	U/A [e]
Sulfates	24 hour	25 μg/m³	A	n/a	n/a
Lead	30 day	1.5 μg/m³	A	n/a	n/a
	Cal. Quarter	n/a	n/a	1.5 μg/m³	A
Hydrogen Sulfide	1 hour	0.03 ppm	U	n/a	n/a
Visibility-Reducing Particles	8 hour	See Note f	U	n/a	n/a

NOTES:

A = Attainment; **N** = Non-attainment; U = Unclassified; n/a = not applicable, no applicable standard; ppm = parts per million; μg/m³ = micrograms per cubic meter.

[a] SAAQS = state ambient air quality standards (California). SAAQS for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, particulate matter, and visibility-reducing particles are values that are not to be exceeded. All other state standards shown are values not to be equaled or exceeded.

[b] NAAQS = national ambient air quality standards. NAAQS, other than ozone and particulates, and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The 8-hour ozone standard is attained when the three-year average of the fourth highest daily concentration is 0.08 ppm or less. The 24-hour PM_{10} standard is attained when the three-year average of the 99th percentile of monitored concentrations is less than the standard. The 24-hour $PM_{2.5}$ standard is attained when the three-year average of the 98th percentile is less than the standard.

[c] On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

[d] State standard = annual geometric mean.

[e] In December 2012, the USEPA strengthened the annual $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) from 15.0 to 12.0 micrograms per cubic meter (μg/m³). In December 2014, the USEPA issued final area designations for the 2012 primary annual $PM_{2.5}$ NAAQS. Areas designated "unclassifiable/attainment" must continue to take steps to prevent their air quality from deteriorating to unhealthy levels. The effective date of this standard was April 15, 2015.

[f] Statewide visibility-reducing particle standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

SOURCE: Bay Area Air Quality Management District (BAAQMD), *Air Quality Standards and Attainment Status.* Available online at http://www.baaqmd.gov/research-and-data/air-quality-standards-and-attainment-status. Accessed on August 30, 2016.

Emission Standards for New Off-Road Equipment

Prior to 1994, there were no standards to limit the amount of emissions from off-road equipment. In 1994, the USEPA established emission standards for hydrocarbons, nitrogen oxides, carbon monoxide, and particulate matter to regulate new pieces of off-road equipment. These emission standards came to be known as Tier 1. Since that time, increasingly more stringent Tier 2, Tier 3, and Tier 4 (interim and final) standards were adopted by the USEPA, as well as by the CARB. Each adopted emission standard was phased in over time. New engines built in and after 2015 across all horsepower sizes must meet Tier 4 final emission standards. In other words, new manufactured engines cannot exceed the emissions established for Tier 4 final emissions standards. Out of the estimated 161,420 pieces of construction equipment used statewide in 2014, 59 percent are Tier 2 and above.[50]

Verified Diesel Emission Control Strategies (VDECS)

Since these tiered emission standards only apply to new engines and off-road equipment can last several years, verified diesel emission control strategies (VDECS) were developed to help reduce emissions from existing engines. VDECS are designed primarily for the reduction of diesel particulate matter emissions and have been verified by the CARB. There are three levels of VDECS. The most effective VDECS (a device, system, or strategy used to achieve the highest level of pollution control from an existing off-road vehicle) is the Level 3 VDECS. Tier 4 engines are not required to install VDECS since they already meet the emissions standards for lower tiered equipment with installed controls.

In July 2007, the CARB adopted the In-Use Off-Road Diesel Vehicle Regulation to reduce diesel particulate matter and oxides of nitrogen emissions from in-use existing off-road diesel vehicles in California. This regulation includes:

- Equipment labeling requirements
- Annual reporting of equipment
- Five-minute (30 seconds within 100 feet of schools) idling limit (applies to off-road and on-road diesel vehicles)
- Restrictions on adding older and dirtier Tier 0 and Tier 1 vehicles to construction fleets.[51]

Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program)

For projects with significant contributions of criteria air pollutants, mitigation of any contributions in excess of threshold levels can be accomplished either by (1) implementing a project that reduces emissions from an existing facility and directly offsets the excess emissions or (2) contributing funds

50 San Francisco Department of the Environment, San Francisco Department of Public Health, and San Francisco Planning Department, *San Francisco Clean Construction Ordinance, Implementation Guide for San Francisco Public Projects, Final,* August 2015, p. 5. Available online at https://www.sfdph.org/dph/files/EHSdocs/AirQuality/San_Francisco_Clean_Construction_Ordinance_2015.pdf. Accessed on November 13, 2016.

51 San Francisco Department of the Environment, San Francisco Department of Public Health, and San Francisco Planning Department, *San Francisco Clean Construction Ordinance, Implementation Guide for San Francisco Public Projects, Final,* August 2015, p. 5. Available online at https://www.sfdph.org/dph/files/EHSdocs/AirQuality/San_Francisco_Clean_Construction_Ordinance_2015.pdf. Accessed on November 13, 2016.

to finance emissions reduction projects being implemented by the BAAQMD and funded by the Carl Moyer Program. The Carl Moyer Program issues grants to replace or retrofit older engines and equipment with cleaner-than-(USEPA)-required engines and equipment to reduce air pollution. This program is used as a basis to determine the amount of off-site contributions required to offset a project's impact. Money collected through the Carl Moyer Program complements California's regulatory program by providing incentives to effect early or extra emission reductions, especially from emission sources in environmental justice communities and areas disproportionately affected by air pollution. The Carl Moyer Program funds clean air projects involving a wide variety of vehicles and equipment, including:

- Repower: The replacement of an in-use engine with another, cleaner engine.
- Retrofit: An emission control system employed exclusively with an in-use engine, vehicle, or piece of equipment.
- New purchases: Vehicles or equipment certified to optional, lower emission standards.
- Fleet modernization or equipment replacement: The replacement of an older vehicle or piece of equipment that still has remaining useful life with a newer, cleaner vehicle or piece of equipment. The old vehicle/equipment is scrapped. Equipment may include on-road heavy-duty vehicle and off-road equipment replacement as well as emergency vehicles (fire apparatus) and lawn and garden equipment replacement.
- Vehicle retirement (or car scrap): Paying owners of older, more polluting vehicles that still have remaining useful life to voluntarily retire those vehicles earlier than they would have otherwise.

The Carl Moyer Program establishes a cost-effectiveness standard that a proposed clean air project must meet in order to receive funding under the program. On March 27, 2015, the cost effectiveness limit was determined to be $18,030 per weighted ton of ROG, NOx, and PM in resulting emissions reductions.[52] The program has established guidelines and criteria for the funding of emissions reduction projects. The BAAQMD administers the Carl Moyer Program within the SFBAAB.

4.8.2.3 Regional and Local Regulations and Plans

Bay Area Air Quality Management District

The BAAQMD is the regional agency with jurisdiction over the nine-county SFBAAB, which includes San Francisco, Alameda, Contra Costa, Marin, San Mateo, Santa Clara, and Napa Counties and portions of Sonoma and Solano Counties. The BAAQMD is responsible for attaining and maintaining air quality in the SFBAAB within federal and state air quality standards, as established by the federal CAA and the CCAA, respectively. Specifically, the BAAQMD has the responsibility to monitor ambient air pollutant levels throughout the SFBAAB and to develop and implement strategies to attain the applicable federal and state standards. The BAAQMD does not have authority to regulate emissions from motor vehicles.

[52] California Air Resources Board, Memorandum Re: Carl Moyer Program: Review and Update of the Cost-Effectiveness Limit and Capital Recovery Factors for 2015, March 27, 2015. Available online at http://www.arb.ca.gov/msprog/mailouts/msc1509/msc1509.pdf. Accessed on April 24, 2015.

Criteria Air Pollutants and Toxic Air Contaminants

Specific rules and regulations adopted by the BAAQMD limit the emissions that can be generated by various stationary sources (including facilities at the SEP, as discussed below), and identify specific pollution reduction measures that must be implemented in association with various activities. These rules regulate not only emissions of the six criteria air pollutants, but also TAC and odor emissions sources, which are subject to these rules and are regulated through the BAAQMD's permitting process and standards of operation. Through this permitting process, including an annual permit review, the BAAQMD monitors the generation of stationary emissions and uses this information in developing its air quality plans. Any sources of stationary emissions constructed as part of the project would be subject to the BAAQMD Rules and Regulations. Both federal and state ozone plans rely heavily upon stationary source control measures set forth in the BAAQMD Rules and Regulations.

Pursuant to its Policy and Procedure Manual, the BAAQMD requires implementation of Best Available Control Technology for Toxics and would deny an Authority to Construct or a Permit to Operate for any new or modified source of TACs that exceeds a cancer risk of 10 in one million or a chronic or acute hazard index of 1.0. The permitting process under BAAQMD Regulation 2, Rule 5 requires a Health Risk Screening Analysis, the results of which are posted on the BAAQMD website.

The BAAQMD's Strategic Incentives Division (SID) provides incentive funding for projects that improve air quality, reduce air quality health impacts, and protect the climate. Funding is primarily focused on mobile source projects that reduce or eliminate pollution from cars, trucks, marine vessels, locomotives, agricultural equipment, or construction equipment. Since 1992, the SID has awarded over $400 million in grant funding for cost-effective emission reduction projects, and the program oversees approximately 1,000 projects funded by state, federal, and local monies every year.

Odors

The BAAQMD is also the agency responsible for investigating and controlling odor complaints in the area. The BAAQMD enforces odor control by helping the public document a public nuisance. Upon receipt of a complaint, the BAAQMD sends an investigator to interview the complainant and to locate the odor source if possible. The BAAQMD typically brings a public nuisance court action when there are a substantial number of confirmed odor events within a 24-hour period. An odor source with five or more confirmed complaints per year averaged over three years is considered to have a substantial effect on receptors. As indicated above (under *Odor Incidents*), the BAAQMD has received two confirmed odor complaints regarding odor at the SEP over the six-year period from January 1, 2009 through October 22, 2015. Thus, based on the odor complaint history, the BAAQMD does not consider the SEP to be a significant source of odors in the area.

There are several BAAQMD regulations and rules that apply to odorous emissions that could be generated by the BDFP. Regulation 1, Rule 301 is the nuisance provision that states sources cannot emit air contaminants that cause nuisance to a considerable number of persons. Regulation 9, Rule 2 limits ground level concentration of H_2S.[53] Regulation 7 specifies limits for the discharge of odorous

[53] BAAQMD, Rules & Regulations, Regulation 9 – Inorganic Gaseous Pollutants, Rule 2 – Hydrogen Sulfide, last amended October 6, 1999.

substances where the BAAQMD receives complaints from ten or more complainants within a 90-day period. Among other things, Regulation 7 precludes discharge of an odorous substance that causes the ambient air at or beyond the property line to be odorous after dilution with four parts of odor-free air (i.e., 5 D/T), and specifies maximum limits on the emission of certain odorous compounds.[54]

BAAQMD Permit to Operate for SEP

The BAAQMD issued and periodically renews a Permit to Operate for the SEP.[55] The permit indicates the sources of criteria air pollutants, toxic air contaminants, and odorous emissions regulated at the SEP (e.g., the cogeneration engine, standby diesel engines, boilers, and abatement equipment serving various facilities) and conditions that apply to the operation of those sources. For example, gas from the digesters must be burned in certain equipment (the boilers or waste gas burners), and flaring of the gas must achieve a minimum destruction efficiency of 98.5 percent for total organic compounds. The permit also contains estimates of annual average emissions by pollutant. With respect to odors, the permit requires the SFPUC to employ all measures, practices, or modifications to abate public nuisance odors from the sludge handling process unit (consisting of GBTs and their associated odor control unit) and other odor sources and their associated odor control units. Requirements for maintenance of odor control units (maintenance intervals and logs, replacement of odor control media) are also addressed in the permit.

Bay Area Air Quality Planning Relative to State and Federal Standards

Federal Air Quality Planning Efforts

Air quality plans developed to meet federal requirements are referred to as State Implementation Plans. The CAA and the CCAA require plans to be developed for areas designated as non-attainment (with the exception of areas designated as non-attainment for the state PM_{10} standard). The most recent Bay Area ozone plan prepared in response to federal air quality planning requirements is the 2001 Ozone Attainment Plan.

State Air Quality Planning Efforts

The CAA and the CCAA require plans to be developed for areas that do not meet air quality standards. The most recent air quality plan, the *2010 Clean Air Plan*, was adopted by the BAAQMD on September 15, 2010. The *2010 Clean Air Plan* updates the *Bay Area 2005 Ozone Strategy* in accordance with the requirements of the CCAA to implement all feasible measures to reduce ozone; provide a control strategy to reduce ozone, particulate matter, air toxics, and GHGs in a single, integrated plan; and establish emission control measures to be adopted or implemented. The *2010 Clean Air Plan* contains the following primary goals:

- Attain air quality standards;
- Reduce population exposure and protect public health in the San Francisco Bay Area; and
- Reduce GHG emissions and protect the climate.

[54] BAAQMD, Rules & Regulations, Regulation 7 – Odorous Substances, last amended March 17, 1982.
[55] BAAQMD, Permit to Operate: San Francisco South East Treatment Plant, Plant #568, expires May 1, 2017.

The *2010 Clean Air Plan*'s emissions control strategy includes stationary-source control measures to be implemented through BAAQMD regulations, mobile-source control measures to be implemented through incentive programs and other activities, and transportation control measures to be implemented through transportation programs in cooperation with the Metropolitan Transportation Commission (MTC), local governments, transit agencies, and others. The *2010 Clean Air Plan* also represents the Bay Area's most recent triennial assessment of the region's strategy to attain the state 1-hour ozone standard.[56] The *2010 Clean Air Plan* represents the most current applicable approved air quality plan for the SFBAAB. Consistency with this plan is the basis for determining whether the project would conflict with or obstruct implementation of air quality plans. The *2010 Clean Air Plan* is currently in the process of being updated, and in January 2017, the BAAQMD released the Draft *2017 Clean Air Plan* for public review.

Local Air Quality Planning Efforts

San Francisco General Plan Air Quality Element

The 1997 Air Quality Element[57] of the *San Francisco General Plan* (General Plan) includes the following objectives pertaining to air quality:

> ***Objective 1:*** Adhere to state and federal air quality standards and regional programs.
>
> ***Objective 2*****:** Reduce mobile sources of air pollution through implementation of the Transportation Element of the General Plan.
>
> ***Objective 3:*** Decrease the air quality impacts of development by coordination of land use and transportation decisions.
>
> ***Objective 4:*** Improve air quality by increasing public awareness regarding the negative health effects of pollutants generated by stationary and mobile sources.
>
> ***Objective 5:*** Minimize particulate matter emissions from road and construction sites.
>
> ***Objective 6:*** Link the positive effects of energy conservation and waste management to emission reductions.

San Francisco Construction Dust Control Ordinance

In July 2008, the San Francisco Board of Supervisors approved a series of amendments to the San Francisco Building and Health Codes generally referred hereto as the Construction Dust Control Ordinance (Ordinance 176-08, effective July 30, 2008) with the intent of reducing the quantity of dust generated during site preparation, demolition, and construction work in order to protect the health of the general public and of on-site workers, to minimize public nuisance complaints, and to avoid orders to stop work by the Department of Building Inspection (DBI). The ordinance requires that all site preparation work, demolition, or other construction activities within San Francisco that have the potential to create dust or to expose or disturb more than 10 cubic yards or 500 square feet of soil comply with specified dust control measures whether or not the activity requires a permit from the

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56 BAAQMD, *2010 Clean Air Plan*. Available online at http://www.baaqmd.gov/Divisions/Planning-and-Research/Plans/Clean-Air-Plans.aspx. Accessed on April 15, 2013.

57 San Francisco Planning Department, Air Quality Element of the *San Francisco General Plan*, July 1997, updated in 2000.

DBI. For projects over one-half acre and with sensitive receptors located within 1,000 feet, the Construction Dust Control Ordinance requires that a project sponsor submit a Dust Control Plan for approval by the San Francisco Department of Public Health (SFDPH). The plan must specify how construction dust on the site will be controlled, subject to approval by the Director of Public Health. Dust suppression activities may include watering of all active construction areas sufficiently to prevent dust from becoming airborne; increased watering frequency may be necessary whenever wind speeds exceed 15 mph. Reclaimed water must be used as required by Article 21, Section 1100 et seq. of the San Francisco Public Works Code. The SFPUC would be required to prepare a Dust Control Plan for the BDFP since the site is over one-half acre in size and sensitive receptors are located within 1,000 feet.

In conjunction with the Dust Control Ordinance, the City's Ordinance 175-91, Restriction of Use of Potable Water for Soil Compaction and Dust Control Activities, restricts the use of potable water for soil compaction and dust control activities undertaken in conjunction with any construction or demolition project occurring within the boundaries of San Francisco, unless permission is obtained from the SFPUC. Non-potable water must be used for soil compaction and dust control activities during project construction and demolition. The SFPUC operates a recycled water truck-fill station at the SEP that provides recycled water for these activities at no charge.

San Francisco Clean Construction Ordinance

In April 2007, the City adopted an ordinance requiring public projects to reduce emissions at construction sites starting in 2009. In March 2015, the City expanded the existing ordinance to require public projects to further reduce emissions at construction sites in certain areas with high levels of background concentrations of air pollutants. Establishment of the APEZ was used as the basis for approving a series of amendments to the San Francisco Environment and Administrative Codes, generally referred to as the Clean Construction Ordinance, or Environment Code Chapter 25 (Ordinance 28-15, effective April 19, 2015). The purpose of the Clean Construction Ordinance is to protect the public health, safety, and welfare by requiring contractors on City public works projects to reduce diesel and other PM emissions generated by construction activities. For projects located within the APEZ, such as the BDFP, the Clean Construction Ordinance requires the following:

- ***Equipment Requirements***
  - Equipment must meet or exceed Tier 2 standards for off-road engines and operate with the most effective CARB VDECS available for the engine type (Tier 4 engines automatically meet this requirement).
  - Portable diesel engines are prohibited where access to alternative sources of power is available.
  - Idling of off-road and on-road equipment is limited to two minutes at any location, except as provided in applicable state regulations (e.g., traffic conditions, safe operating conditions). The contractor must post legible and visible signs in English, Spanish, and Chinese in designated queuing areas and at the construction site to remind operators of the two-minute idling limit.

- ***Construction Emissions Minimization Plan***. A Construction Emissions Minimization Plan must be prepared before the start of construction. The Plan is required to include estimates of the construction timeline by phase and a description of each piece of off-road equipment required for every construction phase (e.g., equipment type, manufacturer, identification number, model year, Tier rating, horsepower, expected fuel usage and hours of operation). Additional details may be included for VDECS (e.g., technology type, serial number, make, model, manufacturer, CARB verification number level). For off-road equipment using alternative fuels, the description must specify the type of alternative fuel being used.

- ***Monitoring.*** Monitoring and reporting actions are required during construction to document compliance with the ordinance.

- ***Waivers***. Waivers to the requirements of the Clean Construction Ordinance can be issued under unusual circumstances (e.g., lack of available qualifying equipment).[58]

San Francisco Regulation of Objectionable Odors

Section 590 of the San Francisco Health Code restricts discharge of substances such as soot, smoke, and their associated odors. It prohibits discharge of objectionable fumes from any flue, chimney, or smokestack for such period of time or in such quantities as to become a nuisance by causing obnoxious odors in any residential or commercial district.

4.8.3 Impacts and Mitigation Measures

4.8.3.1 Significance Criteria

The project would have a significant impact related to air quality if the project were to:

- Conflict with or obstruct implementation of the applicable air quality plan;

- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors);

- Expose sensitive receptors to substantial pollutant concentrations; or

- Create objectionable odors affecting a substantial number of people.

[58] Circumstances under which waivers to Clean Construction Ordinance requirements can be issued include (for example) emergencies; lack of available alternative power sources; or occasions where a particular piece of equipment with Tier 4 Final standards or CARB Level 3 VDECS is technically not feasible, does not produce the desired emissions reduction due to expected operating modes, or would create a safety hazard or impaired visibility.

4.8.3.2 Approach to Analysis

Guidelines and Methodologies Used

This air quality analysis[59] employs the guidelines and methodologies from the BAAQMD, CARB, California Office of Environmental Health Hazard Assessment (OEHHA), California Air Pollution Control Officers Association (CAPCOA), and USEPA. Consistent with the methods recommended in these various guidelines, this analysis estimates criteria air pollutants and the following health impacts: the excess lifetime cancer risk, chronic and acute hazards, and $PM_{2.5}$ concentrations. These health impacts are associated with diesel exhaust that would be emitted by operation of construction equipment, TACs that would be emitted during operation of project stationary sources, and TACs associated with diesel and gasoline exhaust emitted from construction-related and operational hauling, vendor, and worker vehicles traveling to and from the project site. The cumulative analysis estimates excess lifetime cancer risks from TACs and $PM_{2.5}$ concentrations that are attributable to the project in combination with other existing and planned mobile and stationary sources within the SEP site as well as in the project vicinity.

Project Construction

The BDFP's criteria air pollutant emissions associated with on-road and off-road construction-related vehicles[60] and equipment were calculated using methodology consistent with the 2014 version of the Emissions Estimator Model (EMFAC2014) and the California Emission Estimator Model (CalEEMod® 2013.2.2), respectively. Sources of construction emissions include off-gassing from architectural coating and paving, off-road equipment exhaust, and on-road equipment exhaust. The health risk analysis estimates the project's excess lifetime cancer risk, chronic and acute hazards, and $PM_{2.5}$ concentrations in the surrounding community based on air dispersion modeling of TACs, including DPM from off-road construction equipment as well as diesel and gasoline-speciated TOGs from on-road vehicles using the USEPA's atmospheric dispersion modeling system (AERMOD) model.

Project Operation

The BDFP's operational emissions were calculated based on reasonably foreseeable operating conditions in years 2023 and 2045 using operational air emissions data from the BDFP consultant team.[61] Historical actual emissions estimates from the BAAQMD for calendar year 2014 were used as an estimate of existing operational emissions for the cogeneration engine and boilers. Existing operational criteria air pollutant emissions from the waste gas burners, which are not included in BAAQMD emissions estimates, were calculated using the volume of digester gas sent to the waste gas

59 A detailed Air Quality Technical Report (AQTR) was completed by Ramboll Environ for the project. Assumptions, methodologies, and modeling results are detailed in the AQTR. A copy of the AQTR is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2015.000644ENV.

60 "On-road" construction-related vehicles refer to those traveling on local roadways, such as haul trucks, materials delivery trucks, or worker vehicles. "Off-road" vehicles refer to construction equipment operating on the project site and staging areas.

61 Biosolids Digester Facilities Project Consultant Team, Brown and Caldwell with CH2M and Black & Veatch, Conceptual Engineering Report, *Operational Air Emissions Prepared for the SFPUC Biosolids Digester Facilities Project*, Appendix C, March 2016.

burners in calendar year 2014 and BAAQMD emission factors for NO_x and ROG as well as AP-42[62] emission factors for PM_{10}. These existing (2014) criteria air pollutant emissions were subtracted from the project's 2023 (transitional and full operation) and 2045 emissions to determine the net changes in operational emissions with the BDFP. The net changes in health risks (excess lifetime cancer risk, chronic and acute hazards, and $PM_{2.5}$ concentrations) in the surrounding community were estimated based on current on-site operational sources of emissions (DPM, $PM_{2.5}$, and other TACs) and 2023/2045 project-related operational emissions using the AERMOD model. Note that the net increases in operational criteria pollutant emissions and health risks are in part attributable to future increases in wastewater flows (due to population growth) projected to occur whether or not BDFP facilities are implemented (refer to Section 6.3.1.3 in Chapter 6, *Alternatives*, for more information on future conditions without the project [i.e., the No Project Alternative]).

Approach to Analysis of Project Impacts

This section describes the methodology used to evaluate the project's construction and operational impacts related to consistency with the *2010 Clean Air Plan*, emissions of criteria pollutants, local health risks and hazards, and odors. The assessment of criteria air pollutant impacts addresses the second and third bulleted significance criteria identified above. The assessment of localized health risks and odor impacts addresses the fourth and fifth bulleted significance criteria identified above.

Air Quality Plan

The current applicable air quality plan is the BAAQMD's *2010 Clean Air Plan.* A project can be found consistent with the *Clean Air Plan* if it supports the goals of, and includes applicable control measures from, the *Clean Air Plan*, and if it would not disrupt or hinder implementation of any control measures from the *Clean Air Plan*. Consistency with this plan is the basis for determining whether the project would conflict with or obstruct implementation of an applicable air quality plan, the first bulleted significance criterion identified above (see Impact AQ-4 discussion below).

Fugitive Dust

Fugitive dust emissions are typically generated during construction phases. Studies have shown that the application of best management practices (BMPs) at construction sites significantly controls fugitive dust,[63] and individual measures have been shown to reduce fugitive dust by anywhere from 30 to 90 percent.[64] The BAAQMD has identified a number of BMPs to control fugitive dust emissions from construction activities. The City's Construction Dust Control Ordinance (Ordinance 176-08, effective July 30, 2008) requires a number of measures to control fugitive dust to ensure that construction projects do not result in visible dust, and the BMPs employed in compliance with the City's Construction Dust Control Ordinance are an effective strategy for controlling construction-related

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62 AP-42 is a compilation of air pollutant emission factors produced by the USEPA. USEPA, Office of Air Quality Planning and Standards, *Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume 1: Stationary Point and Area Sources*, January 1995. Available online at http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s04.pdf. Accessed on January 8, 2017.

63 Western Regional Air Partnership, *WRAP Fugitive Dust Handbook,* September 7, 2006. Available online at http://wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf. Accessed on April 3, 2016.

64 BAAQMD, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*, October 2009, page 27.

fugitive dust. This analysis assumes that the project would implement the requirements of the Construction Dust Control Ordinance, which is the basis for determining the significance of air quality impacts due to fugitive dust emissions (see Impact AQ-1 discussion below).

Criteria Air Pollutants

By definition, regional air pollution is largely a cumulative impact in that no single project is sufficient in size to, by itself, result in non-attainment of air quality standards. Instead, a project's individual emissions are considered to contribute to existing cumulative air quality impacts. If a project's contribution to existing cumulative air quality conditions is considerable, then the project's impact on air quality would be considered significant.[65]

Table 4.8-6 identifies construction-related and operational criteria air pollutant significance thresholds applied in this analysis (see Impacts AQ-1 and AQ-2 discussions, respectively, below). Projects that would result in criteria pollutant emissions below these significance thresholds would not violate an air quality standard, contribute substantially to an air quality violation, or result in a cumulatively considerable net increase in criteria air pollutants that could result in increased health effects.

TABLE 4.8-6
CRITERIA AIR POLLUTANT SIGNIFICANCE THRESHOLDS

	Construction Thresholds	Operational Thresholds	
Pollutant	Average Daily Emissions (pounds/day)	Average Daily Emissions (pounds/day)	Maximum Annual Emissions (tons/year)
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82 (exhaust)	82	15
$PM_{2.5}$	54 (exhaust)	54	10
Fugitive Dust	Construction Dust Control Ordinance or other best management practices	Not Applicable	

NOTES:
ROG = reactive organic gases; NO_x = nitrogen oxides; PM10 = particulate matter of 10 microns in diameter or less; PM2.5 = particulate matter of 2.5 microns in diameter or less

SOURCE: Bay Area Air Quality Management District, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*, October 2009, page 7. Available online at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/revised-draft-ceqa-thresholds-justification-report-oct-2009.pdf?la=en. Accessed on April 3, 2016.

Construction

Although the regulations specified above apply to new or modified stationary sources, construction of these stationary sources generates criteria pollutant (ROG, NO_x, PM_{10}, and $PM_{2.5}$) emissions as a result of construction equipment, construction-related vehicle trips, and application of architectural coatings. Projects that would result in construction-related emissions below these thresholds would not be considered to contribute to an existing or projected air quality violation or result in a considerable net

[65] Bay Area Air Quality Management District, *CEQA Air Quality Guidelines*, May 2012, page 2-1.

increase in ozone precursors or PM. Due to the temporary nature of construction activities, only the average daily thresholds are applicable to construction-phase emissions.

Operation

The potential for project operations to result in a cumulatively considerable net increase in criteria air pollutants that may contribute to an existing or projected air quality violation is based on the state and federal Clean Air Act emissions limits for stationary sources. To ensure that new stationary sources do not cause or contribute to a violation of a state air quality standard, BAAQMD Regulation 2, Rule 2 requires that any new source that emits criteria air pollutants above specified emissions limits (54 pounds per day or 10 tons per year for ozone precursors ROG and NO_x) must offset those emissions.[66] To ensure that new stationary sources are consistent with attainment of federal air quality standards, the federal New Source Review (NSR) program enforces emissions limits for PM_{10} and $PM_{2.5}$ of 15 tons per year (82 pounds per day) and 10 tons per year (54 pounds per day), respectively. These emissions limits represent levels below which a new source is not anticipated to contribute to an air quality violation or result in a considerable net increase in criteria air pollutants.[67]

In addition to operational stationary sources,[68] criteria pollutant emissions would also be associated with operational mobile sources, on-site area sources (i.e., natural gas combustion for space and water heating, and combustion of other fuels by building and grounds maintenance equipment), and energy usage. However, some of these sources are not discussed in the analysis for the following reasons. Vehicle traffic associated with operation of the SEP includes trucks hauling biosolids product away from the facility, vendor trips delivering treatment chemicals, and worker trips. As indicated in Section 4.6, Transportation and Circulation, the number of daily trucks delivering or hauling materials as a result of the project would increase slightly compared to existing conditions. The project would generate approximately three new truck trips per day, from approximately 33 to 36 trucks per day. The increase in biosolids haul trips would be due to the increase in solids load associated with projected population growth by 2045, and not due to the BDFP. Furthermore, such a small change in truck trips on local roadways would not substantially alter transportation-related criteria pollutant emissions. Therefore operational mobile sources are not discussed further.

Criteria pollutant emissions increases associated with increased energy usage from new on-site area sources for space cooling and water heating would be avoided because the project's long-term energy needs would be fully met by the project's Energy Recovery Facility, thus avoiding any increases in criteria pollutant emissions from energy usage (so no net change would result and this issue is not discussed further). Increases in criteria pollutant emissions associated with building and grounds maintenance are expected to be minimal because existing facilities that would be replaced have already been requiring maintenance (so the net change would be small and this issue is not

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[66] Bay Area Air Quality Management District, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*, October 2009, page 17. Available online at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/revised-draft-ceqa-thresholds-justification-report-oct-2009.pdf?la=en. Accessed on April 3, 2016.

[67] BAAQMD, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*, October 2009, page 16. Available online at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/revised-draft-ceqa-thresholds-justification-report-oct-2009.pdf?la=en. Accessed on April 3, 2016.

[68] Stationary sources include the proposed backup diesel generator and emissions associated with testing it.

discussed further). Criteria pollutant emissions associated with testing of the proposed backup generator for 50 hours per year are included in the operational emissions estimates in Impact AQ-2 below.

Other Criteria Pollutants

As indicated above, the BAAQMD has demonstrated, based on modeling, that in order to exceed the California ambient air quality standard of 9.0 ppm (8-hour average) or 20.0 ppm (1-hour average) for CO, project traffic in addition to existing traffic would need to exceed 44,000 vehicles per hour at affected intersections (or 24,000 vehicles per hour where vertical and/or horizontal mixing is limited). Based on data from the project's traffic analysis,[69] existing and future (with project-related construction and operational traffic) traffic volumes at intersections in the project vicinity do not exceed this threshold level. Construction-related SO_2 emissions represent a negligible portion of the total basin-wide emissions. Therefore, given the Bay Area's attainment status and the limited CO and SO_2 emissions that could result from the project, the project would not result in a cumulatively considerable net increase in CO or SO_2, and these criteria air pollutants are not discussed further.

Local Health Risks and Hazards

As part of the AQTR for this project, Ramboll Environ conducted an HRA for the project to provide quantitative estimates of health risks from exposures to TACs. The HRA assessed both increased excess lifetime cancer and non-cancer (acute and chronic) risks as well as localized $PM_{2.5}$ concentrations from project-related construction and operational sources.[70] Localized $PM_{2.5}$ concentrations are assessed based on annual average concentrations, and hence, separate evaluations are performed for construction and operation. Conversely, cancer risk is assessed based on the probability of contracting cancer over a high-end estimate of residence in a particular home, evaluated as 30 years (5 years of construction followed by 25 years of operation).[71] Therefore, the probability of an increased cancer risk is determined by evaluating a sensitive receptor's exposure to both construction and operational emissions. Both the $PM_{2.5}$ and cancer risk assessments account for background (existing) concentrations and risk levels, as estimated in the San Francisco Community Risk Reduction Plan Health Risk Assessment or CRRP-HRA. For this project, operational emissions are estimated for 2023 (assuming six-months of performance testing and six months of full project operation, which is a conservative but realistic scenario that reflects higher emissions overall that

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[69] Ramboll Environ, *Air Quality Technical Report*, *Biosolids Digester Facilities Project Draft EIR*, *Appendix C*, March 2017. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2015.000644ENV.

[70] Ramboll Environ, *Air Quality Technical Report, Biosolids Digester Facilities Project Draft EIR*, March 2017. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2015.000644ENV.

[71] In February 2015, OEHHA released the updated Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (OEHHA 2015), which combines information from previously released and adopted technical support documents to delineate OEHHA's revised risk assessment methodologies based on current science. This updated Guidance Manual supersedes the 2003 Guidance Manual that previously provided methodologies for conducting health risk assessments under the Air Toxics Hot Spots Program (AB2588). The updated guidance calls for analyzing health risks based on 30 years of exposure instead of 70 years (specified in 2003 guidance). The BAAQMD has issued Draft Guidelines on adopting the OEHHA 2015 Guidance Manual; however, the 2015 OEHHA has not yet been formally adopted. This evaluation used the 2015 methodology in anticipation of its adoption soon. The 2015 guidance is considered more conservative, which ensures that health risk impacts in this analysis would not be underestimated.

could occur in one year than if the performance testing occurred over a longer period) and 2045 (the project's horizon year). The average of 2023 and 2045 emissions was used for the cancer risk calculations to account for the linear increase over time. Additionally, existing operational emissions were modeled for sources not included in the current CRRP-HRA in order to determine net cancer risks. Existing operational sources were also modeled for sources included in the current CRRP-HRA, in order to make them consistent with the modeling for the project's operational sources. The methodologies used to evaluate emissions for the project's construction and operational health risks are based on the most recent guidance provided by the BAAQMD and other sources.[72]

The thresholds of significance used to evaluate health risks from new sources of TACs associated with construction and operation of project facilities are based on the potential for the project to substantially affect the extent and severity of an existing APEZ at sensitive receptor locations or create a new APEZ (see Section 4.8.1.4 for a more detailed description). Sensitive receptors that would be affected by the project are located within the APEZ; therefore, the project would be subject to significance thresholds that are lower (more stringent) than thresholds for projects located outside the APEZ. **Table 4.8-7** presents the health risk thresholds that are applied to projects within an APEZ. The shading in Figure 4.8-2 (presented above, in Section 4.8.1.4), which depict the existing APEZ in blue shading[73] and the Health Vulnerability zip code in beige shading, helps to illustrate the locations where the different significant thresholds presented in Table 4.8-7 apply. In the blue-shaded areas that are outside of the beige-shaded region, background $PM_{2.5}$ concentration exceeds 10 μg/m^3 or the background cancer risk exceeds 100 per million (or both). In the blue-shaded areas within the beige-shaded area, the background $PM_{2.5}$ concentration exceeds 9.0 μg/m^3 or the background cancer risk exceeds 90 per million (or both).

With respect to increased health risks from project-related mobile sources, there would be minimal change in operational vehicle trips (about three trucks per day and no change in worker-related vehicle trips). The BAAQMD considers roads with fewer than 10,000 vehicles per day to be "minor, low-impact" sources that do not pose a significant health impact, even in combination with other nearby sources, and recommends that these sources be excluded from the environmental analysis.[74] The project's estimated three additional trucks per day would be well below this level and would be distributed among the local roadway network; therefore, an assessment of project-generated TACs resulting from such small increases in truck trips is not required. The project would not generate a substantial amount of TAC emissions from operational vehicle trips that could affect nearby sensitive receptors; consequently, operational mobile source emissions are not discussed further.

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72 BAAQMD, Recommended Methods for Screening and Modeling Local Risks and Hazards, May 2012. Available online at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/risk-modeling-approach-may-2012.pdf. Accessed on April 6,2017. ; Bhatia, Rajiv and Thomas Rivard, San Francisco Department of Public Health (SFDPH), *Assessment and Mitigation of Air Pollutant Health Effects from Intra-Urban Roadways: Guidance for Land Use Planning and Environmental Review*, page 17, May 6, 2008; SFDPH, *Memorandum to File regarding 2014 Air Pollutant Exposure Zone Map,* April 9, 2014; BAAQMD, SFDPH, and San Francisco Planning Department, *The San Francisco Community Risk Reduction Plan: Technical Support Documentation*, December 2012.

73 The existing APEZ was updated to account for revised 2015 OEHHA guidance for calculating excess cancer risk for a residential receptor. This was done by scaling existing cancer risk by a calculated factor of 1.3744.

74 BAAQMD, *CEQA Air Quality Guidelines*, updated May 2012, p. 5-12.

TABLE 4.8-7
HEALTH RISK SIGNIFICANCE THRESHOLDS

Affected Sensitive Receptors	Thresholds for Construction and Operation: $PM_{2.5}$ (μg/m³)	Thresholds for Construction and Operation: Excess Cancer Risk (cases per one million population)
1. Criteria for sensitive receptor located within the APEZ[a]		
- Outside Health Vulnerability zip code[b]	10.0	100
- Within Health Vulnerability zip code[c]	9.0	90
2. Project contributions to sensitive receptor locations within the APEZ[d,e]	0.2	7.0
3. Project contributions to sensitive receptor locations not within the APEZ but brought into the APEZ as a result of the project[b,e]	0.3	10.0

NOTES: See Section 4.8.1.4, Local Health Risks and Hazards, for a description of the APEZ and Bay Area Health Vulnerability zip codes.

$PM_{2.5}$ = particulate matter of 2.5 microns in diameter or less; μg/m³ = micrograms per cubic meter; APEZ = Air Pollutant Exposure Zone

a These thresholds consider both the background and project conditions.

b From Bay Area Air Quality Management District, *California Environmental Quality Act Guidelines Update, Proposed Air Quality CEQA Thresholds of Significance*, May 2010, page 2-2.

c From San Francisco Department of Public Health, Environmental Health, Planning, *Memorandum to File regarding 2014 Air Pollutant Exposure Zone Map dated April 9, 2014*.

d A 0.2 μg/m3 increase in PM2.5 would result in a 0.28 percent increase in non-injury mortality or an increase of about 21 excess deaths per 1,000,000 population per year from non-injury causes in San Francisco. This information is based on Jerrett M. et al., Spatial Analysis of Air Pollution and Mortality in Los Angeles, Epidemiology, 16:727-736, 2005. The excess cancer risk has been proportionally reduced to result in a significance criterion of 7 per million persons exposed.

e These thresholds consider project contributions (excluding background conditions).

SOURCES: Bay Area Air Quality Management District (BAAQMD), *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance,* October 2009, page 7. Available online at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/revised-draft-ceqa-thresholds-justification-report-oct-2009.pdf?la=en. Accessed on April 3, 2016; BAAQMD, *California Environmental Quality Act Guidelines Update, Proposed Air Quality CEQA Thresholds of Significance*, May 2010, page 2-2. Available online at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/draft_baaqmd_ceqa_guidelines_may_2010_final.pdf?la=en. Accessed on May 2, 2016; San Francisco Department of Public Health, Environmental Health, Planning, *Memorandum to File regarding 2014 Air Pollutant Exposure Zone Map,* April 9, 2014.

Odors

As indicated in the significance criteria above, Appendix G of the CEQA Guidelines recommends the following significance threshold for odor impacts: *Would a project create objectionable odors affecting a substantial number of people?* The BDFP involves the relocation of an existing source of objectionable odors associated with the solids handling facilities. For this environmental impact report (EIR), the analysis of the change in odor conditions associated with solids handling was based on an assessment of whether BDFP facilities and operations would generate objectionable odors and, if so, based on design features and dispersion modeling, whether future with-project odor conditions (a) would likely worsen or improve existing conditions and (b) would likely affect a substantial number of people.

Dispersion Modeling for the Project

Dispersion modeling using the USEPA's CALPUFF model was conducted for Existing Conditions (see Section 4.8.1.6 above) as well as Future with Project and Future Cumulative scenarios. Based on the results of the dispersion modeling, isopleths were generated for Existing, Future with BDFP only, and Future Cumulative (BDFP with select other planned SEP projects). The dispersion modeling of future conditions was used to assess whether the BDFP, alone and in combination with select other planned SEP projects, would meet odor control goals and design standards, described below.

BDFP Odor Control Goals and Design Standards

In order to set a benchmark target both for meeting regulatory requirements and for the SEP to act as a "good neighbor," the SFPUC has established odor goals or limits at and beyond the SEP fence line. In addition to meeting the requirements of BAAQMD Regulation 7 and Regulation 9, Rule 2 (discussed above) that would apply to the SEP, the SFPUC has established the following odor-based goal and design criteria:[75]

- ***Sewer System Improvement Program (SSIP) Goal*****:** The goal established for the Sewer System Improvement Program (SSIP) is defined as "Limit odors to within the treatment facility's fence-line" for all SSIP projects at the SEP.
- ***BDFP Project-Specific Objective*****:** The BDFP project-specific objective is "Limit noticeable odors from BDFP facilities to the SEP property boundary." To implement this project-specific objective, the odor control facility is designed to meet the 5 D/T criterion with 99 percent compliance based on a 1-hour average.

For the solids treatment processes, 99 percent compliance equates to no more than 88 hours per year during which the 5 D/T design criterion may be exceeded. This exceedance is allowed to account for operational activities such as short-term opened doors/hatches and unplanned plant upsets. The 5 D/T design criterion is consistent with the requirements of Section 302 of BAAQMD Regulation 7. The 99 percent compliance requirement is consistent with the SFPUC's SSIP goal as well as the BDFP's odor objective of limiting odors to within the facility's fence line, while allowing for short-term operational and unplanned events.

Approach to Analysis of Cumulative Impacts

Section 4.1.3, Approach to Cumulative Impact Analysis and Cumulative Projects, describes the overall approach to the cumulative analysis for those topics using a list-based approach and summarizes probable future projects in the vicinity of the project that could contribute to a cumulative impact; refer to Table 4.1-1 and Figure 4.1-1 in Section 4.1, Overview, for a description of potential cumulative projects in the vicinity of the BDFP. The cumulative analyses for air quality use both plan- and list-based approaches.

The cumulative impact analysis assumes that construction and operation of other projects in the geographical area, listed in Table 4.1-1, would be required to comply with the same regulatory requirements as the project, which may serve to avoid and reduce many impacts to less-than-significant levels on a project-by-project basis. The analysis then considers whether or not there would be a significant, adverse cumulative impact associated with project implementation in combination with past, present, and probable future projects in the geographical area, and if so, whether or not the project's incremental contribution to the cumulative impact would be considerable. Both conditions must apply in order for a project's contribution to cumulative effects to

[75] CH2M Hill and Brown and Caldwell, *Final Southeast Plant Odor Characterization Report*, December 2015, *in* SFPUC, Final Biosolids Digester Facilities Project Conceptual Engineering Report, March 2016.

be deemed cumulatively considerable (significant). If so, then mitigation measures are identified to reduce the project's contribution to the extent feasible.

The contribution of a project's individual air emissions to regional air quality impacts is, by its nature, a cumulative effect. Emissions from past, present, and future projects in the vicinity also have or will contribute to adverse regional air quality impacts on a cumulative basis. No single project by itself would be sufficient in size to result in non-attainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulative air quality conditions.[76] As described above, the project-level thresholds for criteria air pollutants are based on levels by which new sources are not anticipated to contribute to an air quality violation or result in a considerable net increase in criteria air pollutants. Therefore, if a project's emissions are below the project-level thresholds, the project would not be considered to result in a considerable contribution to cumulative regional air quality impacts.

Similarly, the HRA takes into account the cumulative contribution of localized health risks to sensitive receptors from sources included in the city-wide modeling (CRRP-HRA) plus the project's sources and other cumulative project sources. Since health risk impacts are localized, and health impacts from sources decrease substantially with increasing distance,[77] cumulative emissions are modeled using AERMOD to account for their locations in relation to the BDFP site. The significance of cumulative contributions within and outside an APEZ is determined by comparing them to applicable thresholds listed in Table 4.8-7 (above). As described under Impact C-AQ-3 below, the approach to evaluating cumulative odor impacts relied on a qualitative evaluation of the odor generation potential of cumulative projects and SEP odor modeling.

4.8.3.3 Impact Evaluation

The impact analysis addresses construction-related and operational impacts as follows:

- Impact AQ-1: Construction-related criteria pollutant emissions
- Impact AQ-2: Operational criteria pollutant emissions
- Impact AQ-3: Health risks from construction-related and operational TAC emissions
- Impact AQ-4: Consistency with the Clean Air Plan
- Impact AQ-5: Construction and operational odor
- Impact C-AQ-1: Cumulative regional air quality impacts (criteria air pollutants)
- Impact C-AQ-2: Cumulative health risks and hazards
- Impact C-AQ-3: Cumulative odors

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[76] BAAQMD, *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance*, October 2009.
[77] California Air Resources Board (CARB), *Air Quality and Land Use Handbook: A Community Health Perspective*, April 2005. Available online at http://www.arb.ca.gov/ch/handbook.pdf. Accessed on May 2, 2016.

Criteria Air Pollutants – Project Construction

Impact AQ-1: The project's construction activities would not generate fugitive dust that could violate an air quality standard or contribute substantially to an existing or projected air quality violation, but project construction would generate criteria air pollutants that would violate an air quality standard and contribute substantially to an existing or projected air quality violation, and result in a cumulatively considerable net increase in criteria air pollutants. (Significant and Unavoidable with Mitigation)

Construction activities typically result in emissions of ozone precursors and PM in the form of dust (fugitive dust) and exhaust (e.g., vehicle tailpipe emissions). Emissions of ozone precursors and PM are primarily a result of the combustion of fuel from on-road and off-road vehicles. However, ROG are also emitted from activities that involve painting, other types of architectural coatings, or asphalt paving. The project includes demolition of existing structures on the BDFP site as well as construction of new solids treatment, odor control, energy recovery, and associated facilities. It has not yet been determined which of the potential staging areas (Piers 94 and 96, 1550 Evans Avenue, and the Southeast Greenhouses) would be used by the project; therefore, construction criteria air pollutant emissions from activity at all three are taken into account in the air quality analysis as a conservative approach, and TAC emissions from the potential construction (demolition and paving) activities at 1550 Evans Avenue were conservatively included in the health risk assessment for the BDFP.[78]

During the project's approximately five-year construction period, construction activities would have the potential to result in emissions of fugitive dust and criteria air pollutants (including ozone precursors and PM), as discussed below.

Fugitive Dust

Project-related demolition, excavation, grading, and other construction activities may cause wind-blown dust that could contribute PM into the local atmosphere. Since the project is over one-half acre in size and sensitive receptors are located within 1,000 feet of the site, the SFPUC and project contractors responsible for construction activities at the project site would be required to submit a Dust Control Plan for approval by the SFDPH in compliance with the Construction Dust Control Ordinance. The plan would specify practices to control construction dust on the site (or other practices that result in equivalent dust control) that are acceptable to the SFDPH. For the BDFP, the Dust Control Plan may include any of the following (or equivalent) measures to accomplish the goal of minimizing visible dust: wet down areas of disturbed soil at least three times per day using non-potable water; analyze wind direction and install upwind and downwind particulate dust monitors; record particulate monitoring results; hire an independent third party to conduct inspections and keep a record of those inspections; establish requirements for when dust-generating operations have to be shut down due to dust crossing the property boundary or if dust within the property boundary is not controlled after a specified number of minutes; establish a hotline for surrounding community members to call and report visible dust problems; limit the area subject to dust-generating construction activities at any one time; minimize on-site storage of excavated material or waste materials; install dust curtains and windbreaks on the property lines on windward and down

[78] Ramboll Environ, *Air Quality Technical Report, Biosolids Digester Facilities Project Draft EIR*, March 2017.

windward sides of construction, as necessary; pave or apply water or non-toxic soil stabilizers on all unpaved access roads, parking areas, and staging areas; limit the amount of soil in hauling trucks to the size of the truck bed and walls and cover with a tarpaulin or other effective covers those trucks hauling soil, sand, and other loose materials; establish a 15 mph speed limit for vehicles entering and exiting construction areas; sweep streets with water sweepers at the end of the day where visible soil material is present; install and use wheel washers to clean truck tires if possible or otherwise brush off tires or tracks before they reenter City streets; temporarily stop excavation, grading, and other construction activities when winds exceed 25 mph; hydroseed or apply soil stabilizers to previously graded areas for at least 10 calendar days; and sweep adjacent streets to reduce particulate emissions. The SFPUC would be required to designate an individual to monitor compliance with these dust control requirements. Compliance with the regulations and procedures set forth by the Construction Dust Control Ordinance would ensure that potential dust-related air quality impacts would be less than significant.

Criteria Air Pollutants

Construction activities would include demolition of existing buildings and structures, site preparation, soil excavation, and foundation/facilities construction. Project-related construction emissions would be generated by many different construction sources, including the following: off-road construction equipment (such as excavators, loaders, backhoes, drill rigs, and cranes); on-road trucks; architectural coatings; and paving. Levels of criteria air pollutants generated by these sources were estimated using methods consistent with CalEEMod and outlined in the AQTR.[79,80] The model, including default data (e.g., emission factors, meteorology, etc.), was developed in collaboration with California air districts' staff. Default assumptions were used where project-specific information was not available. Construction-related emissions estimates assume compliance with the Clean Construction Ordinance which, for projects located within the APEZ and within 1,000 feet of sensitive uses, specifies requirements for off-road engines (refer to the description under San Francisco Clean Construction Ordinance in Section 4.8.2.3, above, for more detail).

Construction of the project would occur over approximately five years. Emissions were converted from tons per year to pounds per day using the estimated construction duration of 1,300 working days (i.e., 5 days a week for 5 years). As shown in **Table 4.8-8**, project construction emissions would be above the threshold of significance for NO_x during all five construction years, representing a significant adverse impact. Construction of the BDFP would result in emissions of ROG, PM_{10}, and $PM_{2.5}$ that would be below the thresholds of significance. As shown in Table 4.8-8, the predominant source of emissions of NO_x, PM_{10}, and $PM_{2.5}$ would be off-road equipment, with such equipment generating 5 to 17 times more NO_x than on-road vehicles depending on the construction year.

79 A representative construction equipment list was provided by the BDFP consultant team for this modeling effort.

80 Ramboll Environ, *Air Quality Technical Report, Biosolids Digester Facilities Project Draft EIR*, March 2017. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2015.000644ENV.

TABLE 4.8-8
TOTAL CONSTRUCTION-RELATED CRITERIA AIR POLLUTANT EMISSIONS AND AVERAGE DAILY EMISSIONS DUE TO PROJECT

Year	Source	Total Criteria Air Pollutant Emissions (pounds)			
		ROG	**NO_x**	**PM_{10}**	**$PM_{2.5}$**
Year 1	Off-Road Equipment[a]	1,033	60,933	261	261
Year 2		1,358	54,385	253	253
Year 3		1,250	49,566	230	230
Year 4		1,061	37,147	180	180
Year 5		559	25,337	119	119
Year 1	On-Road Trucks and Vehicles	677	12,233	50	48
Year 2		562	3,073	16	15
Year 3		770	7,829	31	29
Year 4		794	4,222	25	24
Year 5		648	3,768	21	20
Years 4 and 5	Architectural Coating – Off-Gassing[b]	2,230	--	--	--
Years 1 and 5	Paving – Off-Gassing[c]	22	--	--	--
	Total Emissions	10,963	258,494	1,187	1,179
Year	**Days of Construction Per Year**	**Average Daily Construction Emissions (pounds/day)**			
		ROG	**NO_x**	**PM_{10}**	**$PM_{2.5}$**
Year 1	260	6.6	**281**	1.2	1.2
Year 2	260	7.4	**221**	1.0	1.0
Year 3	260	7.8	**221**	1.0	1.0
Year 4	260	11	**159**	0.8	0.8
Year 5	260	9.0	**112**	0.5	0.5
	Total Length of Project Construction[d] (days)	1,300			
	Daily Emissions Averaged Over All Construction Years	8.4	199	0.9	0.9
Significance Thresholds		54	54	82	54
Emissions Above Thresholds (indicated in bold)?		No	**Yes**	No	No

NOTES: Emissions over threshold levels are in **bold**.

ROG = reactive organic gases; NO_x = nitrogen oxides; PM_{10} = particulate matter of 10 microns in diameter or less; $PM_{2.5}$ = particulate matter of 2.5 microns in diameter or less; VDECS = verified diesel emission control strategy; DPF = diesel particulate filter

[a] Assumes use of Tier 2 Engines + DPF (Level 3 VDECS) in off-road equipment as required by Clean Construction Ordinance.
[b] Architectural coating was assumed to occur during Years 4 and 5.
[c] Paving at 1550 Evans Avenue was assumed to occur in Year 1. Paving otherwise associated with the project was assumed to occur during Year 5.
[d] Construction duration is expected to be 60 months.

SOURCE: Ramboll Environ, *Air Quality Technical Report, Biosolids Digester Facilities Project Draft EIR*, March 2017 (Table 4a).

With NO_x exceedances occurring during all five years of construction, supplemental emissions controls on construction equipment would be required to reduce the severity of the impacts, as specified in **Mitigation Measure M-AQ-1a (Construction Emissions Minimization)**. Such controls would be in addition to those already required under the Clean Construction Ordinance, and would include use of equipment that meets the following emissions controls: equipment with engines greater than or equal to 140 horsepower must meet Tier 4 final standards; equipment with engines less than 140 horsepower must meet Tier 2 standards and be equipped with diesel particulate filters (DPFs); at least 80 percent of haul trucks (i.e., trucks used to remove or deliver backfill soil, excavated soil, and demolition debris) used must have 2010 or newer engines; and all diesel haul trucks and off-road equipment must use renewable diesel. With use of off-road equipment that meets minimum emission standards, construction-related emissions of NOx (and other criteria air pollutants) would be reduced commensurate with the degree of compliance achieved. **Table 4.8-9** presents mitigated daily engine exhaust emissions assuming implementation of feasible supplemental emissions control compared with emission significance thresholds. Such emission controls would reduce total NO_x emissions by 75 percent and daily emissions to below the threshold of significance during Years 2, 4, and 5. However, daily NO_x emissions would still exceed the threshold during Years 1 and 3. As indicated in Table 4.8-9, NOx emissions in Year 1 would be 72 pounds per day under mitigated conditions, which exceeds the significance threshold of 54 pounds per day by 18 pounds per day; in Year 3, emissions would be 55 pounds per day, exceeding the threshold by 1 pound per day. During Year 1, demolition, site preparation, and soil excavation would occur. During Year 3, peak facilities construction would occur with two work shifts and extended work hours. (See Section 2.6 in Chapter 2, *Project Description*, for a detailed description of proposed construction activities and schedule.) Thus, with implementation of Mitigation Measure M-AQ-1a, NOx impacts would be less than significant during Years 2, 4, and 5 but would remain significant for NO_x emissions in Years 1 and 3, even with implementation of the supplemental construction emissions controls.

Because construction-related emissions of NOx would remain significant in certain years even with implementation of Mitigation Measure M-AQ-1a (Construction Emissions Minimization) **Mitigation Measure M-AQ-1b (Emission Offsets)** would also be required in order to reduce the residual NOx emissions by an average of 18 pounds per day in Year 1 and 1 pound per day in Year 3. Mitigation Measure M-AQ-1b would require the SFPUC to offset remaining emissions to below significance thresholds by either implementing a specific offset program (e.g., equipment replacement), funding the implementation of an emissions reduction project through payment of a mitigation offset fee to the BAAQMD's Bay Area Clean Air Foundation,[81] or a combination of the two approaches, in an amount sufficient to mitigate residual construction NOx emissions. As discussed above under Section 4.8.2, Regulatory Framework, the BAAQMD administers the Carl Moyer program within the SFBAAB, which established the cost-effectiveness criteria for funding emissions

[81] In 2008, the BAAQMD's Board of Directors created the nonprofit Bay Area Clean Air Foundation to support the BAAQMD's mission by funding programs that reduce emissions and educate community members about air quality in the Bay Area. The BAAQMD's mission is to create a healthy breathing environment for every Bay Area resident while protecting and improving public health, air quality, and the global climate.

TABLE 4.8-9
TOTAL CONSTRUCTION-RELATED CRITERIA AIR POLLUTANT EMISSIONS AND AVERAGE DAILY EMISSIONS – MITIGATED

Year	Source	Total Criteria Air Pollutant Emissions (pounds)			
		ROG	**NO_x**	**PM_{10}**	**$PM_{2.5}$**
Year 1	Off-Road Equipment[a]	1,714	8,270	148	148
Year 2		1,958	8,355	154	154
Year 3		1,795	7,437	140	140
Year 4		1,455	6,455	113	113
Year 5		819	4,967	73	73
Year 1	On-Road Trucks and Vehicles[b]	551	10,355	28	27
Year 2		529	3,377	14	13
Year 3		729	6,986	25	23
Year 4		781	3,842	23	22
Year 5		639	3,514	20	19
Years 4 and 5	Architectural Coating - Off-Gassing[c]	2,230	--	--	--
Years 1 and 5	Paving - Off-Gassing[d]	22	--	--	--
	Total Emissions	13,222	63,559	738	731
Year	**Days of Construction Per Year**	**Average Daily Construction Emissions (pounds/day)**			
		ROG	**NO_x**	**PM_{10}**	**$PM_{2.5}$**
Year 1	260	8.7	**72**	0.7	0.7
Year 2	260	10	45	0.7	0.6
Year 3	260	10	**55**	0.6	0.6
Year 4	260	13	40	0.5	0.5
Year 5	260	10	33	0.4	0.4
	Total Length of Project Construction[e] (days)	1,300			
	Daily Emissions Averaged Over All Construction Years	10	49	0.6	0.6
Significance Thresholds		54	54	82	54
Emissions Above Thresholds (indicated in bold)?		No	**Yes** (Years 1 and 3 only)	No	No

NOTES: Emissions over threshold levels are in **bold**.
ROG = reactive organic gases; NO_x = nitrogen oxides; PM_{10} = particulate matter of 10 microns in diameter or less; $PM_{2.5}$ = particulate matter of 2.5 microns in diameter or less; VDECS = verified diesel emission control strategy; DPF = diesel particulate filter

[a] Assumes use of Tier 4 Engines on larger equipment (140 horsepower or greater) and Tier 2 Engines + DPF (Level 3 VDECS) on smaller equipment (less than 140 horsepower) in off-road equipment as well as use of renewable diesel in all diesel off-road equipment.
[b] Assumes (a) use of renewable diesel in all diesel on-road haul trucks and (b) that 80 percent of haul trucks would have 2010 or newer engines.
[c] Architectural coating was assumed to occur during Years 4 and 5.
[d] Paving at 1550 Evans Avenue was assumed to occur in Year 1. Paving otherwise associated with the project was assumed to occur during Year 5.
[e] Construction duration is expected to be 60 months.

SOURCE: Ramboll Environ, *Air Quality Technical Report, Biosolids Digester Facilities Project Draft EIR*, March 2017 (Table 4c).

reduction projects at $18,030 per weighted ton of ROG, NOx and PM emissions.[82] The Carl Moyer guidelines can be used to evaluate other emissions reduction projects within the SFBAAB that are administered by the Strategic Incentive Division of BAAQMD. As specified in Mitigation Measure M-AQ-1b, the mitigation offset fee is determined by the amount of emissions, expressed in tons per year; the remaining construction emissions offset required is 2.3 tons per year of ozone precursors. The 2.3 tons per year of ozone precursors reduction is based on the construction-related NOx emissions exceeding the significance threshold that would occur under mitigated conditions during Year 1 of construction and assumes implementation of feasible supplemental emissions controls. As described above, NOx emissions in Year 1 would exceed the significance threshold by 18 pounds per day. Assuming construction occurs 260 days per year, 18 pounds per day is equivalent to 2.3 tons per year. This amount, which is well above the 1 pound per day NOx exceedance that would occur during Year 3 of construction, would also provide sufficient offset for the Year 3 exceedance. However, whether implementation of Mitigation Measure M-AQ-1b would fully offset excess NOx emissions cannot be confirmed at this time for two reasons. First, the SFPUC is in the process of determining whether there are enough opportunities available for upgrading existing SFPUC facilities sufficient to achieve the needed offset to reduce this impact to below the significance threshold. Second, although implementation of emissions offsets via the mitigation offset fee would result in an agreement with a third party, the BAAQMD, that agreement depends in part on the actions of that third party, and thus is not fully within the City’s control. Therefore, the residual impact of construction emissions is conservatively considered significant even with implementation of identified mitigation measures.

It is difficult to predict the magnitude of health effects from the project’s exceedance of significance criteria for regional NOx emissions.[83] However, the increase in emissions associated with the BDFP represents less than 0.01 percent of total SFBAAB regional NOx emissions (49 pounds per day, on average, compared to 316 tons per day in the SFBAAB region in 2011[84]). Although Table 4.8-1 indicates that the most stringent applicable ozone standards were not exceeded at the Potrero Hill monitoring station between 2011 and 2015, the SFBAAB region experienced an average of 8.6 days of exceedance per year between 2011 and 2015.[85] As an ozone precursor, the BDFP’s NOx increases could contribute to new or exacerbated air quality violations in the SFBAAB region by contributing

82 The following equation is used to calculate the Weighted Emissions Reductions: Weighted Emissions Reductions = NOx reductions (tons/year) + ROG Reductions (tons/year) + (20 x [PM Reductions (tons/year)]). On March 27, 2015, CARB updated the cost-effectiveness limit to $18,030 (ARB mail-out announcement available online at https://www.arb.ca.gov/msprog/mailouts/msc1509/msc1509.pdf).

83 Several factors influence health impacts associated with NOx, including the concentrations of ground-level ozone in the atmosphere, the duration of exposure, average volume of air breathed per minute, the length of intervals between short-term exposures, and the sensitivity of the person to the exposure (The World Bank Group, *Pollution Prevention and Abatement Handbook 1998: Toward Cleaner Production*, pp. 227–230, 1999. Available online at http://www.ifc.org/wps/wcm/connect/0f8fe18048855d738f04df6a6515bb18/PPAH.pdf?MOD=AJPERES&CACHEID=0f8fe18048855d738f04df6a6515bb18. Accessed on September 9, 2016; AirNow, *Air Quality Guide for Ozone,* August 2015. Available online at www.airnow.gov/index.cfm?action=pubs.aqiguideozone. Accessed on September 9, 2016; AirNow, *Air Quality Guide for Ozone,* August 2015. Available online at www.airnow.gov/index.cfm?action=pubs.aqiguideozone. Accessed on September 9, 2016).

84 Bay Area Air Quality Management District, *Annual Bay Area Emissions Inventory Summary Report for Criteria Air Pollutants: Base Year 2011, Table 3,* page 5, May 2014. Available online at http://www.baaqmd.gov/research-and-data/emission-inventory/criteria-air-pollutants. Accessed on September 9, 2016.

85 Bay Area Air Quality Management District, *Annual Bay Area Air Quality Summaries*, 2015. Available online at http://www.baaqmd.gov/about-air-quality/air-quality-summaries. Accessed on September 9, 2016.

to more days of ozone exceedance or result in AQI values that are unhealthy for sensitive groups and other populations. As shown in Table 4.8-2, the SFBAAB has averaged between 8 and 17 days per year that are considered unhealthy for sensitive groups and had three unhealthy (red) days total between 2010 and 2015. On unhealthy days, persons are recommended to avoid both prolonged and heavy exertion outdoor activities.[86]

Summary of Impact AQ-1

Construction of the project would generate emissions of fugitive dust and criteria air pollutants. The SFPUC, through its contractors, would be required to implement dust control measures in compliance with the requirements of the Construction Dust Control Ordinance, and therefore, construction-related air quality impacts due to fugitive dust would be ***less than significant***.

The SFPUC, through its contractors, would also be required to implement emissions control measures in compliance with the requirements of the Clean Construction Ordinance. With these control measures, estimated average daily construction emissions of ROG, PM_{10}, and $PM_{2.5}$ would be below the applicable thresholds during all five construction years. Emissions of NO_x, however, would exceed the applicable significance thresholds. Implementation of Mitigation Measure M-AQ-1a (Construction Emissions Minimization) would help to reduce NO_x emissions, but not to below the applicable significance threshold during the first and third construction years. Implementation of Mitigation Measure M-AQ-1b (Emission Offsets) could offset the residual NO_x emissions to below significance thresholds. While use of waivers allowed under Mitigation Measure M-AQ-1a could alter the residual NO_x emissions requiring offsets under Mitigation Measure M-AQ-1b, use of these waivers is not expected to occur frequently enough to alter the amount of offsets that would be required under Mitigation Measure M-AQ-1b. Although implementation of these two mitigation measures combined would mitigate NO_x emissions to below threshold levels, construction-related NO_x emissions are considered ***significant and unavoidable with mitigation*** for the reasons stated above (i.e., uncertainty of availability of sufficient offset opportunities and reliance on an agreement with a third party).

Mitigation Measure M-AQ-1a. Construction Emissions Minimization

The SFPUC's contractors shall comply with the following:

A. ***Engine Requirements.***

1. All off-road equipment with larger engines (greater than or equal to 140 horsepower) shall meet United States Environmental Protection Agency (USEPA) or California Air Resources Board (CARB) Tier 4 Final off-road emission standards, while equipment with smaller engines (less than 140 horsepower) shall meet or exceed Tier 2 off-road emission standards and be equipped with diesel particulate filters (DPFs), which is equivalent to a Level 3 verified diesel emission control strategy (VDECS).

2. At least 80 percent of haul trucks (i.e., trucks used to remove or deliver backfill soil, excavated soil, and demolition debris) used must have 2010 or newer engines.

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[86] U.S. Environmental Protection Agency, *Air Quality Index, A Guide to Air Quality and Your Health*, February 2014. Available online at www.epa.gov/airnow/aqi_brochure_02_14.pdf. Accessed on September 9, 2016.

3. All diesel-powered haul trucks and off-road equipment must use renewable diesel.

B. ***Waivers.***

1. Pursuant to the Clean Construction Ordinance, the SFPUC General Manager (GM) or designee may waive the alternative source of power requirement if an alternative source of power is limited or infeasible at the project site. If the SFPUC GM grants the waiver, the contractor shall submit documentation that the equipment used for on-site power generation meets the requirements of Subsection (A)(1).

2. The SFPUC GM or designee may waive the equipment requirements of Subsection (A)(1) but only under any of the following unusual circumstances: if a particular piece of off-road equipment with Tier 4 Final standards or CARB Level 3 VDECS is technically not feasible; the equipment would not produce desired emissions reduction due to expected operating modes; installation of the equipment would create a safety hazard or impaired visibility for the operator; or there is a compelling emergency need to use off-road equipment that is not retrofitted with a CARB Level 3 VDECS. If the SFPUC GM or designee grants the waiver, the contractor shall use the next cleanest piece of off-road equipment, according to the following table:

Compliance Alternative	Engine Emission Standard
1	Tier 4 Interim
2	Tier 3
3	Tier 2

NOTES: How to use the table: If the SFPUC GM or designee determines that the equipment requirements cannot be met, then the contractor shall meet Compliance Alternative 1. If the SFPUC GM or designee determines that the contractor cannot supply off-road equipment meeting Compliance Alternative 1, then the contractor shall meet Compliance Alternative 2. If the SFPUC GM or designee determines that the contractor cannot supply off-road equipment meeting Compliance Alternative 2, then the contractor shall meet Compliance Alternative 3.

Mitigation Measure M-AQ-1b. Emission Offsets

During the five-year construction period and prior to project completion, the SFPUC, with the oversight of the Planning Department, shall implement either of the following two options or a combination of both:

1. Directly implement a specific offset program (such as replace equipment) to achieve reductions of 2.3 tons per year of ozone precursors, subject to Environmental Review Officer (ERO) approval. To qualify under this mitigation measure, the specific emissions retrofit project must result in emissions reductions within the San Francisco Bay Area Air Basin (SFBAAB) that are real, surplus, quantifiable, enforceable, and would not otherwise be achieved through compliance with existing regulatory requirements or any other legal requirement. Prior to implementation of the offset project, the SFPUC must obtain Planning Department's approval of the proposed offset project by providing documentation of the estimated amount of emissions of 2.3 tons per year of ozone precursors within the SFBAAB from the emissions reduction project(s). The project sponsor shall notify the Planning Department within six months of completion of the offset project for verification.

2. Pay a mitigation offset fee to the Bay Area Air Quality Management District's (BAAQMD) Bay Area Clean Air Foundation (Foundation) in an amount to be determined at the time of the impact. The mitigation offset fee will be no less than $18,030 per weighted ton of ozone precursors per year requiring emissions offsets plus an administrative fee of no less than 5 percent, to fund one or more emissions reduction projects within the SFBAAB. This fee will be determined by the Planning Department in consultation with the SFPUC and BAAQMD and based on the type of projects available at the time of impact. This fee is intended to fund emissions reduction projects to achieve reductions of 2.3 tons per year of ozone precursors.

   For this option, the SFPUC is required to enter into a Memorandum of Understanding (MOU) with the BAAQMD's Foundation. The MOU will include details regarding the funds to be paid, administrative fee and the timing of the emissions reductions project. Acceptance of this fee by the BAAQMD shall serve as an acknowledgment and commitment by the BAAQMD to: (1) implement an emissions reduction project(s) within a time frame to be determined based on the type of project(s) selected, after receipt of the mitigation fee to achieve the emission reduction objectives specified above; and (2) provide documentation to the ERO and the SFPUC describing the amount of and the project(s) funded by the mitigation fee, including the amount of emissions of NOx reduced (tons per year) within the SFBAAB from the emissions reduction project(s). If there is any remaining unspent portion of the mitigation offset fee following implementation of the emission reduction project(s), the SFPUC shall be entitled to a refund in that amount from the BAAQMD. To qualify under this mitigation measure, the specific emissions reduction project must result in emission reductions within the SFBAAB that are real, surplus, quantifiable, enforceable, and would not otherwise be achieved through compliance with existing regulatory requirements or any other legal requirement.

Criteria Air Pollutants – Project Operation

Impact AQ-2: During project operations, net changes in criteria air pollutant emissions would not result in any new violations of air quality standards, contribute to an existing or projected air quality violation, or result in a cumulatively considerable net increase in criteria air pollutants. (Less than Significant)

Criteria air pollutant emissions from BDFP operations would primarily result from operation of proposed energy recovery and biosolids treatment facilities, rather than motor vehicle trips.

Changes in Emissions

Total and net changes in operational-related criteria air pollutant emissions associated with existing operations and the project were estimated using (1) BAAQMD records data for existing SEP facilities, (2) USEPA AP-42 emissions factors to estimate emissions from existing facilities to be decommissioned as part of the project as well as proposed equipment to be added, (3) manufacturer specifications for proposed equipment, and (4) BAAQMD Best Available Control Technology (BACT) standards for proposed equipment. Estimated emissions from these sources and their derivations are presented in the AQTR.

There are several existing stationary sources of criteria air pollutants that would be decommissioned as part of project implementation:

- A cogeneration engine;
- Sludge handling process unit (comprised of two GBTs);
- Nine anaerobic digesters and two waste gas burners (or flares);[87]
- A sludge dewatering facility; and
- Three hot water boilers.

In addition to removing these existing stationary emission sources, the project would add the following stationary emission sources:

- Two gas turbines (one duty and one future standby);
- Two backup steam boilers (both standby);
- One emergency diesel engine;
- Five anaerobic digesters and two enclosed waste gas burners (both standby);
- One odor control system; and
- Four microturbines (three duty/one standby which are estimated to be brought online in 2031).

Net changes in emissions associated with the addition of these new facilities in combination with removal of existing sources are represented in the 2023 start-up year and 2045 horizon year. **Table 4.8-10** presents existing daily and annual emissions associated with these existing facilities[88] as well as new emissions associated with project facilities.

Project facilities would be operational as early as 2023. As shown in Table 2-10 in Chapter 2, *Project Description*, following construction there would be a transition period to phase out existing facilities and bring new facilities online. During the first six months of this transition period, performance testing (start-up) of the new facilities would be conducted. This was modeled in the air quality analysis by assuming that (a) neither the existing cogeneration engines nor the proposed turbine would operate, but that 50 percent of the existing digester gas production would be burned using the existing waste gas burners and 50 percent would be burned through the proposed waste gas burners; and (b) the backup boiler would operate on natural gas instead of digester gas. Performance testing would be followed by approximately 24 months of full facility commissioning, during which both old and new biosolids treatment systems would operate concurrently. As the new systems are tested, stabilized, and optimized, the BDFP would gradually increase its share of the solids treatment, while the old systems would be phased out. The period when existing and proposed biosolids treatment

87 Waste gas burners are abatement for digesters and not considered a separate emission source.

88 Three of the identified emission sources (sludge handling process unit, anaerobic digesters, and sludge dewatering facility) that are proposed to be removed under this project are part of the entire SEP operations but their emissions were not estimated by the BAAQMD. The BAAQMD only estimated the total organics emissions from all wastewater treatment plant operations, and did not estimate the emissions from individual operations. Therefore, the emissions associated with the sludge handling process unit, anaerobic digesters, and sludge dewatering facility were assumed to be zero for purposes of estimating existing operational emissions for this analysis. This method is conservative as it leads to lower existing operational emissions and a higher net increase in criteria pollutants attributable to project emissions.

TABLE 4.8-10
PROJECT-RELATED NET OPERATIONAL CRITERIA AIR POLLUTANT EMISSIONS

Daily Emissions for Each Operating Scenario			Net Daily Emissions (pounds/day)			
			ROG	**NOx**	**PM10**	**PM2.5**
Existing (2014)[a]		Total	28	118	9.3	9.3
Future with Project	Performance Testing (2023)[b]	Total	54	76	20	20
		Project Impact (Net Change)[c]	*27*	*(42)*	*11*	*11*
	Full Operation (2023)[d]	Total	11	128	25	25
		Project Impact (Net Change)[c]	*(17)*	*10*	*15*	*15*
	Full Operation (2045)[e]	Total	3.8	133	25	25
		Project Impact (Net Change)[c]	*(24)*	*14*	*16*	*16*
Significance Threshold (pounds/day)			54	54	82	54
Net Emissions Above Threshold?			*No*	*No*	*No*	*No*
Annual Emissions for Each Operating Scenario			**Net Annual Emissions (tons/year)**			
			ROG	**NOx**	**PM10**	**PM2.5**
Existing (2014)[a]		Total	5.0	22	1.7	1.7
Future with Project	Performance Testing (2023)[b,f]	Total	9.9	14	3.6	3.6
		Project Impact (Net Change)[c]	*4.9*	*(7.7)*	*1.9*	*1.9*
	Full Operation (2023)[d,f]	Total	2.0	23	4.5	4.5
		Project Impact (Net Change)[c]	*(3.1)*	*1.8*	*2.8*	*2.8*
	Full Operation (2045)[e]	Total	0.69	24	4.6	4.6
		Project Impact (Net Change)[c]	*(4.3)*	*2.6*	*2.9*	*2.9*
Significance Threshold (tons/year)			10	10	15	10
Net Emissions Above Threshold?			*No*	*No*	*No*	*No*

NOTES:

ROG = reactive organic gases; NO_X = nitrogen oxides; PM_{10} = particulate matter of 10 microns in diameter or less; $PM_{2.5}$ = particulate matter of 2.5 microns in diameter or less; BDFP = Biosolids Digester Facilities Project; BAAQMD = Bay Area Air Quality Management District; SEP = Southeast Water Pollution Control Plant

Numbers in parentheses (x) indicate a reduction in emissions.

[a] The existing operational scenario is based on the emissions during the 2014 year of operation of existing BDFP facilities (the most recent full year of emissions data that was available from the BAAQMD at the time the Notice of Preparation was issued for the BDFP environmental impact report [EIR]). Emissions from existing facilities are represented by emissions from the cogeneration engine, two waste gas burners/flares, and two hot water boilers.

[b] The 2023 performance testing represents emissions when new equipment would be brought online. During this period, neither the existing cogeneration engines nor the proposed turbine would operate, but 50 percent of the existing biogas production would be burned using existing waste gas burners, while 50 percent would be burned using the proposed waste gas burners. Additionally, the backup boiler would operate on natural gas instead of digester gas.

[c] Existing biosolids processing facilities at the SEP currently emit criteria pollutants and these are represented by "Existing (2014)" emissions. Because these existing facilities would be decommissioned and replaced by project facilities, project-related emissions would be the net change from existing emissions to future (with project) emissions under the three different operating scenarios listed in this table.

[d] The 2023 Full Operation Scenario represents emissions from project sources (such as turbines) that are fully operational, with the exception of the future equipment and the microturbines, which are not expected to be installed or operate until future years (starting in 2031). When $PM_{2.5}$ emissions under this scenario (associated with turbine emissions) are compared to $PM_{2.5}$ emissions during performance testing (associated with emissions from waste gas burners), it appears that $PM_{2.5}$ emissions would increase, but this increase is not expected to actually occur to the degree indicated in this table because it is based a manufacturer guaranteed emission factor for the proposed turbine, which is very conservative. The turbine should never exceed this value, and therefore it would likely operate with much lower emissions.

[e] The 2045 Full Operation Scenario would increase emissions due to the increased biogas production – a function of population growth. To accommodate the projected biogas increase, three microturbines would be added and the hours of operation of the boilers would be increased. By 2045, a backup turbine would be installed and the waste gas burners are expected to only operate in emergency situations.

[f] The emissions reflect 12 months of performance testing and 12 months of full operation (since emissions are shown in tons per year), although the 2023 scenario would more likely consist of 6 months of performance testing and 6 months of full operation in 2023.

SOURCE: Ramboll Environ, *Air Quality Technical Report, Biosolids Digester Facilities Project Draft EIR*, March 2017 (Table 14).

systems would operate concurrently was not explicitly modelled since the amount of digester gas (which powers energy recovery equipment and generates attendant emissions) remains fixed. The assumption that the BDFP facilities would process 100 percent of the digester gas is conservative since NOx and PM emissions from the project equipment are assumed to be greater than from the existing equipment.[89] Full facility commissioning is expected to be complete in 2025. Although the transition period could last up to three years, emissions modeling was completed only for the performance testing period. Assuming six months of performance testing and six months of full project operation for 2023 is a conservative but realistic scenario that reflects the highest expected emissions for the one year that any performance testing occurs. (If the performance testing were to occur over a period longer than six months, emissions would be lower than those presented here.)

Existing biosolids processing facilities at the SEP currently emit criteria pollutants, and these are represented by "Existing (2014)" emissions listed in Table 4.8-10. The project would replace existing solids processing and energy recovery facilities emissions sources with new equipment. Therefore, the total operational emissions associated with the project would be the net changes in emissions, or the difference between emissions from the new project sources and emissions from existing sources to be decommissioned. Table 4.8-10 presents the net changes in daily and annual operational emissions associated with the project. The net changes in criteria pollutant emissions are presented for the performance testing (six months in 2023) and for when project facilities are in full operation in the remaining six months in 2023 and in 2045. As shown in Table 4.8-10, during performance testing in 2023, ROG, PM_{10}, and $PM_{2.5}$ emissions would increase over existing emissions, but NO_x emissions would decrease based on the equipment assumed to be operating. Once project facilities are fully operational in 2023, ROG emissions would decrease and would continue to decrease through 2045, while NO_x would increase and continue to increase through 2045. PM_{10} (and $PM_{2.5}$)[90] emissions would also increase in 2023 and continue to increase through 2045. Nevertheless, for daily and annual emissions, project-related net changes in criteria pollutant emissions would not exceed the applicable significance thresholds. Therefore, operation of the BDFP would not violate an air quality standard, contribute substantially to an air quality violation, or result in a cumulatively considerable net increase in criteria air pollutants within the SFBAAB.

Summary of Impact AQ-2

As shown in Table 4.8-10, operational emissions associated with the project would not exceed any of the significance thresholds for criteria air pollutants. The project's impact with respect to causing new violations of air quality standards, contributing to an existing or projected air quality violation, or causing a cumulatively considerable net increase in criteria air pollutants during operations would therefore be ***less than significant***.

Mitigation: None required.

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[89] Turbine emissions are based on manufacturer guaranteed emission factors operating continuously (8,760 hours per year) at full capacity. A manufacturer guaranteed emission factor is conservative as the turbine should never exceed this value, and therefore the turbine would likely operate with much lower NOx and PM emissions. As such, higher NOx and PM emissions are a result of conservative assumptions made in this analysis.

[90] PM2.5 emissions are assumed to be equal to PM10 emissions.

Toxic Air Contaminants – Project Construction and Operation

Impact AQ-3: Construction and operation of the project would generate toxic air contaminants, including diesel particulate matter, but would not expose sensitive receptors to substantial air pollutant concentrations or result in a cumulatively considerable net increase in health risks or hazards. (Less than Significant)

Construction TAC Sources

The project would require construction activities for the approximate five-year construction period. Project construction activities would result in short-term emissions of DPM and other TACs over this five-year period. The project site is located in an area that already experiences poor air quality, and project construction activities would generate additional air pollution, affecting nearby sensitive receptors.

Operational TAC Sources

As indicated above under Impact AQ-2, the project would involve the decommissioning of several existing stationary sources and the addition of several new stationary sources of TAC emissions. Existing sources of TAC emissions to be decommissioned include a cogeneration engine, sludge handling process unit (comprised of two GBTs), nine anaerobic digesters, two waste gas burners (or flares), a sludge dewatering facility, and three hot water boilers. New stationary sources of TAC emissions associated with BDFP facilities include two gas turbines (one duty and one future standby), two backup steam boilers (both standby), one emergency diesel engine, five anaerobic digesters, two enclosed waste gas burners (both standby), one odor control system, and four microturbines (three duty/one standby which would be brought online in 2031).

The primary sources of TACs from proposed facilities would be associated with energy recovery (turbine, microturbines, waste gas burners, boilers, emergency diesel generator), anaerobic digestion (digester gas), and odor control. Examples of stationary-source air toxics include DPM, 3-methylchloranthrene, 7,12-dimethylbenz(a)anthracene, benz(a)anthracene, benzene, benzo(a)-pyrene, benzo(b)fluroanthene, benzo(k)fluoranthene, 1,3-butadiene, carbon tetrachloride, vinyl chloride, diesel particulate matter, formaldehyde, acetaldehyde, acrolein, naphthalene, and chloroform.

Health Risk Assessment

Both construction-related and operational sources considered in the health risk analysis include DPM and TOG emissions from diesel equipment and on-road vehicles, and operational TAC emissions from the project's stationary sources (including periodic testing of the backup diesel generator that is part of the Energy Recovery Facility).[91] If the proposed backup diesel generator is larger than 50 horsepower, it would require a permit from the BAAQMD and must comply with the Airborne Toxic Control Measure for Stationary Compression Ignition Engines. For construction emissions, the project was analyzed assuming use of Tier 2 equipment with DPFs.

[91] Under California regulatory guidelines, DPM is used as a surrogate measure of carcinogen exposure for the mixture of chemicals that make up diesel exhaust as a whole.

Changes to Air Pollution Exposure Zone Boundaries

As described in Section 4.8.1.4, the project site and its vicinity are located in the APEZ and Health Vulnerability zip code 94124, which indicates that the area already experiences poor air quality due to emissions from various stationary and mobile sources in the area. The San Francisco Community Risk Reduction Plan model (CRRP-HRA) indicates that the existing background excess cancer risk ranges from 7 to 143 cases per million within 1 kilometer (km, equal to 0.6 mile) of the project, while the existing background $PM_{2.5}$ concentration ranges from 8.1 to 10.6 μg/m^3 within 1 km of the project.[92]

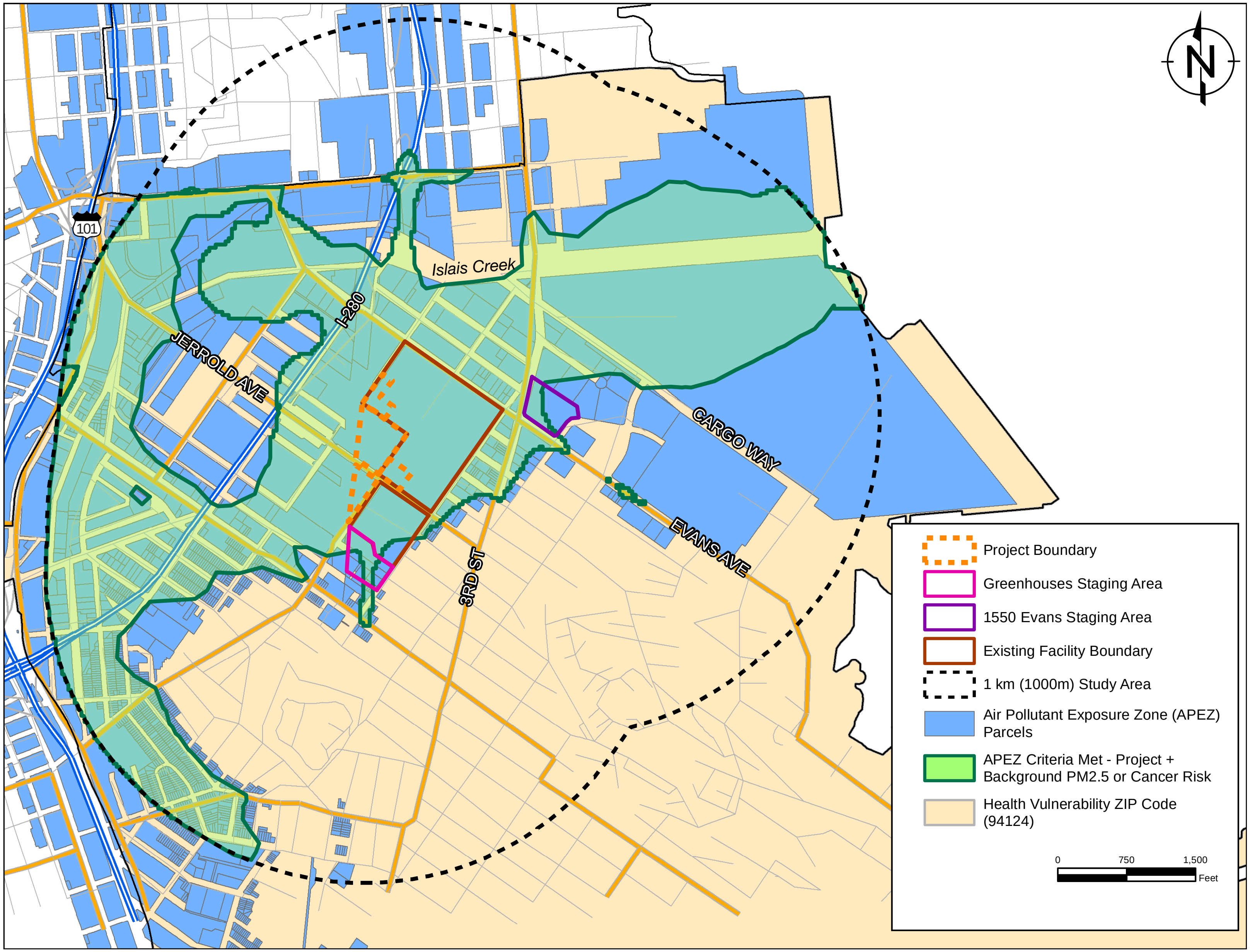
The presence of an APEZ at a sensitive receptor location is a significant health risk impact. The thresholds of significance used to evaluate the cancer risk from new sources of TACs are based on the potential for the BDFP to substantially affect the extent and severity of an APEZ at sensitive receptors (i.e., whether the project would expand the existing boundaries of an APEZ or substantially contribute to existing health risks at sensitive receptors already within an APEZ).[93] For sensitive receptors previously located outside an APEZ, but brought into the APEZ by the BDFP's impact, thresholds of 10 per million for excess cancer risk and $PM_{2.5}$ concentration of 0.3 μg/m3 are applied to determine if the project would have a considerable contribution to the significant cumulative impact. For sensitive receptors already located within an APEZ, thresholds of 7.0 per million for excess cancer risk and $PM_{2.5}$ concentration of 0.2 μg/m3 are applied to determine if the project would have a considerable contribution to the significant cumulative impact. (Table 4.8-7, above, provides more background information on these thresholds.)

Figure 4.8-5 indicates where project-related construction and operational emissions increases would potentially expand the APEZ for both $PM_{2.5}$ or cancer risk. Figure 4.8-5 shows the existing APEZ (in blue shading) which is defined by areas where either (a) the background $PM_{2.5}$ exceeds 9.0 μg/m^3 inside the Health Vulnerability zip code or 10 μg/m^3 outside the Health Vulnerability zip code or (b) the background cancer risk exceeds 90 per million inside the Health Vulnerability zip code or 100 per million outside the Health Vulnerability zip code.[94] The green shaded area shows the same information but for the sum of the background-plus-project impacts. As shown in Figure 4.8-5, the area resulting from project implementation (green shaded area) would not extend beyond areas already within the APEZ (blue-shaded area). Since the project would not expand the APEZ boundaries, project construction and operations would not significantly affect sensitive receptors in the project vicinity.

92 The CRRP-HRA takes into account the cumulative contribution of localized health risks to sensitive receptors from sources included in the city-wide modeling, which includes stationary sources such as diesel-fueled standby generators within 1 km of the project and major roadways (carrying over 10,000 vehicles per day, as defined by the BAAQMD). The CRRP-HRA background cancer risk levels were then adjusted to include existing stationary sources at the SEP that were not modeled in the CRRP-HRA but would be removed as part of the project (including waste gas flares and the cogeneration engine). Additionally, the boilers, which are already included in the CRRP-HRA, were remodeled in their exact locations and with building downwash to get an adjusted existing risk that is more comparable to calculated risks for the project. The CRRP-HRA risks were also scaled by a factor of approximately 1.4 to be consistent with health assumptions in the California Office of Environmental Health Hazard Assessment (OEHHA) 2015 Guidance Manual since they were originally calculated with the 2003 Guidance Manual.

93 As indicated in Table 4.8-7, in zip codes not designated as Health Vulnerability zip codes, the APEZ delineates areas that are subject to background excess cancer risk greater than 100 per million and PM2.5 concentrations in excess of 10 μg/m^3. In zip codes designated as Health Vulnerability zip codes, the APEZ area is redefined as areas that are subject to background excess cancer risk greater than 90 per million and PM2.5 concentrations in excess of 9.0 μg/m^3.

94 The existing APEZ boundaries (blue shading) shown in Figures 4.8-2 and 4.8-5 were updated to account for the revised 2015 OEHHA guidance for calculating excess cancer risk for a residential receptor. This was done by scaling existing cancer risk by a calculated factor of 1.3744.



SOURCE: BAAQMD, San Francisco Department of Public Health, and San Francisco Planning Department, The San Francisco Community Risk Reduction Plan: Technical Support Documentation, December 2012; Ramboll-Environ consulting analysis for the BDFP, 2017.

SFPUC Biosolids Digester Facilities

Figure 4.8-5
Project-Related Changes in Combined (PM2.5 and Cancer Risk) Air Pollutant Exposure Zone in Project Vicinity

Cancer Risk

Table 4.8-11 presents the excess cancer risks associated with project construction and operation as well as background cancer risk from existing sources within the 1-km area.[95] As shown in this table, the BDFP's construction and operational emissions would result in a lifetime excess cancer risk of 3.8 per million at the maximum receptor (with highest levels to the east). When existing facilities to be decommissioned are subtracted from project-related emissions, the project's net excess cancer risk would range between less than (<) 0.1 and 3.4 per million.[96] The maximally exposed individual sensitive receptor (MEISR) (greatest excess cancer risk at sensitive receptor locations) for the project occurs east of the project site. More specific details on the health risk calculations and methodology are provided in the AQTR for this project.[97]

When the project's net increase in excess cancer risk within the existing APEZ is added to the background cancer risk (as reflected in the CRRP-HRA model), the net combined excess cancer risk at receptors already within the APEZ would increase by <0.1 to 3.4 per million (from 69 to 102 per million to 69 to 105 per million; see Table 4.8-11). With implementation of Mitigation Measure M-AQ-1a (Construction Emissions Minimization, not required to reduce this impact but required to reduce Impact AQ-1), the project's net combined excess cancer risk within the existing APEZ would decrease from <0.1 to 3.4 per million to <0.1 to 1.7 per million. The combined excess cancer risk is compared to the existing APEZ to determine whether any new areas would exceed either 90 or 100 per million.[98] The project's impact would be considered cumulatively considerable if new areas were added to the APEZ <u>and</u> if the project's contribution to the excess cancer risk exceeded the threshold of 7.0 or 10 per million (discussed above). As shown on Figure 4.8-5, the project's impacts do not expand the APEZ, and no new sensitive receptors would be added to the APEZ. In addition, the project's construction-related and operational net increase in cancer risk of <0.1 to 3.4 per million (or <0.1 to 1.7 per million with mitigation) would not exceed the 7 per million threshold.

For areas outside the APEZ, the project's estimated net increase in excess cancer risk (<0.1 to 1.8 per million) due to construction-related and operational emissions would not exceed the project-level significance thresholds for cancer risk of 10 per million at receptors located within 1 km of the site. With implementation of Mitigation Measure M-AQ-1a, the project's estimated net increase in excess cancer risk would be further reduced to <0.1 to 1.6 per million.[99]

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95 Long-term health impacts (cancer risk and $PM_{2.5}$ concentrations) are evaluated at sensitive receptors, and the maximum impact for each is called the MEISR (maximally exposed individual sensitive receptor).

96 The range shown here represents the minimum and maximum net excess cancer risks due to the project at receptors within the 1-km study area. This analysis evaluated two 30-year exposure scenarios. The risks shown represent 30-year exposure of a resident commencing at the time of project construction in 2018 and continuing to include exposure to project operation. A scenario representing 30-year exposure of a resident commencing at the time of project operations in 2023 was also analyzed in the AQTR (results were lower).

97 Ramboll Environ, *Air Quality Technical Report, Biosolids Digester Facilities Project Draft EIR*, March 2017. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2015.000644ENV.

98 The lower cumulative significance thresholds for excess cancer risk are applied to sensitive receptors within APEZs and also in Health Vulnerability areas (as indicated by zip code 94124), while the higher thresholds represent cumulative thresholds specified for areas within APEZs but outside Health Vulnerability zip codes.

99 If waivers under Mitigation Measures M-AQ-1a are exercised, the mitigated excess cancer risk would be greater than the mitigated level (<0.1 to 1.6 per million) but less than the unmitigated level (<0.1 to 1.8 per million).

TABLE 4.8-11
PROJECT-RELATED NET CANCER RISKS – PROJECT CONSTRUCTION AND OPERATION

Source	Net Excess Cancer Risks (Cases Per Million)	
	With Project[a]	**Mitigated**[a]
Adjusted Existing CRRP-HRA Background[b]	102	85[b]
Project Construction	3.8	1.7
Project Operation[c]	0.4	0.3
Less Existing Operations to be Decommissioned[d]	(0.7)	(0.4)
Total Net Project Excess Cancer Risk at All Sensitive Receptors within 1-km Area	3.4	1.7
Total Combined Excess Cancer Risk at All Sensitive Receptors within 1-km Area	105	87
Cumulative Significance Thresholds[e]	90 / 100	90 / 100
Do Total Combined Emissions Exceed Either Cumulative Threshold?	Yes / Yes	No / No
Project-Level Significance Thresholds[f]	7.0 / 10	7.0 / 10
Do Total Project Emissions Exceed Either Project-Level Threshold?	No / No	No / No

NOTES:
CRRP-HRA = San Francisco Community Risk Reduction Plan Health Risk Assessment; km = kilometer
Numbers in parentheses (x) indicate a reduction in emissions.

[a] The AQTR analysis evaluates two 30-year exposure scenarios for cancer risk. The risks shown here represent the 30-year exposure of a resident commencing at the time of project construction in 2018 (5 years) and continuing to include exposure to project operation (25 years). A lower risk representing the 30-year exposure of a resident commencing at the time of project operations in 2023 is presented in the AQTR. For construction emissions, the "With Project" case (corresponding to the “Uncontrolled” case in the Air Quality Technical Report [AQTR]) assumes use of Tier 2 equipment with diesel particulate filters (DPFs), as required by the San Francisco Clean Construction Ordinance, and the project’s net increase in cancer risk would be less than significant. With implementation of Mitigation Measure M-AQ-1a (required to reduce Impact AQ-1), the "Mitigated" case (corresponding to the “Controlled” case in the AQTR) assumes use of Tier 4 Final equipment for all equipment greater than or equal to 140 horsepower, while equipment less than 140 horsepower is assumed to be Tier 2 equipment with a DPF. "Mitigated" emissions also assume (a) use of renewable diesel for all diesel off-road equipment and on-road diesel haul trucks and (b) that 80 percent of haul trucks would have 2010 or newer engines.

[b] The background levels for cancer risk from existing nearby stationary sources were obtained from the San Francisco Community Risk Reduction Plan (CRRP-HRA) geodatabase. The CRRP-HRA risks were adjusted to include existing stationary sources at the Southeast Water Pollution Control Plant (SEP) that were not modeled in the CRRP-HRA but would be removed as part of the project (including waste gas burners and the cogeneration engine). Additionally, the boilers, which are already included in the CRRP-HRA, were remodeled in their exact locations and with building downwash to get an adjusted existing risk that is more comparable to calculated risks for the project. The CRRP-HRA risks were also scaled by a factor of approximately 1.4 to be consistent with health assumptions in the California Office of Environmental Health Hazard Assessment (OEHHA) 2015 Guidance Manual since they were originally calculated with the 2003 Guidance Manual. Background cancer risk is at the maximally exposed individual sensitive receptor (MEISR). The locations of the maximum project impacts are different for the “with project” and “mitigated” cases, which is why the background values are not the same for both.

[c] Cancer risk is at the MEISR or maximum combined receptor. Cancer risk is based on the project’s operational toxic air contaminant (TAC) emissions at full operation for all years from the proposed turbine (one duty/one future standby), microturbines, two backup boilers (two standby), emergency diesel engine, two waste gas burners, and solids odor control system. TAC emissions from the existing waste gas burners are also included since they would operate during the six-month performance testing in 2023.

[d] Cancer risk is at the MEISR or maximum combined receptor. The adjusted cancer risk from the existing operational sources that would be decommissioned and replaced by project facilities was subtracted from the risk to calculate net project cancer risk. Existing health risks are based on existing operational TAC emissions from existing waste gas burners, cogeneration engine, and boilers.

[e] The lower cumulative significance threshold for excess cancer risk is applied to sensitive receptors within APEZs and also in Health Vulnerability areas (as indicated by zip code 94124), while the higher threshold represents the cumulative threshold specified for areas within APEZs but outside Health Vulnerability zip codes.

[f] The lower project-level significance threshold for excess cancer risk represents the threshold for sensitive receptor locations within the APEZ under existing and cumulative conditions, while the higher threshold represents the threshold for sensitive receptor locations not within the APEZ under existing conditions but brought into the APEZ as a result of the project.

SOURCE: Ramboll Environ, *Air Quality Technical Report, Biosolids Digester Facilities Project Draft EIR*, March 2017.

Therefore, the project's combined cancer risk would be less than significant, and no mitigation would be necessary. Although the impact would be less than significant, implementation of controls specified in Mitigation Measure M-AQ-1a (Construction Emissions Minimization to reduce Impact AQ-1) would reduce the project's less-than-significant impact by decreasing the project's net increase in cancer risk from <0.1 to 3.4 per million to <0.1 to 1.7 per million, which would also be less than significant. Additionally, the combined or cumulative excess cancer risk of 69 to 87 per million would not exceed the 90 or 100 per million threshold, and therefore would also be less than significant.

PM2.5 Concentrations

Table 4.8-12 presents the $PM_{2.5}$ emissions associated with project construction and operation as well as background $PM_{2.5}$ from existing sources within the 1-km area. As indicated in this table, the BDFP's construction-related $PM_{2.5}$ emissions (2018 to 2023) would result in $PM_{2.5}$ concentrations at sensitive receptors within 1 km of the BDFP site of <0.1 $\mu g/m^3$ (without and with implementation of Mitigation Measure M-AQ-1a). The project's net operational $PM_{2.5}$ emissions (2023 to 2045) would result in $PM_{2.5}$ concentrations at sensitive receptors within 1 km of the BDFP site ranging between -0.2 and 0.1 $\mu g/m^3$ (the receptor with the lowest project impact and highest project impact). The BDFP would result in the MEISR (highest $PM_{2.5}$ levels at sensitive receptor locations) to the east of the project site. More specific details on the $PM_{2.5}$ calculations and methodology are provided in the AQTR for this project.[100]

As indicated in Table 4.8-12, when the project's construction-related increase in $PM_{2.5}$ emissions of <0.1 $\mu g/m^3$ is added to the existing background $PM_{2.5}$ concentration of 9.1 $\mu g/m^3$ (as reflected in the CRRP-HRA model),[101] the combined $PM_{2.5}$ concentration would increase to 9.2 $\mu g/m^3$. While background $PM_{2.5}$ concentrations for some receptors already exceed 9.0 $\mu g/m^3$ and are thus in the APEZ due their location within a Health Vulnerability zip code, the addition of project-related construction emissions would not exceed the significance threshold of 0.2 $\mu g/m^3$.

With implementation of controls specified in Mitigation Measure M-AQ-1a (Construction Emissions Minimization), the project's net construction-related $PM_{2.5}$ contributions would decrease slightly (<0.1 $\mu g/m^3$), such that the combined $PM_{2.5}$ level would remain at 9.2 $\mu g/m^3$.

When the project's future operational $PM_{2.5}$ contributions/reductions (2023 to 2045) of -0.2 to 0.1 $\mu g/m^3$ (at the receptors with the lowest and highest contributions from the project) are added to background $PM_{2.5}$ concentrations of 8.9 $\mu g/m^3$, $PM_{2.5}$ levels would increase to a maximum of 9.0 $\mu g/m^3$.

[100] Ramboll Environ, *Air Quality Technical Report*, *Biosolids Digester Facilities Project Draft EIR*, March 2017. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2015.000644ENV.

[101] The CRRP-HRA takes into account the cumulative contribution of localized health risks to sensitive receptors from sources included in the city-wide modeling, which includes stationary sources such as diesel-fueled standby generators within 1 km of the project and major roadways (carrying over 10,000 vehicles per day, as defined by the BAAQMD). In addition, project-related operational PM2.5 emissions are adjusted for contributions from existing stationary sources at the SEP that were not included in the CRRP-HRA.

TABLE 4.8-12
PROJECT-RELATED $PM_{2.5}$ CONCENTRATIONS –
PROJECT CONSTRUCTION AND OPERATION

Source	Maximum Annual $PM_{2.5}$ Concentrations ($\mu g/m^3$)[a]		
	Construction, With Project[b]	Construction, Mitigated[b]	Operational
CRRP-HRA Background $PM_{2.5}$[c]	9.1	9.1	8.9
Net Project $PM_{2.5}$ Concentrations[d]	<u><0.1</u>	<u><0.1</u>	<u>0.1</u>
Total Combined $PM_{2.5}$ Concentrations	9.2	9.2	9.0
Cumulative Significance Thresholds[e]	9.0/10	9.0/10	9.0/10
Do Total Combined Emissions Exceed Cumulative Thresholds?	Yes/No	Yes/No	No/No
Project-Level Significance Thresholds[f]	0.2/0.3	0.2/0.3	0.2/0.3
Do Total Project Emissions Exceed Project-Level Thresholds?	No/No	No/No	No/No

NOTES:
CRRP-HRA = San Francisco Community Risk Reduction Plan Health Risk Assessment; $PM_{2.5}$ = particulate matter of 2.5 microns in diameter or less; $\mu g/m^3$ = micrograms per cubic meter
Numbers in parentheses (x) indicate a reduction in emissions.

a $PM_{2.5}$ concentration is reported as a maximum annual value. Since $PM_{2.5}$ concentrations are evaluated over a shorter period (annually), the construction-related and operational impacts are evaluated separately for $PM_{2.5}$. For Construction, the concentration is reported for Year 4, which is the construction year with the highest $PM_{2.5}$ concentration. For Operational impacts, $PM_{2.5}$ concentration is reported for the maximum year, which is during performance testing in 2023.

b For construction emissions, the "With Project" case assumes use of Tier 2 equipment with diesel particulate filters (DPFs), as required by the San Francisco Clean Construction Ordinance. With implementation of Mitigation Measure M-AQ-1a, the "Mitigated" case assumes use of Tier 4 Final equipment for all equipment greater than or equal to 140 horsepower. Equipment less than 140 horsepower is assumed to be Tier 2 equipment with a DPF. "Mitigated" emissions also assume(a) use of renewable diesel for all diesel off-road equipment and on-road diesel haul trucks and (b) that 80 percent of haul trucks would have 2010 or newer engines.

c The background levels for $PM_{2.5}$ concentrations from existing nearby stationary sources were obtained from the San Francisco Community Risk Reduction Plan (CRRP-HRA) geodatabase. The background levels are different for the construction and operational scenarios since the maximally-exposed individual sensitive receptors (MEISRs) are at different locations.

d The $PM_{2.5}$ concentrations from the existing operational sources were adjusted from the value calculated in the San Francisco Risk Reduction Plan (CRRP-HRA) by modeling the existing operational sources in their actual locations and adding building downwash. These sources are proposed to be replaced by project facilities; therefore, this adjusted value was subtracted from project-related $PM_{2.5}$ concentrations to calculate net project $PM_{2.5}$ concentrations.

e The lower cumulative significance thresholds for $PM_{2.5}$ concentrations are applied to sensitive receptors within Air Pollutant Exposure Zones (APEZs) and also in Health Vulnerability areas (as indicated by zip code 94124), while the higher thresholds represent cumulative thresholds specified for areas within APEZs but outside Health Vulnerability zip codes.

f The lower project-level significance thresholds for $PM_{2.5}$ concentrations represent thresholds specified for Health Vulnerability areas (as indicated by specified zip codes) within APEZs, while the higher thresholds represent thresholds specified for areas within APEZs but outside Health Vulnerability zip codes.

SOURCE: Ramboll Environ, *Air Quality Technical Report, Biosolids Digester Facilities Project Draft EIR*, March 2017.

In order to determine whether the project's construction-related or operational contributions to background levels are considered significant, the project's contribution must be compared to the project-level significance thresholds for $PM_{2.5}$ concentrations. When compared to both the 0.2 and 0.3 $\mu g/m^3$ project-level threshold levels for $PM_{2.5}$ for sensitive receptors located within and outside of the APEZ (and within and outside the Health Vulnerability zip code 94124), respectively, the project's construction-related and operational $PM_{2.5}$ concentrations would be less than significant since construction-related and operational concentrations, with and without Mitigation Measure M-AQ-1a would not exceed either threshold level.

Summary of Impact AQ-3

Both construction and operation of the project would generate emissions of $PM_{2.5}$ and toxic air contaminants, including DPM. Project-related construction and operational emissions increases would not expand APEZ boundaries or create new APEZs. The project-specific HRA indicated that the project's net construction-related and operational cancer risk as well as $PM_{2.5}$ concentrations would not exceed significance thresholds at sensitive receptors within 1 km of the BDFP site. Therefore, the project's impact would be ***less than significant***.

Mitigation: None required.

Consistency with Clean Air Plan – Project Construction and Operation

Impact AQ-4: The project's construction-related air pollutant emissions could conflict with, or obstruct implementation of, the *2010 Clean Air Plan*. (Less than Significant with Mitigation)

The most recently adopted air quality plan in the SFBAAB is the BAAQMD's *2010 Clean Air Plan*. The *2010 Clean Air Plan* is a road map showing how the San Francisco Bay Area will achieve compliance with the state 1-hour ozone standard as expeditiously as practicable, and how the region will reduce transport of ozone and ozone precursors to neighboring air basins. The primary goals of the *2010 Clean Air Plan* are to (1) reduce emissions and decrease concentrations of harmful pollutants, (2) safeguard the public health by reducing exposure to air pollutants that pose the greatest health risk, and (3) reduce GHG emissions. To meet the primary goals, the *2010 Clean Air Plan* recommends specific control measures and actions. These control measures are grouped into various categories and include stationary and area source measures, mobile source measures, transportation control measures, land use measures, and energy and climate measures. The *2010 Clean Air Plan* recognizes that, to a great extent, community design dictates individual travel mode, and that a key long-term control strategy to reduce emissions of criteria pollutants, air toxics, and GHGs from motor vehicles is to channel future Bay Area growth into vibrant urban communities where goods and services are close at hand and people have a range of viable transportation options.

Project Relationship to 2010 Clean Air Plan Control Measures

The *2010 Clean Air Plan* includes 55 control measures aimed at reducing air pollution in the SFBAAB. The control measures most applicable to the project are the stationary source control measures and land use and local impact measures, which are intended to reduce public health impacts associated with air pollution, as well as the energy and climate measures, which reduce air pollutant and GHG emissions by promoting energy efficiency and renewable energy production. The project's relationship to applicable *2010 Clean Air Plan* control measures is as follows:

- **Mobile Source Control Measures.** The *2010 Clean Air Plan* includes 10 mobile source measures (MSMs) that reduce emissions by accelerating the replacement of older, dirtier vehicles and equipment through programs such as the BAAQMD's Vehicle Buy-Back and Smoking Vehicle programs, and promoting advanced technology vehicles that reduce emissions of criteria pollutants and/or GHGs. Since the CARB is responsible for establishing statewide motor vehicle emissions standards and fuel specifications, implementation of the 10 MSMs relies heavily upon incentive programs, such as the Carl Moyer Program and the Transportation Fund for Clean Air, to achieve voluntary emission reductions in advance of, or in addition to, CARB requirements. Of the 10 MSMs, three would pertain to the project. One measure relates to use of off-road construction equipment (MSM C-1, Construction and Farming Equipment), while two relate to use of on-road heavy duty vehicles (MSM B-1, HDV Fleet Modernization, and MSM B-2, Low NOx Retrofits for In-Use Engines). MSM C-1 calls for incentives to retrofit construction equipment with DPM filters or upgrade to Tier 3 or 4 engines and use of renewable alternative fuels in applicable equipment. MSM B-1 encourages replacement or retrofit of on-road heavy-duty diesel engines in advance of CARB regulatory requirements, while MSM B-2 encourages installation of retrofit devices that reduce NOx emissions for older heavy-duty engines (model years 1994-2006). The project would be consistent with MSM C-1 because construction equipment associated with the project would be equipped with DPM filters, as required by the Clean Construction Ordinance. With implementation of Mitigation Measure M-AQ-1a, the project would be consistent with MSM B-1 and B-2 because the SFPUC or its contractors would be required to implement the following measures: (1) equipment with engines greater than 140 horsepower would meet Tier 4 Final standards; (2) equipment with engines less than 140 horsepower would meet Tier 2 standards and be equipped with DPFs consistent with the Clean Construction Ordinance; (3) at least 80 percent of haul trucks used would have 2010 or newer engines; and (4) all diesel-powered haul trucks, off-road equipment, and on-road vehicles would use renewable diesel. Therefore, with implementation of Mitigation Measure M-AQ-1a, the project would be consistent with these *2010 Clean Air Plan* control measures.

- **Stationary Source Control Measures.** The project includes stationary sources, and the *2010 Clean Air Plan* includes stationary source control measures (SSMs) to enhance the BAAQMD's regulatory program. The BAAQMD's regulatory program includes the New Source Review program and the Air Toxics Hot Spots program. Measures SSM 17 (Revise Regulation 2, Rule 2: New Source Review) and SSM 18 (Revise Regulation 2, Rule 5: New Source Review for Air Toxics) support implementation of more stringent requirements through these programs based on revisions to OEHHA risk factors and methodologies. This analysis uses the more stringent 2015 OEHHA guidance in evaluating the project's health risks and hazards. As indicated in Impact AQ-3, the project's stationary source emissions would not exceed the more stringent thresholds outlined in the 2015 OEHHA guidance, indicating the project's consistency with these *2010 Clean Air Plan* control measures.

- **Land Use and Local Impact Measures.** The *2010 Clean Air Plan*'s land use and local impact measures include establishing appropriate CEQA significance thresholds (Measure LUM 3, Enhanced CEQA Program) and establishing a system to track cumulative health risks from all emissions sources in impacted communities (as identified by the BAAQMD's Community Air Risk Evaluation [CARE] program) in order to monitor progress in reducing population exposure (Measure LUM 5, Reduced Risk in Impacted Communities). As part of the CARE program, communities most affected by air pollution are identified. In support of this program, the City completed the CRRP which included a city-wide HRA, described above in Section 4.8.3.2. The CRRP-HRA provides the basis for the designation of APEZs in San Francisco and establishes more stringent criteria for projects located within these zones. Designation of APEZs and application of more stringent criteria in these areas in identifying the project's health risk impacts as less than significant reflect the project's consistency with the *2010 Clean Air Plan*'s land use and local impact measures, which are intended to protect public health and reduce health risks in impacted communities.

The BAAQMD designates eastern San Francisco as a CARE impacted community, and the project is located within this area. Most of the designated APEZs and Health Vulnerability zip codes are located within the CARE community boundary identified by the BAAQMD as eastern San Francisco. Projects within APEZs are subject to more stringent project-level significance thresholds for excess cancer risk and $PM_{2.5}$ concentrations, and this analysis uses these more stringent significance thresholds in determining the significance of the project's health risks and hazards and reducing the project's impact to be consistent with these threshold levels.

- **Energy and Climate Measures.** The *2010 Clean Air Plan*'s energy and climate measures (Measures ECM 1, Energy Efficiency, and ECM 2, Renewable Energy) promote energy efficiency and renewable energy for purposes of both air quality and climate protection. With respect to energy efficiency and renewable energy, the project would result in an increase in energy demand, but this increase would be offset by the project's increased energy generation from digester gas and the provision of solar panels (ultimately resulting in a surplus of energy), efficiency and conservation (see Section 4.18, Mineral Resources, Energy Resources, and Water Use, Impact ME-2, for more discussion). In addition, the project would directly increase production of renewable energy from digester gas and indirectly increase utilization of renewable energy by making more renewable energy from hydropower available to other Hetch Hetchy hydropower customers (see Section 4.9, Greenhouse Gas Emissions, Impact C-GG-1, for more discussion).

Examples of projects that could cause the disruption or delay of these *2010 Clean Air Plan* control measures are projects involving stationary sources that would be allowed to exceed threshold levels in APEZs and Health Vulnerability zip codes, or projects that would preclude transit improvements such as the extension of a transit line or bike path.

The project's operational criteria pollutant and TAC emissions would not exceed threshold levels, and project implementation would not preclude the extension of a transit line or a bike path or any other transit improvement. However, the project's construction-related NOx emissions would exceed threshold levels during all five years of construction, a significant impact. With implementation of Mitigation Measures M-AQ-1a (Construction Emissions Minimization) and M-AQ-1b (Emissions Offsets) combined, NOx emissions would be reduced and/or offset, but not necessarily to a less-than-significant level for the reasons stated in Impact AQ-1 (uncertainty of availability of sufficient offset opportunities; reliance on an agreement with a third party). Although construction-related NO_x emissions are considered to be significant and unavoidable with mitigation in Impact AQ-1, this significance determination does not necessarily indicate a significant conflict with the *2010 Clean Air Plan.* The project's consistency with the *2010 Clean Air Plan* is determined by other factors such as a project's consistency with pertinent measures, as described above. Based on the project's consistency with these measures, the project would not conflict with or obstruct implementation of the *2010 Clean Air Plan* because it would not hinder the plan's ability to meet its primary goals to reduce emissions and harmful pollutants, safeguard public health, and reduce GHG emissions.

Project Relationship to Draft 2017 Clean Air Plan Control Measures

In January 2017, the BAAQMD released the Draft *2017 Clean Air Plan* for public review.[102,103] The plan's primary goals are to protect public health and protect the climate. The plan includes a wide range of proposed control measures, which consist of actions to reduce combustion-related activities, decrease fossil fuel combustion, improve energy efficiency, and decrease emissions of potent GHGs. Numerous measures address reduction of several pollutants: ozone precursors, particulate matter, air toxics, and/or GHGs. Other measures focus on a single type of pollutant, potent GHGs such as methane and black carbon, or harmful fine particles that affect public health. Of the 84 control measures outlined in Draft *2017 Clean Air Plan*, draft stationary source control measures that pertain to the project include the following:

- SS23, Digester Gas Flares, which calls for development of a new BAAQMD rule to reduce NOx from non-refinery flares and investigate the potential for more stringent limits on emissions from non-refinery flares. Implementation of the project would reduce flaring of digester gas through provision of an energy recovery facility, which would be consistent with this draft control measure (see Section 4.9, Greenhouse Gas Emissions, Impact C-GG-1, for more discussion).
- SS21, New Source Review for Toxics, which was approved in December 2016, revised BAAQMD Rule 2-5, New Source Review of Toxic Air Contaminants, and the BAAQMD's HRA trigger levels for each TAC using the OEHHA's 2015 Health Risk Assessment Guidelines and CAPCOA's 2015 Risk Management Guidance. As indicated above, this analysis uses the more stringent 2015 OEHHA guidance in evaluating the project's health risks and hazards. As indicated in Impact AQ-3, the project's stationary source health impacts would not exceed thresholds outlined in the 2015 OEHHA guidance and therefore the project's impact on health risks would be less than significant, reflecting the project's consistency with this draft control measure.

Draft transportation (mobile source) control measures that pertain to the project include the following:

- TR19, Medium- and Heavy-Duty Trucks, directly provides and encourages organizations to provide incentives for purchasing new trucks that exceed the CARB's 2010 NOx emission standards for heavy-duty vehicles, new hybrid trucks, and new zero-emission trucks. With implementation of Mitigation Measure M-AQ-1a, which would require that at least 80 percent of haul trucks have 2010 or newer engines, the project would be consistent with this draft control measure.
- TR22, Construction and Farming Equipment, which provides incentives for early deployment of electric, Tier 3 and Tier 4 off-road engines used in construction equipment. With implementation of Mitigation Measure M-AQ-1a, the project would be consistent with this draft control measure.

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[102] BAAQMD, *Draft 2017 Clean Air Plan, Spare the Air, Cool the Climate,* 2017. Available online at http://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/baaqmd_2017_cap_draft_122816-pdf.pdf?utm_campaign=CAP+2017+Draft&utm_medium=email&utm_content=article3_link1. Accessed on January 13, 2017.

[103] On April 19, 2017, the BAAQMD approved the 2017 CAP, but at that time, the Draft EIR text was going to print. If the final 2017 CAP differs from the draft 2017 CAP described in the Draft EIR, the relevant updates will be reflected in the Final EIR.

Draft water control measures that pertain to the project include the following:

- WR1, Limit GHGs from POTWs (publicly owned treatment works), which calls for initiating a process to better understand and quantify GHG emissions at POTWs, exploring rulemaking to reduce GHG emissions from POTWs, and promoting the use of digester gas recovery systems at POTWs. The project's proposed energy recovery facility would be consistent with this control measure.

The project's operational criteria pollutant and health impacts would not exceed threshold levels (consistent with 2015 OEHHA guidance), and Mitigation Measures M-AQ-1a and M-AQ-1b would require the project to reduce construction-related emissions or offset excess emissions so that they do not exceed significance thresholds. Construction-related health impacts would not exceed thresholds. With implementation of these mitigation measures, the project would not conflict with or obstruct implementation of the Draft *2017 Clean Air Plan* because it would not hinder the draft plan's ability to meet its primary goals to protect public health and the climate.

Summary of Impact AQ-4

The project would be consistent with the adopted *2010 Clean Air Plan* and Draft *2017 Clean Air Plan* because it would not hinder either plan in meeting its primary goals. Additionally, with implementation of Mitigation Measures M-AQ-1a and M-AQ-1b, the project would be consistent with the *2010 Clean Air Plan*'s control measures, including mobile/stationary source measures, land use/local impact measures, and energy/climate measures, as well as the Draft *2017 Clean Air Plan's* transportation, stationary source, and water control measures. Therefore, the mitigated project would not conflict with or obstruct implementation of the *2010 Clean Air Plan*, and the impact would be ***less than significant with mitigation***.

> **Mitigation Measures M-AQ-1a. Construction Emissions Minimization and M-AQ-1b. Emission Offsets** (see Impact AQ-1).

Odors During Project Construction and Operation

Impact AQ-5: Construction and operation of the BDFP facilities would not create objectionable odors that would affect a substantial number of people. (Less than Significant)

Odors During Project Construction

During construction, diesel exhaust from construction equipment would generate some odors at various locations within and around the project site vicinity. However, construction-related odors would be temporary and variable, depending on the construction activities, and would not persist upon project completion. In addition, the project would involve commonly used construction techniques and materials, which are not particularly odorous. Thus, construction activities would not be expected to create objectionable odors affecting a substantial number of people, and the impact would be less than significant.

Odors During Project Operation

Decommissioning of Existing Facilities

Following construction, there would be a 24-month period during which the new and the existing biosolids treatment systems would be commissioned and decommissioned, respectively. The decommissioning of existing solids handling facilities would involve (among other things) emptying, cleaning, and disconnecting existing structures. Facilities and equipment at the SEP are periodically emptied and cleaned, either as part of regularly scheduled maintenance activities or to address equipment failure, and several odor incidents at the SEP have been linked to such activities.[104] Similarly, decommissioning of existing solids handling equipment could also result in odor incidents. The SFPUC would continue existing practices to limit the potential for odors to emanate off-site during emptying and cleaning operations (e.g., washdown of exposed sludge, application of a layer of water to act as an odor barrier) as well as continue ongoing monitoring and odor incident response practices. Unlike some previous odor incidents that have been associated with digester cleanout in response to equipment failure, the proposed facility decommissioning and associated odor control measures and preventive action(s) would be planned in advance and implemented to minimize the potential for odor problems. Therefore, decommissioning activities would not be expected to create objectionable odors that could affect a substantial number of people, and the impact would be less than significant.

Full Operation – Proposed Facilities

Changes in Existing and Proposed Facilities Associated with Odor. As described in Section 4.8.1.6, SEP solids treatment facilities are an existing source of odors in the vicinity of the SEP. The project would replace the existing solids treatment system with new biosolids handling facilities at a new location farther away from residences. For comparison, under existing conditions, residences are less than 100 feet from the digesters. With the project, the proposed Solids Pretreatment Facility (the closest solids handling facility to residences) would be approximately 900 feet from the nearest residence on Phelps Street. Similarly, digester gas handling facilities would be located approximately 1,000 feet from the nearest residences (refer to Figure 2-5 in Chapter 2, *Project Description*), compared to approximately 200 feet under current conditions. As described in Chapter 2, Section 2.4.1.6, the BDFP includes the Solids Odor Control Facility. All of the solids treatment facilities identified as an existing odor source (see Table 4.8-3) or otherwise associated with an odor incident (see Table 4.8-4) would be taken out of service and replaced with new facilities, and all new odor sources would be served by the new Solids Odor Control Facility. Figure 2-7 in Chapter 2 depicts the specific unit processes (e.g., thickening, screening) from which odorous air would be collected via a system of ducts and fans, and subsequently treated.

Proposed Odor Control. As indicated in Section 4.8.3.2, the SFPUC adopted goals for the BDFP that odor control facilities would be designed to meet the 5 D/T design criterion with 99 percent compliance based on a 1-hour average.[105] The Solids Odor Control Facility is being designed to contain, treat, and disperse odors to meet this goal. The proposed odor control system would have

[104] Examples include cleanout of clarifiers and maintenance of a heat exchanger at Building 620 (Digester Group 1 Control Building).
[105] SFPUC, *Biosolids Digester Facilities Project Alternatives Analysis Report*, December 2014.

redundant features to help the BDFP meet the off-site odor goals during both routine maintenance and accidental shutdowns.[106] In addition, fans and ductwork would be slightly oversized to account for any future increases in odorous airflows. The specific odor control technologies proposed as part of the BDFP are described in **Table 4.8-13** and include carbon adsorption with potassium permanganate, biofiltration, and ammonia scrubbers. The SFPUC selected these technologies in part because of their low risk of odor break-through, technology maturity, and reliability.[107] In its guidance to Bay Area agencies regarding air quality improvement methods, the BAAQMD identifies carbon adsorption, biofiltration, and ammonia scrubbers as effective methods to reduce odor impacts from wastewater treatment plants.[108] For the BDFP Solids Odor Control Facility, overall removal performance is estimated to be 99.98 percent removal of H_2S and 98.5 percent removal of general odor.[109]

Odor Modeling Results. The BDFP odor control facilities would be designed and constructed to meet the project's design standard of 5 D/T with 99 percent compliance based on a 1-hour average, and considering the demonstrated success of the proposed BDFP odor control technologies at other facilities, odors from the BDFP facilities are not expected to extend beyond the SEP boundary. Dispersion modeling was completed for the BDFP as part of the Odor Characterization Report to confirm the effectiveness of odor controls using the CALPUFF model (see Section 4.8.1.6, above for description). The modeling results determined that there would be no exceedances of the project's 5 D/T 99 percent design standard over five years outside the SEP boundary from BDFP sources. The maximum odor was found to be 3 D/T, which would occur along the western SEP property boundary near the railroad tracks. The modeling demonstrates that, in addition to meeting the BDFP's goal to limit odors to within the SEP's fence line, the project would also improve existing odor conditions.[110]

Future Monitoring. As part of proposed future operations, the potential for odor nuisance would also be reduced for BDFP facilities by odor monitoring for internal SFPUC operations and maintenance purposes and responding proactively to the monitoring data with odor control practices. The new odor control units proposed as part of the BDFP would also be subject to monitoring requirements and conditions in the BAAQMD's Permit to Operate (discussed in Section 4.8.2.3) for the purpose of abating any public nuisance from odors.

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[106] The biofilter is split into three modules or cells to allow for uninterrupted ventilation and treatment when one cell is out of service for media replacement or maintenance. Exhaust fans would be provided with a standby unit such that if one exhaust fan fails or must be removed for maintenance, the standby unit would provide uninterrupted operation. The adsorption polishing units also would have a redundant unit, allowing for uninterrupted ventilation and treatment when one unit is down for media replacement or maintenance.

[107] San Francisco Water Power Sewer, Sewer System Improvement Program – Odor Control Fact Sheet, December 2014.

[108] BAAQMD, *BAAQMD CEQA Air Quality Guidelines*, adopted May 2011, updated May 2012, pages 7-3 to 7-4. Available online at http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_Final_May%202012.ashx?la=en.

[109] San Francisco Water Power Sewer, Sewer System Improvement Program – Odor Control Fact Sheet, December 2014.

[110] CH2M Hill and Brown and Caldwell, Final Southeast Plant Odor Characterization Report, Section 5.2.2 Solid Process Sources, December 2015, *in* SFPUC, Final Biosolids Digester Facilities Project Conceptual Engineering Report, March 2016.

TABLE 4.8-13
BDFP PROPOSED ODOR CONTROL TECHNOLOGY

Technology	Description of Odor Control Technologies
Adsorption vessels - combination of virgin carbon and potassium permanganate blend	• ***Carbon adsorption*** uses activated carbon as the adsorption medium to remove odors, gases, and other VOCs. Activated carbon has a complex pore structure with a very large surface area. Odorous compounds are transferred from the air being treated to the surface of the carbon as the air is forced through the carbon bed. There is a physical attraction between the compound and the carbon that causes a bonding. The odor compounds will continue to adsorb onto the surface of the carbon until all the pore space in the carbon is used up, at which point odors will break through and the carbon has to be replaced (or reused after regeneration: restoring the adsorption capacity of the saturated activated carbon).[a] Chemical treatment using ***potassium permanganate*** is used to enhance the adsorbing properties of carbon. Potassium permanganate is an inorganic chemical compound that is a strong oxidizing agent. It removes contaminants and impurities by chemisorption.[b]
Biofilters - engineered media	• ***Biofiltration*** uses biological oxidation as the treatment mechanism. Microorganisms in media oxidize odor and air emission compounds, producing carbon dioxide, water, biomass, and benign by-products (i.e., chloride, sulfate). Biofilters work by routing odorous air through a porous filter media. The media functions as the contact surface area on which the microorganisms live and where the biological oxidation takes place.[c] The BDFP would use engineered media (as opposed to naturally occurring media such as lava rock or seashells), chosen for its known efficacy, odor removal efficiency, and preferable disposal interval. The microorganisms need water to remain active; the presence of water affects the transfer of the contaminants from the air to the media.
Ammonia scrubber tank and related equipment	• ***Ammonia scrubbers*** use packed bed adsorber to remove ammonia from a gas stream either by physical removal (injecting liquid into the air) or chemical removal (by chemical reaction). The Solids Odor Control Facility would include two ammonia scrubbers (one duty and one backup) primarily for removing ammonia gas produced during anaerobic digestion. Odorous air from post-digestion sources would flow through the ammonia scrubber before being routed to the biofilter and carbon adsorption media for additional odor removal. Due to the expected low vapor-phase ammonia levels at the BDFP, the proposed scrubber would primarily use water to remove ammonia with provision to use sulfuric acid to adjust pH and improve removal efficiency, if needed. Ammonia scrubbers are used by many industries to control emissions of ammonia gas, due to their demonstrated removal efficiencies of 99 percent.[d] In addition, low pH leachate from the biofilter would be used to lower pH at the ammonia scrubbers, resulting in reduced chemical use.

NOTES:
VOCs = volatile organic compounds; BDFP = Biosolids Digester Facilities Project

a CH2M Hill and Brown and Caldwell, Final Southeast Plant Odor Characterization Report, Section 5.2.2 Solid Process Sources, December 2015, *in* SFPUC, Final Biosolids Digester Facilities Project Conceptual Engineering Report, March 2016.
b Chemisorption is a process during which potassium permanganate media converts odorous air into harmless microscopic particles, which remain trapped in the media.
c Webster Environmental Associates, Inc., *Environmental and Odor Control Engineering,* January 2016.
d United States Environmental Protection Agency (USEPA), *Control and Pollution Prevention Options for Ammonia Emissions*, April 1995.

SOURCE: SFPUC, Final Biosolids Digester Facilities Project Conceptual Engineering Report, March 2016.

Summary of Impact AQ-5

Project construction activities would not be expected to create objectionable odors affecting a substantial number of people. During project operation, odors from the solids treatment facilities both inside and outside the SEP boundary are expected to improve compared to existing conditions. Based on the relocation of solids handling and digester gas handling facilities farther from sensitive receptors, design of proposed facilities, implementation of the proposed odor control features, and results of odor modeling, operation of the BDFP is not expected to create objectionable odors that would affect a substantial number of people, and this impact would be ***less than significant***.

Mitigation: None required.

Cumulative Impacts

As discussed above, regional air pollution is by its very nature a cumulative impact. Emissions from past, present, and future projects contribute to the region's adverse air quality on a cumulative basis. No single project by itself would be sufficient in size to result in regional non-attainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulative adverse air quality impacts.[111] The project-level thresholds for criteria air pollutants are based on levels by which new sources are not anticipated to contribute to an air quality violation or result in a considerable net increase in criteria air pollutants. For these reasons, the geographic scope of the cumulative impact analysis of criteria air pollutant emissions encompasses the SFBAAB.

Impact C-AQ-1a: Construction of the project, in combination with other past, present, and probable future projects, would result in a cumulatively considerable net increase in criteria air pollutants and contribute to cumulative regional air quality impacts. (Significant and Unavoidable with Mitigation)

Regional air pollution is by its very nature a cumulative impact. Emissions from past, present, and future projects contribute to the region's adverse air quality on a cumulative basis. No single project by itself would be sufficient in size to result in regional nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulative adverse air quality impacts.[112] The project-level thresholds for criteria air pollutants are based on levels by which new sources are not anticipated to contribute to an air quality violation or result in a considerable net increase in criteria air pollutants.

The project's construction-related criteria pollutant emissions would exceed the project-level threshold for NO_X, but would not exceed thresholds for other criteria pollutants (ROG, PM_{10}, and $PM_{2.5}$). With implementation of Mitigation Measure M-AQ-1a, the project's construction-related criteria air pollutant emissions (Impact AQ-1) would still exceed the project-level thresholds for NO_X for the first and third years of construction. Implementation of Mitigation Measure M-AQ-1b (Emission Offsets) could offset the residual NO_X emissions to below significance thresholds during these two construction years, but

[111] BAAQMD, *CEQA Air Quality Guidelines*, May 2011, page 2-1.
[112] Ibid.

construction-related NO_X emissions are considered significant and unavoidable with mitigation for reasons stated above (uncertainty of availability of sufficient offset opportunities; reliance on an agreement with a third party). Likewise, the project would also be considered to result in a cumulatively considerable contribution to regional air quality impacts even with implementation of mitigation measures identified for Impact AQ-1, and the cumulative impact is also considered significant and unavoidable with mitigation for the first and third years of construction, and less than significant with mitigation for all other construction years. Because the project's criteria pollutant emissions could result in a cumulatively considerable contribution to regional air quality impacts during the first and third years of construction, the cumulative impact of construction-related criteria pollutant emissions is considered ***significant and unavoidable with mitigation***.

Mitigation Measures M-AQ-1a. Construction Emissions Minimization and M-AQ-1b. Emission Offsets (see Impact AQ-1)

Impact C-AQ-1b: Operation of the project, in combination with other past, present, and probable future projects, would not result in a cumulatively considerable net increase in criteria air pollutants nor contribute to cumulative regional air quality impacts. (Less than Significant)

The project's net operational criteria pollutant emissions would not exceed threshold levels (Impact AQ-2), and therefore, the project also would not result in a cumulatively considerable contribution to regional air quality impacts, a ***less-than-significant*** impact.

Mitigation: None required

Impact C-AQ-2: Construction and operation of the project, in combination with other past, present, and probable future projects, would generate toxic air contaminants, including diesel particulate matter, but would not expose sensitive receptors to substantial air pollutant concentrations or result in a cumulatively considerable net increase in health risks and hazards. (Less than Significant)

The geographic scope of analysis of cumulative localized air pollutant exposure impacts from TAC emissions encompasses existing and new emissions sources (including diesel-fueled standby emergency generators) located within approximately 1 km of the project site. These emissions sources include those modeled in the CRRP-HRA as well as additional on- and off-site projects modeled specifically for the BDFP.[113] Although a zone encompassing TAC emission sources within a distance of 1,000 feet is typically applied,[114] a distance of 3,281 feet (1 km) from the project site and major roadways (carrying over 10,000 vehicles per day, as defined by the BAAQMD) was applied to be consistent with the CRRP methodology.

[113] On-site emissions sources modeled as part of the cumulative analysis include both construction-related and operational future sources of emissions that are expected to occur at the SEP, which are not included in the CRRP-HRA. Off-site emissions sources modeled for the BDFP cumulative analysis include construction projects within the vicinity of the SEP. (See footnotes 116 and 116 for listing of the projects evaluated.)

[114] Beyond 1,000 feet, the CARB has found that ground-level TAC emissions return to background levels. (California Air Resources Board, *Air Quality and Land Use Handbook: A Community Health Perspective,* April 2005, page C-3. Available online at http://www.arb.ca.gov/ch/handbook.pdf.)

As discussed above, the project site is located in an APEZ, which indicates that the area already experiences poor air quality. In addition to the project, there are 10 other SFPUC projects at the SEP ("on-site cumulative projects")[115] and 10 more projects located outside of the SEP boundary and within 1 km of the project ("off-site cumulative projects").[116] These projects have either been recently completed, are currently under construction, or are planned to be constructed so that their construction or operation could coincide with the construction or operation of the BDFP. The methodologies used to evaluate emissions for the project's construction and operational health risks as well as its contribution to cumulative health risks are the same as those used in Impact AQ-3, and they are based on the most recent guidance provided by the BAAQMD and other sources.[117]

Cancer Risk

Table 4.8-14 presents the cumulative cancer risks at nearby sensitive receptors from exposure to TAC emissions from the project in combination with existing sources within the 0.6-mile (1-km) area[118] as well as other cumulative projects. As indicated in this table, the maximum cumulative excess cancer risk is estimated as 166 cases per million persons exposed (the range of minimum to maximum excess cancer risk is 70 to 166 cases per million). The combined excess cancer risk at some receptors would exceed both 90 per million (within APEZ and Health Vulnerability zip code 94124) and 100 per million (within APEZ but outside this zip code), indicating a significant cumulative impact. With implementation of controls specified in Mitigation Measures M-AQ-1a (Construction Emissions Minimization, not required to reduce this impact but required to reduce Impact AQ-1), the cumulative net excess cancer risk would decrease to between 70 and 111 cases per million persons exposed at some receptors, and would still be in the APEZ. In order to determine whether the project's construction and operational contributions to the excess cancer risk are considered cumulatively considerable, the project's contribution must be compared to the project-level significance thresholds for cancer risk. When compared to both the 7.0 and 10 per million excess cancer risk thresholds for sensitive receptors located within and outside the APEZ, respectively, the project's excess cancer risk of <0.1 to 3.4 per million (and <0.1 to 1.7 per million with Mitigation

[115] The 10 other SFPUC on-site cumulative projects are SEP Headworks Replacement; SEP Chemical System Relocation and Facilities Upgrades; SEP Existing Digester Roof Repairs; SEP Building 521 Replacement/522 Disinfection Upgrade; SEP Power Feed and Primary Switchgear Upgrades; SEP Primary/Secondary Clarifier Upgrades; SEP Seismic Reliability and Condition Assessment Improvements; SEP Oxygen Generation Plant Replacement; Demolition of the Existing SEP Digesters and Southside Renovation Project; and Southeast Greenhouses Demolition located to the south of the project. Refer to Table 4.1-1 in Section 4.1, Overview, and Table 17 of the AQTR for more information on these projects.

[116] The 10 off-site cumulative projects are Central Bayside System Improvement Project; Central Shops Relocation and Land Reuse; Land Reuse – 1801 Jerrold Avenue; Kansas and Marin Streets Sewer Improvements; Southeast Outfall Islais Creek Crossing Replacement; Quint Street Bridge Replacement Project; Quint-Jerrold Connector Road; San Francisco Wholesale Produce Market Expansion; 1995 Evans Avenue; and Quint Street Lead Track. Refer to Table 4.1-1 in Section 4.1, Overview, and Table 17 of the AQTR for more information on these projects.

[117] BAAQMD, *Recommended Methods for Screening and Modeling Local Risks and Hazards*, May 2012. Available online at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/risk-modeling-approach-may-2012.pdf. Accessed on April 6,2017. ; Bhatia, Rajiv and Thomas Rivard, San Francisco Department of Public Health (SFDPH), *Assessment and Mitigation of Air Pollutant Health Effects from Intra-urban Roadways: Guidance for Land Use Planning and Environmental Review,* May 6, 2008, page 17; SFDPH, *Memorandum to File regarding 2014 Air Pollutant Exposure Zone Map,* April 9, 2014; BAAQMD, SFDPH, San Francisco Planning Department, *The San Francisco Community Risk Reduction Plan: Technical Support Documentation,* December 2012.

[118] Long-term cancer risk is evaluated at sensitive receptors and the maximum impact is at the MEISR.

Measure M-AQ-1a) would not exceed either threshold level, indicating that the project's contribution would be less than cumulatively considerable, a less-than-significant impact.

TABLE 4.8-14
CUMULATIVE LIFETIME CANCER RISKS

Source	Lifetime Excess Cancer Risks[a] (Cases Per Million)	
	With Project[b]	**Mitigated[b]**
Net Project Excess Cancer Risk (Construction + Operation – Existing)[c]	3.4	1.7
Cumulative Projects[d]	61	24
Adjusted CRRP-HRA Background[e]	102	85
Total Cumulative Excess Cancer Risk	166	111
Cumulative Significance Thresholds[f]	90/100	90/100
Do Total Cumulative Emissions Exceed Cumulative Thresholds?	Yes/Yes	Yes/Yes
Project-Level Significance Thresholds[g]	7.0/10	7.0/10
Do Total Project Emissions Exceed Project-Level Thresholds?	No/No	No/No

NOTES:

CRRP-HRA = San Francisco Community Risk Reduction Plan Health Risk Assessment

a Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to the emissions associated with the project was calculated based on the modeled annual average pollutant concentrations, the intake factor for resident child, the Cancer Potency Factors (CPF) for all toxic pollutants emitted, and the Age Sensitivity Factors (ASF).

b Since cancer risks are evaluated over a 30-year exposure period, the construction-related and operational impacts are evaluated together. For construction emissions, the "With Project" case assumes use of Tier 2 equipment with diesel particulate filters (DPFs), as required by the San Francisco Clean Construction Ordinance. With implementation of Mitigation Measure M-AQ-1a (required to reduce Impact AQ-1), the "Mitigated" case assumes use of Tier 4 Final equipment for all equipment greater than or equal to 140 horsepower. Equipment less than 140 horsepower is assumed to be Tier 2 equipment with a DPF. "Mitigated" emissions also assume (a) use of renewable diesel for all diesel off-road equipment and on-road diesel haul trucks, and (b) that 80 percent of haul trucks would have 2010 or newer engines. The locations of the maximum project impacts are different for the "with project" and "mitigated" cases, which is why the background values are not the same for both.

c The adjusted cancer risk from the existing operational sources that would be decommissioned and replaced by project facilities was subtracted from project's risk to calculate the net project cancer risks.

d The excess lifetime cancer risk from additional projects at the Southeast Water Pollution Control Plant (SEP) and in the surrounding area (within 1,000 meters) that would be under construction during the construction and operation of the Biosolids Digester Facilities Project (BDFP) were estimated.

e The background cancer risk from existing nearby stationary sources was obtained from the CRRP-HRA geodatabase. The Community Risk Reduction Plan-Health Risk Assessment (CRRP-HRA) cancer risk values were calculated with the 2003 California Office of Environmental Health Hazard Assessment (OEHHA) health risk assessment guidance. The CRRP-HRA risk shown here was scaled by a calculated factor of 1.3744 to account for the revised 2015 OEHHA guidance for calculating excess cancer risk for a residential receptor. The CRRP-HRA cancer risk was also adjusted to include existing stationary sources at the SEP that were not modeled in the CRRP-HRA but would be removed with this project, including waste gas flares and the cogeneration engine. Additionally, the boilers, which are already in the CRRP-HRA, were remodeled in their exact locations and with building downwash to get an adjusted existing risk that is more comparable to project calculated risks. The locations of the maximum project impacts are different for the "with project" and "mitigated" cases, which is why the background values are not the same for both.

f The lower cumulative significance thresholds for excess cancer risk are applied to sensitive receptors within Air Pollutant Exposure Zones (APEZs) and also in Health Vulnerability areas (as indicated by zip code 94124), while the higher thresholds represent cumulative thresholds specified for areas within APEZs but outside Health Vulnerability zip codes.

g The lower project-level significance threshold for excess cancer risk represents the threshold specified for sensitive receptor locations within the APEZ under existing and cumulative conditions, while the higher threshold represents the threshold for sensitive receptor locations not within the APEZ under existing conditions but brought into the APEZ as a result of the project.

SOURCE: Ramboll Environ, *Air Quality Technical Report, Biosolids Digester Facilities Project Draft EIR*, March 2017.

$PM_{2.5}$ Concentrations

Table 4.8-15 presents the $PM_{2.5}$ emissions associated with the project in combination with existing sources within the 0.6-mile (1-km) area[119] as well as other cumulative projects. As indicated in this table, the cumulative construction-related $PM_{2.5}$ emissions (without and with implementation of Mitigation Measure M-AQ-1a: Construction Emissions Minimization, required to reduce Impact AQ-1) would increase by a maximum increment of <0.1 for a maximum cumulative total of 9.2 $\mu g/m^3$, which would exceed the 9.0 $\mu g/m^3$ threshold for sensitive receptors located within the APEZ in the Health Vulnerability zip code, indicating a significant cumulative impact. Across all receptors, the cumulative total would range from 8.2 to 9.2 $\mu g/m^3$ (receptor with the minimum project impact and maximum project impact). In order to determine whether the project's construction-related contributions to $PM_{2.5}$ are cumulatively considerable, the project's contribution was compared to the project-level significance thresholds for $PM_{2.5}$. When compared to both the 0.2 and 0.3 $\mu g/m^3$ $PM_{2.5}$ thresholds for sensitive receptors located within the APEZ as well as within and outside the Health Vulnerability zip code 94124, respectively, the project's $PM_{2.5}$ concentrations of <0.1 $\mu g/m^3$ would not be cumulatively considerable since it would not exceed either threshold level. Therefore, the project's construction-related $PM_{2.5}$ contributions to this cumulative impact are considered less than cumulatively considerable, a less-than-significant impact.

With respect to operational emissions, when the project's operational $PM_{2.5}$ emissions are considered with background $PM_{2.5}$ levels from existing sources within 0.6 mile of the BDFP site and other cumulative projects, cumulative operational $PM_{2.5}$ concentrations would increase to between 8.9 and 9.0 $\mu g/m^3$, which would not exceed either the 9.0 and 10.0 $\mu g/m^3$ $PM_{2.5}$ concentrations required for an area to be determined an APEZ. Therefore, the project's contribution would not be cumulatively considerable, a less-than-significant impact.

Summary of Impact C-AQ-2

Cumulative increases in excess cancer risk from the project in combination with background risks and other development would exceed the cumulative threshold of 90 per million and 100 per million, indicating a significant cumulative impact. However, since the project's combined construction-related and operational cancer risks (without and with Mitigation Measure M-AQ-1a, which is not required to reduce this impact but required to reduce Impact AQ-1) would not exceed the project-level thresholds of 7.0 per million and 10 per million, the project's contribution to the cumulative cancer risks is considered to be less than cumulatively considerable, a ***less-than-significant*** impact.

Cumulative $PM_{2.5}$ increases during construction would exceed the cumulative $PM_{2.5}$ threshold of 9.0 $\mu g/m^3$, indicating a significant cumulative impact. However, the project's construction-related contributions (without and with Mitigation Measure M-AQ-1a, which is not required to reduce this impact but required to reduce Impact AQ-1) to cumulative $PM_{2.5}$ levels within the APEZ would not exceed the project-level thresholds of 0.2 and 0.3 $\mu g/m^3$, and therefore the project's construction-related contribution to the cumulative $PM_{2.5}$ levels would not be cumulatively considerable, a ***less-than-significant*** impact. With respect to project operations, cumulative operational $PM_{2.5}$ emissions would

[119] Long-term $PM_{2.5}$ concentrations are evaluated at sensitive receptors and the maximum impact is at the MEISR.

TABLE 4.8-15
CUMULATIVE $PM_{2.5}$ CONCENTRATIONS

Source	Maximum Annual $PM_{2.5}$ Concentrations ($\mu g/m^3$)		
	Construction, With Project[a]	Construction, Mitigated[a]	Operational
Net Project PM2.5 Concentrations[b]	<0.1	<0.1	0.1
Cumulative Projects[c]	<0.1	<0.1	<0.1
CRRP-HRA Background $PM_{2.5}$ Concentration[d]	9.1	9.1	8.9
Total Cumulative $PM_{2.5}$ Concentrations	9.2	9.2	9.0
Cumulative Significance Thresholds[e]	9.0/10	9.0/10	9.0/10
Do Total Cumulative Emissions Exceed Cumulative Thresholds?	Yes/No	Yes/No	No/No
Project-Level Significance Thresholds[f]	0.2/0.3	0.2/0.3	0.2/0.3
Do Total Project Emissions Exceed Project-Level Thresholds?	No/No	No/No	No/No

NOTES:

CRRP-HRA = San Francisco Community Risk Reduction Plan Health Risk Assessment; $PM_{2.5}$ = particulate matter of 2.5 microns in diameter or less; $\mu g/m^3$ = micrograms per cubic meter

[a] Since $PM_{2.5}$ concentrations are evaluated over a shorter period (annually), the construction-related and operational impacts are evaluated separately for $PM_{2.5}$. For construction emissions, the "With Project" case assumes use of Tier 2 equipment with diesel particulate filters (DPFs), as required by the San Francisco Clean Construction Ordinance. With implementation of Mitigation Measure M-AQ-1a (required to reduce Impact AQ-1), the "Mitigated" case assumes use of Tier 4 Final equipment for all equipment greater than or equal to 140 horsepower. Equipment less than 140 horsepower is assumed to be Tier 2 equipment with a DPF. "Mitigated" emissions also assume (a) use of renewable diesel for all diesel off-road equipment and on-road diesel haul trucks and (b) that 80 percent haul trucks would have 2010 or newer engines.

[b] The $PM_{2.5}$ from the existing operational sources was adjusted from the value calculated in the San Francisco Community Risk Reduction Plan (CRRP-HRA) by modeling the existing operational sources in their actual locations and adding building downwash. These sources would be replaced with project facilities; therefore, this adjusted value was subtracted from project concentrations to calculate a net project concentration.

[c] The $PM_{2.5}$ emissions from additional projects at the Southeast Water Pollution Control Plant (SEP) and in the surrounding area that would be under construction during construction and operation of the Biosolids Digester Facilities Project (BDFP) were estimated. The construction of the modeled cumulative projects was assumed to occur during both construction and operation of the project, so the $PM_{2.5}$ emissions were added to both project construction and operational impacts.

[d] The background $PM_{2.5}$ concentration from existing nearby stationary sources was obtained from the CRRP-HRA geodatabase. It is different for the construction and operational scenarios since the maximally exposed individual sensitive receptors (MEISRs) are at different locations.

[e] The lower cumulative significance thresholds for $PM_{2.5}$ concentrations are applied to sensitive receptors within Air Pollutant Exposure Zones (APEZs) and also in Health Vulnerability areas (as indicated by zip code 94124), while the higher thresholds represent cumulative thresholds specified for areas within APEZs but outside Health Vulnerability zip codes.

[f] The lower project-level significance thresholds for $PM_{2.5}$ concentrations represent thresholds specified for Health Vulnerability areas (as indicated by specified zip codes) within APEZs, while the higher thresholds represent thresholds specified for areas within APEZs but outside Health Vulnerability zip codes.

SOURCE: Ramboll Environ, *Air Quality Technical Report, Biosolids Digester Facilities Project Draft EIR*, March 2017.

also not exceed either the 9.0 and 10 $\mu g/m^3$ $PM_{2.5}$ project-level significance thresholds, and therefore the project's operational contribution to the cumulative $PM_{2.5}$ levels would not be cumulatively considerable, a ***less-than-significant*** impact.

Mitigation: None required.

Impact C-AQ-3: The project, in combination with past, present, and probable future projects, would not create objectionable odors that would affect a substantial number of people. (Less than Significant)

The geographic scope for cumulative odor impacts is the vicinity of the SEP. Cumulative odor impacts could occur if cumulative projects generated objectionable odors and affected a substantial number of people that would also be affected by the BDFP. Of the cumulative projects identified in Table 4.1-1 (in Section 4.1, Overview), the projects proposed at the SEP were evaluated for their potential to generate cumulative odor impacts; the remaining cumulative projects were determined to be either beyond the geographic scope for cumulative odor impacts and/or not to have the potential to generate odors. Factors considered include whether odor incidents have been attributed to the SEP facilities with which these projects are associated, and project characteristics, including whether odor control is part of the project's design. Based on this assessment, the potential for the cumulative project to change existing odor conditions was determined. **Table 4.8-16** depicts the results of the evaluation. As shown, none of the projects would be expected to worsen existing odor conditions and some projects are expected to improve odor conditions.

Of the projects proposed at the SEP, Projects 1 through 4, 7, 9, and 12 were initially deemed to have the potential to adversely affect future odor conditions based on their association with facilities identified as an odor source in the Odor Characterization Report (refer to Table 4.8-3) or with a history of odor incidents (refer to Table 4.8-4). Projects 1, 2, 3, and 7 each include a new odor control component in their design; as a result, these projects would be expected to improve existing odor conditions in the vicinity of the SEP. An objective of Project 1, SEP Headworks Replacement, includes maximizing control of odors and involves the replacement of structures associated with numerous odor emissions sources (refer to Table 4.8-3). While Project 12 (Demolition of the Existing SEP Digesters and Southside Renovation Project) does not include an odor control component and the existing digesters are an existing source of odors, the *decommissioning* of the digesters (including removal of all odor-producing solids, liquids, and gases) would occur as part of the BDFP (described above in Impact AQ-5) and prior to their demolition under Project 12. Implementation of the other projects at the SEP (Projects 4, 5, 6, 8, 9, 10, 11, and 13) is not expected to change existing odor conditions, based on available information on these projects. As odor conditions in the vicinity of the BDFP would either improve or remain unchanged, these projects combined would be expected to improve odor conditions in the vicinity and reduce the likelihood of SEP operations generating objectionable odors affecting a substantial number of people.

Dispersion modeling was conducted for the BDFP in combination with two other projects proposed at the SEP: SEP Headworks Replacement (Project 1 in Table 4.8-16), and SEP Primary/Secondary Clarifier Upgrades (Project 7 in Table 4.8-16). As shown in Table 4.8-16, these projects involve modifications to and/or demolition and replacement of multiple facilities associated with existing odor sources, the results of which are described in the Odor Characterization Report. **Figure 4.8-6** shows the exceedance plot (5 D/T, 99 percent compliance, 1-hour average) for the future scenario assuming the following: primary sedimentation basins would be covered and ventilated through a discharge stack without treatment (Project 7), headworks with odor control (Project 1), BDFP with odor control, and remaining existing SEP sources. As shown on Figure 4.8-6, the 99 percent compliance isopleth extends beyond the SEP fence line primarily toward the north and northeast of

TABLE 4.8-16
PROJECTS CONTRIBUTING TO CUMULATIVE ODOR CONDITIONS[a]

Project No.	Name	Odor Generation Potential	Associated with an Existing Odor Source? (SEP Building No.)[b]	Odor Control Included	Change to Existing Odor Conditions
1	SEP Headworks Replacement	The objectives of this project include maximizing the control of odors within the treatment facility. The project includes an odor control facility. The SFPUC has indicated that all buildings would be sealed and equipped with odor control.	Yes (012)	Yes	Improve
2	SEP Chemical System Relocation and Facilities Upgrade	The project includes structural and mechanical repairs as well as upgrades to the odor control systems in various buildings, including SEP 012. The odor control unit contains two fans that serve the two seashell biofilter units. Both units are currently run simultaneously to reduce and treat odors at SEP 012.	Yes (012)	Yes	Improve
3	SEP Existing Digester Roof Repairs	This project repaired/replaced the roofs on five existing digesters and associated appurtenances. No odor-generating facilities or operations *per se* were proposed as part of this project.	Yes. Release of digester gas is a source of multiple incidents, many of which are attributable to gas management equipment (boilers, gas manifold, heat exchanger) and incomplete combustion of digester gas. Some complaints are associated with the digesters themselves. (630-660, 690-730, 741)	No; however, replacement of digester covers could reduce odorous digestion gas emissions from the digesters, reducing the extent that the existing covers (e.g., propensity to tip) contributes to odor incidents.	Potentially improve
4	SEP Existing Digester Gas Handling Improvements	The project includes improving the digester gas control system.	Yes. Release of digester gas is a source of multiple odor incidents; many are attributable to gas management equipment (boilers, gas manifold, heat exchanger) and incomplete combustion of digester gas. Leaks at failed seals of the aged gas compressors have been observed at the SEP. (620, 680, 741)	No. Odor control improvements are not proposed as part of this project.	No change
5	SEP Building 521 Replacement/522 Disinfection Upgrade	This project does not include new equipment that would generate odor (would include pumps, hydraulic power unit, compressor, standby generator) or any changes to operations/maintenance activities.	No	No	No change
6	SEP Power Feed and Primary Switchgear Upgrades	The project involves installing and replacing electrical equipment.	No	No	No change
7	SEP Primary/Secondary Clarifier Upgrades	The project includes installing odor control design features (i.e., installing covers on the primary sedimentation tanks, installing a ventilation system designed to extract and dilute odorous air from clarifiers and discharge the diluted air at a height of 21 feet), and replacing aging infrastructure.	Yes (SEP 042, 230, 260)	Yes	Improve

TABLE 4.8-16 (Continued)
PROJECTS CONTRIBUTING TO CUMULATIVE ODOR CONDITIONS[a]

Project No.	Name	Odor Generation Potential	Associated with an Existing Odor Source? (SEP Building No.)[b]	Odor Control Included	Change to Existing Odor Conditions
8	SEP Seismic Reliability and Condition Assessment Improvements	This project does not include facilities or operations that would generate odor.	Odor incidents associated with SEP 040/041	No	No change
9	SEP Northside Reliability Project	This project replaced equipment in kind, mostly in 2011-2012, so it is part of baseline conditions. Buildings 040/041 are mentioned in odor incidents.	Yes (041, 042)	No	No change
10	SEP Oxygen Generation Plant Replacement	This project does not include facilities or operations that would generate odor emissions.	No	No	No change
11	SEP Repair and Replacement Projects	This project does not include facilities or operations that would generate odor emissions.	Unknown (projects could occur at multiple buildings)	No	No change
12	Demolition of the Existing SEP Digesters and Southside Renovation Project	Existing digesters would be emptied and cleaned as part of the BDFP; thus, the source of odors will have been removed from the existing digesters prior to demolition.	Yes (630-660, 690-730, 741)	No	No change to future (post-BDFP) conditions
13	Eastside Recycled Water Project	While the specific characteristics of the Eastside Recycled Water Project are not known, these types of projects (e.g., the addition of tertiary treatment) typically are not expected to produce odors.	No	No	No change

NOTES:

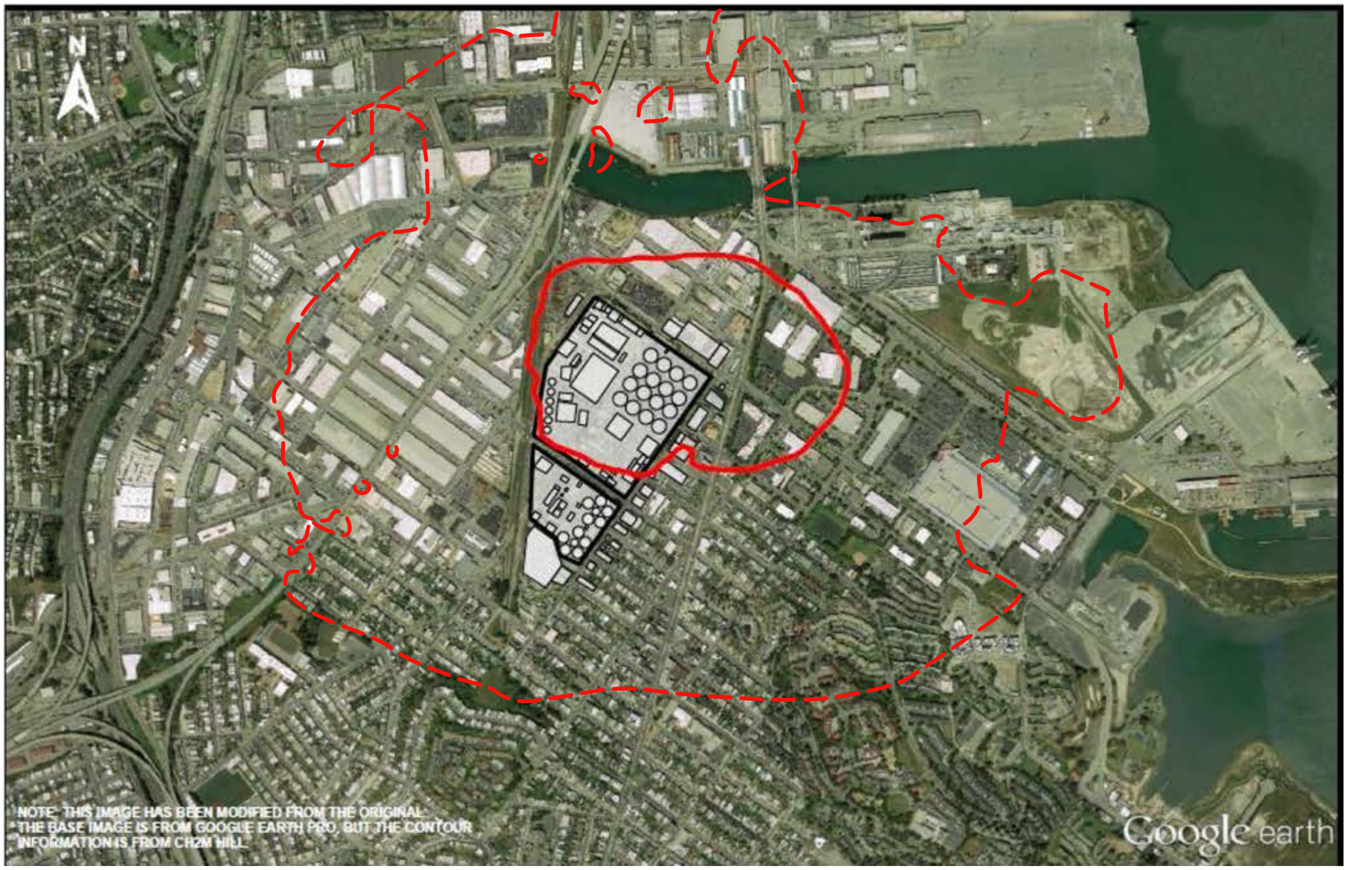
SEP = Southeast Water Pollution Control Plant; BDFP = Biosolids Digester Facilities Project; SFPUC = San Francisco Public Utilities Commission

[a] The following San Francisco Public Utilities Commission (SFPUC) projects are not expected to contribute to cumulative odor impacts, either because the project is not expected to generate odors or based on the distance to sensitive receptors, and are therefore excluded from the analysis: Central Bayside System Improvement Project, Central Shops Relocation and Land Reuse, Land Reuse - 1801 Jerrold Avenue, Kansas and Marin Streets Sewer Improvements, Griffith Yard Improvements, Southeast Outfall Islais Creek Crossing Replacement, Southeast Community Facility Revitalization, Southeast Greenhouses Demolition, Griffith Pump Station, and Marin Street Sewer Replacement.

The following non-SFPUC off-site projects are not expected to generate odors and are therefore excluded from analysis: Jerrold Bridge North Span Replacement, Quint Street Bridge Replacement Project, Quint-Jerrold Connector Road, San Francisco Wholesale Produce Market Expansion, 1995 Evans Avenue, Candlestick Point-Hunters Point Shipyard Phase I and II Development Project, Event Center and Mixed-Use Development at Mission Bay Blocks 29-32, Pier 70 Waterfront Site, Blue Greenway Project and Heron's Head Park Improvements, Pier 90-94 Backlands Improvements, Asphalt and Concrete Recycling and Production Plant at Pier 94, Quint Street Lead Track, Pier 96 Bulk Export Terminal, Peninsula Corridor Electrification Project, 2225 Jerrold Avenue Facility, India Basin Mixed-Use Development, and San Francisco Gateway.

[b] Refer to Tables 4.8-3 and 4.8-4.

SOURCE: Refer to Table 4.1-1 in Section 4.1, Overview; ESA analysis for the BDFP.



Existing Overall SEP (Liquids and Solids) Summer Conditions

Future Cumulative Conditions with BDFP, Overall SEP (Liquids and Solids)

SEP Fenceline

NOTE: This figure illustrates the modeled geographic extent of existing and future source odors exceeding the 5 D/T, 99 percent (5 D/T exceedance occurring for 88 hours per year), 1-hour average compliance goal over the five year modeling period.
D/T (dilution to threshold ratio) refers to the amount of pure air that must be added to a known volume of odorous air in order to dilute the sample to the concentration at which the odor can just be detected.

SOURCE: CH2M Hill and Brown and Caldwell, Final Southeast Plant Odor Characterization Report, December 2015, *in* SFPUC, Final Biosolids Digester Facilities Project Conceptual Engineering Report, March 2016

SFPUC Biosolids Digester Facilities

Figure 4.8-6
Future Cumulative Odor Concentration Isopleths at SEP

the SEP, an area smaller than that affected currently. The residential areas to the south and southeast that are currently exposed to odors above the 5 D/T design criterion would no longer be within the exceedance plot. The primary reason for exceedances above the BDFP's design standard would be due to emissions from the SEP's liquid treatment process, particularly the odor from the primary sedimentation basins being discharged without treatment and the open design of the secondary sedimentation clarifiers. Although the odors associated with the cumulative scenario would exceed the 5 D/T at and beyond the SEP fence line, there are no residential receptors within the affected area.

On the basis of an assessment of the odor generation potential of cumulative projects, supplemented by dispersion modeling for select cumulative projects, implementation of cumulative projects at the SEP, including the BDFP, would not create a significant cumulative odor impact. Thus cumulative impacts would be ***less than significant***.

Mitigation: None required.

4.9 Greenhouse Gas Emissions

This section describes greenhouse gas (GHG) emissions and global climate change, the existing regulatory framework governing GHG emissions, and the potential impacts related to GHGs associated with implementation of the Biosolids Digester Facilities Project (BDFP or project). Mitigation measures are identified to avoid or reduce adverse impacts, as appropriate. The project's energy generation is evaluated for compliance with Assembly Bill 32 (discussed below), and other components of the project (e.g., building energy use, transportation, etc.) are evaluated for compliance with San Francisco's *Strategies to Address Greenhouse Gas Emissions*, which is recognized by the Bay Area Air Quality Management District (BAAQMD) as meeting the criteria of a qualified GHG Reduction Strategy.

4.9.1 Setting

4.9.1.1 Overview

Gases that trap heat in the atmosphere are referred to as GHGs because they capture heat radiated from the sun as it is reflected back into the atmosphere, much like a greenhouse does. As discussed further below, the accumulation of GHGs contributes to global climate change. The primary GHGs, or climate pollutants, are carbon dioxide (CO_2), black carbon, methane (CH_4), nitrous oxide (N_2O), ozone, and water vapor.

Individual development projects contribute to the cumulative effects of climate change by emitting GHGs during demolition, construction, and operational phases. While the presence of the primary GHGs in the atmosphere is naturally occurring, CO_2, CH_4, and N_2O are also emitted from human activities, accelerating the rate at which these compounds occur within the earth's atmosphere. Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas CH_4 results from off-gassing associated with agricultural practices, landfills, and to a lesser extent wastewater treatment.[1] Black carbon has emerged as a major contributor to global climate change, possibly second only to CO_2. Black carbon is produced naturally and by human activities as a result of the incomplete combustion of fossil fuels, biofuels, and biomass.[2] N_2O is a byproduct of various industrial processes including wastewater treatment.[3] Other GHGs include hydrofluorocarbons, perfluorocarbons, and sulfur

1 As discussed in Chapter 2, *Project Description*, the anaerobic digestion process produces biogas (digester gas), comprised mostly of methane and carbon dioxide. Similar to the existing processes at the Southeast Water Pollution Control Plant (Southeast Plant or SEP), the BDFP would reduce greenhouse gas emissions by converting digester gas into energy. Nationwide, wastewater treatment accounts for 2.0 percent of United States methane emissions (U.S. Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2014, p. 2-20, April 15, 2016). Available online at https://www3.epa.gov/climatechange/ghgemissions/usinventoryreport.html. Accessed on July 3, 2016.

2 Center for Climate and Energy Solutions, *What is Black Carbon?*, April 2010. Available online at http://www.c2es.org/docUploads/what-is-black-carbon.pdf. Accessed on March 3, 2016.

3 N_2O is emitted through processes to remove nitrogen from wastewater through nitrification (the biological oxidation of nitrogen-containing compounds like ammonia into nitrate) and denitrification (the biological conversion of nitrate into dinitrogen gas). Nationwide, wastewater treatment accounts for 1.6 percent of N_2O emissions (U.S. Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2010 [EPA 430-R-12-001], April 15, 2012)

hexafluoride, and are generated in certain industrial processes. GHGs are typically reported in "carbon dioxide-equivalent" (CO_2E) measures.[4]

There is international scientific consensus that human-caused increases in GHGs contribute to global warming and, thus, climate change. Many impacts resulting from climate change, including sea level rise, increased fires, floods, severe storms, and heat waves, already occur and will only become more severe and costly.[5] Secondary effects of climate change likely include impacts on agriculture, the state's electricity system, and native freshwater fish ecosystems; an increase in the vulnerability of levees such as in the Sacramento-San Joaquin Delta; changes in disease vectors; and changes in habitat and biodiversity.[6,7]

4.9.1.2 GHG Emission Estimates and Energy Providers in California

The California Air Resources Board (CARB) estimated that in 2010 California produced about 451.60 million gross metric tons of CO_2E (million $MTCO_2E$).[8] The CARB found that transportation is the source of 38 percent of the state's GHG emissions, followed by electricity generation (both in-state generation and imported electricity) at 21 percent and industrial sources at 19 percent. Commercial and residential fuel use (primarily for heating) accounted for 10 percent of GHG emissions.[9] In San Francisco, motorized transportation and natural gas sectors were the two largest sources of GHG emissions, accounting for approximately 42 percent (2.0 million $MTCO_2E$) and 31 percent (1.5 million $MTCO_2E$), respectively, of San Francisco's 4.75 million $MTCO_2E$ emitted in 2012.[10] Electricity consumption (building operations and transit) accounts for approximately 22 percent (1.0 million $MTCO_2E$) of San Francisco's GHG emissions.[11]

Electricity in San Francisco is primarily provided by the Pacific Gas and Electricity Company (PG&E) and the San Francisco Public Utilities Commission (SFPUC). In 2012, electricity consumption in San Francisco was approximately 6.0 billion megawatt-hours (kWh).[12] Of this total, PG&E produced approximately 71 percent of the electricity distributed (4.2 billion kWh; about 81 percent of San Francisco's electricity-driven GHG emissions), and the SFPUC produced approximately

4 Because of the differential heat absorption potential of various GHGs, GHG emissions are frequently measured in "carbon dioxide-equivalents," which present a weighted average based on each gas's heat absorption (or "global warming") potential.

5 Intergovernmental Panel on Climate Change, *Climate Change 2013: The Physical Science Basis, Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, 2013. Available online at http://www.climatechange2013.org/images/report/WG1AR5_ALL_FINAL.pdf. Accessed on March 3, 2016.

6 Ibid.

7 California Climate Change Center, *Our Changing Climate 2012: Vulnerability and Adaptation to the Increasing Risks from Climate Change in California*, July 2012. Available online at http://www.energy.ca.gov/2012publications/CEC-500-2012-007/CEC-500-2012-007.pdf. Accessed on March 3, 2016.

8 California Air Resources Board, *California Greenhouse Gas Inventory for 2000-2010— by Category as Defined in the Scoping Plan*. Available online at http://www.arb.ca.gov/cc/inventory/pubs/reports/2000_2010/ghg_inventory_scopingplan_00-10_2013-02-19.pdf. Accessed on March 3, 2016.

9 Ibid.

10 San Francisco Department of Environment (DOE), Community GHG Inventory data for 1990-2012. Available online at https://data.sfgov.org/Energy-and-Environment/San-Francisco-Communitywide-Greenhouse-Gas-Invento/btm4-e4ak/data. Accessed August 31. 2016.

11 Ibid.

12 Ibid.

16 percent of the electricity distributed (0.9 billion kWh; about 0 percent of San Francisco's electricity-driven GHG emissions, described below).[13]

PG&E's 2014 power mix was as follows: 24 percent natural gas, 21 percent nuclear, 27 percent eligible renewables (described below), 8 percent large hydroelectric, and 21 percent unspecified power.[14]

The SFPUC operates three hydroelectric power plants in association with San Francisco's Hetch Hetchy water system and provides electrical power to Muni, City and County of San Francisco (CCSF or City) buildings, and a limited number of other commercial accounts in San Francisco. Electricity generated by the Hetch Hetchy system achieved net zero GHG emissions for fiscal year 2012-2013.[15]

4.9.2 Regulatory Framework

4.9.2.1 Federal Regulations

Mandatory Greenhouse Gas Reporting

Title 40 Code of Federal Regulations Part 98, Mandatory Greenhouse Gas Reporting, establishes mandatory GHG reporting requirements for certain facilities that directly emit GHGs, including wastewater treatment plants.[16] The purpose of the mandated GHG Reporting Program is to provide accurate and timely GHG data to inform the public, policy makers, and other interested parties regarding emissions from specific industries, emissions from individual facilities, factors that influence GHG emission rates, and actions that could be taken at facilities to reduce emissions.

Section 98.2(a)(2) of Subpart A specifies that any facility that falls under one of the following categories is subject to GHG reporting requirements: (1) source categories listed in Table A-3 of Subpart A; (2) source categories listed in Table A-4 of Subpart A that emit 25,000 metric tons CO_2E ($MTCO_2E$) or more per year in combined emissions from stationary fuel combustion units, or (3) source categories that are not listed in Table A-3 or Table A-4 but have an aggregate maximum rated input capacity of the stationary fuel combustion units at the facility of 30 million British thermal units per hour (mmBtu/hr) or greater, and that emit 25,000 $MTCO_2E$ or more per year in combined emissions from stationary fuel combustion sources. Table A-4 includes industrial wastewater treatment facilities (among other source categories), but Subpart II, Industrial Wastewater Treatment, Section 98.350(c) indicates that this source category does not include municipal wastewater treatment plants. For any facility not falling under Table A-3 or Table A-4

13 San Francisco Department of Environment (DOE), Community GHG Inventory data for 1990-2012. Available online at https://data.sfgov.org/Energy-and-Environment/San-Francisco-Communitywide-Greenhouse-Gas-Invento/btm4-e4ak/data. Accessed August 31. 2016.

14 Pacific Gas & Electricity, PG&E's 2014 Power Mix, 2015. Available online at https://www.pge.com/includes/docs/pdfs/myhome/myaccount/explanationofbill/billinserts/11.15_PowerContent.pdf. Accessed on December 6, 2016.

15 San Francisco Public Utilities Commission (SFPUC), SFPUC Departmental Climate Action, Annual Report, Fiscal Year 2012-2013, March 18, 2014. Available online at http://sfwater.org/modules/showdocument.aspx?documentid=4138. Accessed December 6. 2016.

16 Title 40, Chapter 1, Subchapter C, Part 98, Subparts A and II. Available online at http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=c784a291ba489991c58a3321c8ff8fcf&mc=true&n=pt40.23.98&r=PART&ty=HTML#se40.23.98_12. Accessed on October 5, 2016.

source categories, but meeting the third source category, the annual GHG report must cover emissions from stationary fuel combustion sources only.

The proposed power generation equipment under the BDFP would produce an estimated 4.2 megawatts (MW) in 2023 and up to 5.2 MW in 2045. Stationary fuel combustion sources associated with the project would emit up to 212 $MTCO_2E$ per year of non-biogenic emissions (in accordance with the federal reporting requirement, CO_2 emissions from biomass are not included in the calculation of emissions for comparison to the reporting threshold).[17] Such emissions would be well below the 25,000 MTCO2E per year federal reporting requirement threshold. Therefore, the proposed project would not appear to be subject to federal mandatory GHG reporting requirements on its own. However, project emissions would need to be combined with other emissions at the Southeast Water Pollution Control Plant (Southeast Plant or SEP) to ultimately determine whether the SEP would be subject to federal reporting requirements.

4.9.2.2 State Regulations

Executive Orders S-3-05 and B-30-15

Executive Order (EO) S-3-05 sets forth a series of target dates by which statewide emissions of GHGs need to be progressively reduced, as follows: by 2010, reduce GHG emissions to 2000 levels (approximately 457 million $MTCO_2E$); by 2020, reduce emissions to 1990 levels (estimated at 427 million $MTCO_2E$); and by 2050, reduce emissions to 80 percent below 1990 levels (approximately 85 million $MTCO_2E$). As discussed in Section 4.9.1, California produced about 452 million MTCO2E in 2010, thereby meeting the 2010 target date to reduce GHG emissions to 2000 levels.

EO B-30-15 set an additional, interim statewide GHG reduction target of 40 percent below 1990 levels to be achieved by 2030. The purpose of this interim target is to ensure California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050.[18] EO B-30-15 also requires all state agencies with jurisdiction over sources of GHG emissions to implement measures within their statutory authority to achieve reductions of GHG emissions to meet the 2030 and 2050 GHG emissions reductions targets.

Assembly Bill 32

In 2006, the California legislature passed Assembly Bill No. 32 (California Health and Safety Code Division 25.5, Sections 38500, et seq., or AB 32), also known as the California Global Warming Solutions Act. AB 32 requires the CARB to design and implement emission limits, regulations, and other measures, such that feasible and cost-effective statewide GHG emissions are reduced to 1990 levels by 2020.

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17 In 40 CFR Parts 98.2(b)(2) and 98.2(c), CO_2, CH_4 and N_2O emissions from non-biomass sources as well as CH_4 and N_2O emissions from biomass sources are included in the determination of whether or not a facility meets the 25,000 MT CO2e reporting threshold (CO_2, emissions from biomass sources are excluded).

18 Governor's Office, *Governor Brown Establishes Most Ambitious Greenhouse Gas Reduction Target in North America*, April 29, 2015. Available online at https://www.gov.ca.gov/news.php?id=18938. Accessed on March 3, 2016.

GHG Mandatory Reporting Regulation

Requirements

The GHG Mandatory Reporting Regulation,[19] administered by the CARB, applies to the SEP. The regulation classifies three types of reporting entities: industrial sources, fuel suppliers (of natural gas, CO_2, and transportation fuels), and electricity importers/power entities. Application of the regulation is determined based on the total emissions of all applicable source categories for each type of reporting entity. Generally, cement production, lime manufacturing, nitric acid production, and petroleum refineries are subject to reporting regardless of their emissions level. Other facilities with greater than 25,000 $MTCO_2E$ of emissions, inclusive of non-biogenic and biogenic emissions (discussed below), are subject to full reporting requirements. (Facilities with emissions between 10,000 and 25,000 $MTCO_2E$ of emissions have the option to file an abbreviated report.)

Biogenic and Non-Biogenic Emissions

Under the GHG Mandatory Reporting Regulation, biogenic emissions must be included in the reporting. Biogenic emissions result from materials that are derived from living cells, as opposed to non-biogenic (also referred to as anthropogenic) emissions derived from fossil fuels and other materials that have been transformed by geological processes. Biogenic emissions contain carbon that is present in organic materials (including, but not limited to, wood, paper, vegetable oils, animal fat, and food, animal and yard waste).[20]

Non-biogenic and biogenic sources of GHG emissions have different impacts on the global carbon cycle. Carbon in fossil fuel reservoirs, such as coal, oil, and gas deposits, was removed from the atmosphere over millions of years. Without human intervention, fossil-fuel carbon would remain isolated from the active carbon cycle. Through extraction and combustion of fossil fuels, humans release this fossil-fuel carbon, increasing the total amount of carbon in the atmosphere and in the active carbon cycle.[21] In contrast to fossil-fuel carbon (non-biogenic), carbon present in biomass and part of the active carbon cycle is cycling through the atmosphere and global carbon cycle on a much faster time scale. For example, over the course of a year, carbon removed from the atmosphere by growing corn is released back into the atmosphere through the harvest, and subsequent combustion or decomposition of the corn biomass. Over short time scales, the mass of carbon released by the decomposition of biomass will generally equal the mass of carbon taken up by living organisms. Because biogenic carbon is constantly being released and taken up in the carbon cycle, biogenic CO_2 emissions do not act to increase the total amount of carbon in the atmosphere in the same way as the release of carbon from fossil fuels.

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19 Codified in California Code of Regulations Title 17, Subchapter 10, Article 2, Sections 95100 to 95133.

20 Bay Area Air Quality Management District, *BAAQMD CEQA Guidelines*, May 2012, p. 4-5. Available online at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/baaqmd-ceqa-guidelines_final_may-2012.pdf?la=en. Accessed on April 25, 2016.

21 U.S. Environmental Protection Agency, *Accounting Framework for Biogenic CO_2 Emissions from Stationary Sources*, September 2011, Available online at http://www.epa.gov/climatechange/Downloads/ghgemissions/Biogenic-CO2-Accounting-Framework-Report-Sept-2011.pdf. Accessed on April 25, 2016.

SEP Emissions Reported Under the GHG Mandatory Reporting Regulation

The SEP is required to report its emissions to the CARB under the GHG Mandatory Reporting Regulation. Year 2014 total emissions (combustion, process, vented, and supplier) for the SEP were 10,614 $MTCO_2E$. Total non-biogenic CO_2E emissions in 2014 were reported to be 217 $MTCO_2E$, while biogenic CO_2E emissions were 10,397 $MTCO_2E$.[22] Annual GHG emissions from existing operations were estimated as part of this analysis and estimated to be higher, 14,165 $MTCO_2E$ (non-biogenic emissions of 234 $MTCO_2E$ and biogenic emissions of 13,931 $MTCO_2E$). The emissions estimates for this analysis differ from the estimates provided to CARB because of the inclusion of emissions from the waste gas burners (although waste gas burners are excluded under the GHG reporting rule – and therefore excluded from the CARB estimates -- they are still a source of GHGs, with emissions of 3,741 $MTCO_2E$ in 2014) and exclusion of emissions from boilers associated with Building 850 (which would not be affected by implementation of the BDFP, and account for 209 $MTCO_2E$ of the CARB estimates).

Cap-and-Trade

On January 1, 2013, the CARB launched the second largest GHG cap-and-trade program in the world. The Cap-and-Trade Regulation ensures progress toward the near-term 2020 statewide limit and is a vital component in achieving both California's near- and long- term GHG emissions targets. In February 2016, the CARB issued updated guidance for reporting biomass-derived fuels under California's Mandatory GHG Reporting Regulation. The guidance states, "Under the greenhouse gas (GHG) emissions accounting framework established by Mandatory Reporting of Greenhouse Gas Emissions and the Cap-and-Trade Regulation, CO_2 emissions from the combustion of biomass fuels that meet specified criteria in the regulations are considered biogenic fuels and are exempt from a compliance obligation under the Cap-and-Trade Regulation." Digester gas appears to meet eligibility requirements for biomass-derived fuels that are listed in Section 95852.1.1 of the Cap-and-Trade Regulation.[23] Section 95852.2(a)(8)(B) of this Regulation lists biogas (digester gas) or biomethane from wastewater treatment plants as one of the emissions without compliance obligation.

Based on this CARB guidance, the project would not be subject to requirements of the Cap-and-Trade Regulation because over 99 percent of the project's CO_2E emissions would be biogenic.

California Climate Change Scoping Plan

Pursuant to AB 32, the CARB adopted the *Climate Change Scoping Plan* (Scoping Plan) in December 2008 outlining measures to meet the 2020 GHG reduction limits. In order to meet the goals of AB 32, California must reduce its GHG emissions by 30 percent below projected 2020 business-as-usual emissions levels (approximately 15 percent below 2008 levels).[24] The Scoping Plan estimates a

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[22] CARB, Mandatory GHG Reporting - 2014 GHG Facility and Entity Emissions, November 2015. Available online at http://www.arb.ca.gov/cc/reporting/ghg-rep/reported-data/ghg-reports.htm. Accessed on April 6, 2016. The total biogenic CO_2E emissions reported to the CARB does not include emissions from waste gas burners since they are excluded under this rule.

[23] Section 95852.1.1(a)(3) states that biogas or biomethane used at the site of production, and not transferred to another operation, can be considered a "biomass-derived fuel."

[24] California Air Resources Board, *California's Climate Plan: Fact Sheet*. Updated January 27, 2010. Available online at http://www.arb.ca.gov/cc/facts/scoping_plan_fs.pdf. Accessed on March 3, 2016.

reduction of 174 million $MTCO_2E$ from transportation, energy, agriculture, forestry, and other high global warming sectors (see **Table 4.9-1**).[25]

TABLE 4.9-1
GREENHOUSE GAS REDUCTIONS
FROM ASSEMBLY BILL NO. 32 SCOPING PLAN SECTORS

	GHG Reductions (Million $MTCO_2E$)
GHG Reduction Measures By Sector	
Transportation Sector	62.3
Electricity and Natural Gas	49.7
Industry	1.4
Landfill Methane Control Measure (Discrete Early Action)	1
Forestry	5
High Global Warming Potential GHGs	20.2
Additional Reductions Needed to Achieve the GHG Cap	34.4
Other Recommended Measures	
Government Operations	1 – 2
Agriculture – Methane Capture at Large Dairies	1
Water	4.8
Green Buildings	26
Recycling/Zero Waste	9
Total Reductions Counted Toward 2020 Target	**216.8 – 217.8**

NOTES:
GHG = greenhouse gas; $MTCO_2E$ = metric tons of carbon dioxide-equivalent

SOURCES: California Air Resources Board, *Climate Change Scoping Plan*, December 2008. Available online at http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf. Accessed on March 3, 2016; California Air Resources Board, *California's Climate Plan: Fact Sheet*, January 27, 2010. Available online at http://www.arb.ca.gov/cc/facts/scoping_plan_fs.pdf. Accessed on March 3, 2016.

The Scoping Plan also anticipates that actions by local governments will result in reduced GHG emissions because local governments have the primary authority to plan, zone, approve, and permit development to accommodate population growth and the changing needs of their jurisdictions.[26] The Scoping Plan also relies on the requirements of Senate Bill (SB) 375 (discussed below) to align local land use and transportation planning to achieve GHG reduction.

The Scoping Plan must be updated every five years to evaluate AB 32 policies and ensure that California is on track to achieve the 2020 GHG reduction goal. In 2014, the CARB released the *First Update to the Climate Change Scoping Plan* (First Update), which builds upon the initial scoping plan with new strategies and recommendations. The First Update identifies opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and

[25] Ibid.
[26] California Air Resources Board, *Climate Change Scoping Plan*, December 2008. Available online at http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf. Accessed on March 3, 2016.

targeted low carbon investments. This update defines the CARB's climate change priorities for the next five years and sets the groundwork to reach long-term goals set forth in EO S-3-05. The First Update highlights California's progress toward meeting the near-term 2020 GHG emission reduction goals in the initial scoping plan. It also evaluates how to align the state's longer-term GHG reduction strategies with other state policy priorities for water, waste, natural resources, clean energy, transportation, and land use.[27]

One of these strategies, Measures W-5, Renewable Energy Production from Water, was designed to propose opportunities for developing renewable energy projects on lands associated with California's state and local water infrastructure. The California Energy Commission (CEC) recently financed public interest research and demonstration projects that focus on developing and demonstrating biogas technologies at wastewater plants to meet on-site electricity demand and supply the local electricity grid with excess generation. The research supports several efforts to improve renewable energy generation from wastewater treatment plants. For example, a hybrid combined heat and power project operated by the San Bernardino Municipal Water Department reforms biogas into a hydrogen-rich gas, which is then blended with non-reformed biogas to create a fuel for reciprocating engines that will meet air quality standards.[28]

Such goals and programs support the development of projects such as the proposed energy recovery facilities at the SEP.

Senate Bill 375

The Scoping Plan also relies on the requirements of SB 375 (Chapter 728, Statutes of 2008), also known as the Sustainable Communities and Climate Protection Act of 2008, to reduce carbon emissions from land use decisions. SB 375 requires regional transportation plans developed by each of the state's 18 metropolitan planning organizations (MPOs) to incorporate a "Sustainable Communities Strategy" in each regional transportation plan that will then achieve GHG emission reduction targets set by the CARB. For the Bay Area, the per-capita GHG emission reduction target is a 7 percent reduction by 2020 and a 15 percent reduction from 2005 levels by 2035.[29] *Plan Bay Area*, the Metropolitan Transportation Commission's regional transportation plan, adopted in July 2013, is the region's first plan subject to SB 375 requirements.[30]

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27 California Air Resources Board, *First Update to the Climate Change Scoping Plan*, May 2014. Available online at http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf. Accessed on March 3, 2016.

28 California Air Resources Board, *First Update to the Climate Change Scoping Plan*, Appendix B, Status of Initial Scoping Plan Measures, Posted March 14, 2014, p. 26. Available online at http://www.arb.ca.gov/cc/scopingplan/document/updatedscopingplan2013.htm. Accessed on July 22, 2016.

29 California Air Resources Board, *Executive Order No. G-11-024, Relating to Adoption of Regional Greenhouse Gas Emission Reduction Targets for Automobiles and Light Trucks Pursuant to Senate Bill 375,* February 2011. Available online at http://www.arb.ca.gov/cc/sb375/executive_order_g11024.pdf. Accessed on March 3, 2016.

30 Association of Bay Area Governments and Metropolitan Transportation Commission, *Plan Bay Area*, adopted July 18, 2013. Available online at http://planbayarea.org/plan-bay-area.html. Accessed on March 3, 2016.

Senate Bills 1078, 107, X1-2, and 350 and Executive Orders S-14-08 and S-21-09

California established aggressive renewable portfolio standards under SB 1078 (Chapter 516, Statutes of 2002) and SB 107 (Chapter 464, Statutes of 2006), which require retail sellers of electricity to provide at least 20 percent of their electricity supply from renewable sources by 2010. EO S-14-08 (November 2008) expanded the state's renewable portfolio standard from 20 to 33 percent of electricity from renewable sources by 2020. In September 2009, then Governor Schwarzenegger continued California's commitment to the renewable portfolio standard by signing EO S-21-09, which directed the CARB to enact regulations to help California meet the renewable portfolio standard goal of 33 percent renewable energy by 2020.[31]

In April 2011, Governor Brown signed SB X1-2 (Chapter 1, Statutes of 2011) codifying the GHG reduction goal of 33 percent by 2020 for energy suppliers. This renewable portfolio standard preempts the CARB's 33 percent renewable sources electricity standard and applies to all electricity suppliers (not just retail sellers) in the state, including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. Under SB X1-2, all of these entities must adopt the new renewable portfolio standard goals of 20 percent of retail sales from renewable sources by the end of 2013, 25 percent by the end of 2016, and 33 percent by the end of 2020.[32] Eligible renewable sources include geothermal, ocean wave, solar photovoltaic, and wind, but exclude large hydroelectric (30 megawatts [MW] or more). Therefore, because the SFPUC receives more than 67 percent of its electricity from large hydroelectric facilities, the remaining electricity provided by the SFPUC is required to be 100 percent renewable.[33] SB 350 (Chapter 547, Statutes of 2015), signed by Governor Brown in October 2015, dramatically increased the stringency of the renewable portfolio standard. SB 350 establishes a renewable portfolio standard target of 50 percent by 2030, along with interim targets of 40 percent by 2024 and 45 percent by 2027.

Senate Bill 32 and Assembly Bill 197

In August 2016, the California state legislature passed Senate Bill 32 (SB 32) which establishes a new target for GHG emissions reductions in the state. This bill requires the CARB to ensure that statewide GHG emissions are reduced to 40 percent below the 1990 level by the year 2030. The bill would augment AB 32, (described above). The Legislature paired SB 32 with AB 197, which directs the CARB to prioritize disadvantaged communities in its climate change regulations and to evaluate the cost-effectiveness of the measures it considers. SB 32 and AB 197 have been enacted[34] and became effective on January 1, 2017.

[31] California Public Utilities Commission, *RPS Program Overview*, June 2015. Available online at http://www.cpuc.ca.gov/RPS_Overview/. Accessed on August 31, 2016.
[32] Ibid.
[33] San Francisco Public Utilities Commission, *Approval of the Enforcement Program for the California Renewable Energy Resources Act*, December 13, 2011. Available online at https://infrastructure.sfwater.org/fds/fds.aspx?lib=SFPUC&doc=741114&data=285328890. Accessed on March 3, 2016.
[34] Chapters 249 and 250, Statutes of 2016 (chaptered September 8, 2016).

California Green Building Standards Code

The 2013 California Green Building Standards Code, as specified in Title 24, Part 11 of the California Code of Regulations, specifies building standards to improve public health, safety, and general welfare by enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices in five categories: planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and environmental quality. The provisions of this code apply to the planning, design, operation, construction, replacement, use and occupancy, location, maintenance, removal, and demolition of every building or structure or any appurtenances connected or attached to such building structures throughout California.

4.9.2.3 Regional and Local Regulations and Plans

Regional

The BAAQMD is responsible for attaining and maintaining federal and state air quality standards in the San Francisco Bay Area Air Basin (SFBAAB), as established by the federal Clean Air Act (CAA) and the California Clean Air Act (CCAA), respectively. The CAA and the CCAA require plans to be developed for areas that do not meet air quality standards, generally. The most recent air quality plan, the *Bay Area 2010 Clean Air Plan*, includes a goal of reducing GHG emission to 1990 levels by 2020, 40 percent below 1990 levels by 2035, and 80 percent below 1990 levels by 2050.[35]

In addition, the BAAQMD established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the SFBAAB; the program includes GHG reduction measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative energy sources.[36]

The BAAQMD California Environmental Quality Act (CEQA) Air Quality Guidelines also assist lead agencies in complying with the requirements of CEQA regarding potentially adverse impacts on air quality. The BAAQMD advises lead agencies to consider adopting a GHG reduction strategy capable of meeting AB 32 goals and then reviewing projects for compliance with the GHG reduction strategy as a CEQA threshold of significance.[37] This is consistent with the approach to analyzing GHG emissions described in CEQA Guidelines Section 15183.5.

[35] Bay Area Air Quality Management District, *Clean Air Plan*, September 2010. Available online at http://www.baaqmd.gov/plans-and-climate/air-quality-plans/current-plans. Accessed on March 3, 2016.

[36] Bay Area Air Quality Management District, *Climate Protection Program*. Available online at http://www.baaqmd.gov/plans-and-climate/climate-protection/climate-protection-program. Accessed on October 5, 2016.

[37] Bay Area Air Quality Management District, *California Environmental Quality Act Air Quality Guidelines*, May 2012. Available online at http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_Final_May%202012.ashx?la=en. Accessed on March 3, 2016.

Local

2004 Climate Action Plan for San Francisco[38]

The *Climate Action Plan for San Francisco, Local Actions to Reduce Greenhouse Gas Emissions* (2004) outlines citywide actions to reduce GHGs in the energy, transportation, and solid waste sectors. The 2004 Climate Action Plan includes GHG reduction strategies such as targeting emissions from fossil-fuel use in cars, power plants, and commercial buildings; developing renewable energy technologies like solar, wind, fuel cells, and tidal power; and expanding residential and commercial recycling programs. The 2004 Climate Action Plan identifies implementing agencies for GHG reduction strategies in the various sectors and describes actions the SFPUC was taking and intended to take to reduce GHGs at that time.

2008 San Francisco Greenhouse Gas Reduction Ordinance

In May 2008, the City adopted Ordinance No. 81-08 amending the San Francisco Environment Code to establish GHG emissions targets and require departmental action plans and to authorize the San Francisco Department of Environment (DOE) to coordinate efforts to meet these targets. The City ordinance establishes the following GHG emissions reduction limits and target dates by which to achieve them: determine 1990 citywide GHG emissions by 2008, the baseline level, with reference to which target reductions are set; reduce GHG emissions by 25 percent below 1990 levels by 2017; reduce GHG emissions by 40 percent below 1990 levels by 2025; and reduce GHG emissions by 80 percent below 1990 levels by 2050.[39] The City's GHG reduction targets are consistent with—in fact, are more ambitious than—those set forth in Governor Brown's EO B-30-15 by targeting a 40 percent reduction of GHGs by 2025 rather than a 40 percent reduction by 2030.

2010 San Francisco Greenhouse Gas Reduction Strategy

San Francisco has developed a number of plans and programs to reduce the City's contribution to global climate change and meet the goals of the Greenhouse Gas Reduction Ordinance. San Francisco's *Strategies to Address Greenhouse Gas Emissions*[40] documents the City's actions to pursue cleaner energy, energy conservation, alternative transportation, and solid waste policies. For instance, the City has implemented mandatory requirements and incentives that have measurably reduced GHG emissions, including, but not limited to, increasing the energy efficiency of new and existing buildings, installing solar panels on building roofs, implementing a green building strategy, adopting a zero waste strategy, adopting a construction and demolition debris recovery ordinance, creating a solar energy generation subsidy, incorporating alternative fuel vehicles in the City's transportation fleet (including buses), and adopting a mandatory recycling and composting ordinance. The strategy also includes 30 specific regulations for new development that would reduce a project's GHG emissions. These GHG reduction actions have resulted in a 23.3 percent reduction in

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[38] San Francisco Department of Environment and San Francisco Public Utilities Commission, *Climate Action Plan for San Francisco: Local Actions to Reduce Greenhouse Gas Emissions.* September 2004.

[39] City and County of San Francisco, *Greenhouse Gas Emissions Targets and Departmental Action Plans*, May 13, 2008. Available online at http://environment.sanfranciscocode.org/9/902. Accessed on August 31, 2016.

[40] San Francisco Planning Department, *Strategies to Address Greenhouse Gas Emissions in San Francisco*, November 2010, p. VIII-22. Available online at: http://www.sf-planning.org/index.aspx?page=2627. Accessed on September 1, 2016.

GHG emissions in 2012 compared to 1990 levels,[41] exceeding the year 2020 reduction goals in the BAAQMD's *Bay Area 2010 Clean Air Plan*, EO S-3-05 and EO B-30-15, and AB 32.

2011 Updated Electricity Resource Plan

In Ordinance 81-08, the City endorsed a goal to have a GHG-free electric system by 2030, generating, deploying, and procuring all of its energy needs from renewable and zero-GHG electric energy sources. The purpose of the 2011 Update of San Francisco's 2002 Electricity Resource Plan (2002 ERP) is to identify the next steps that San Francisco must take in order to achieve this goal. It identifies recommendations that promote zero GHG energy, influence procurement of electric resources at the wholesale level, and expand reliable, reasonably priced, and environmentally sensitive electric service. The most recent annual update prepared for the SFPUC in 2015[42] highlighted the past year's activities, which included working toward implementation of the CleanPower SF program, offering San Francisco residents and businesses a cleaner electricity supply; completing the Power Enterprise Business Plan, identifying strategies to increase delivery of clean energy supplies in San Francisco; certifying the SFPUC's Kirkwood generating units as eligible renewable energy resources under California's Renewables Portfolio Standard (RPS); and initiating GHG-free SFPUC electric service to the residents of the Shipyard, San Francisco's newest neighborhood.

2013 San Francisco Climate Action Strategy[43]

The San Francisco Department of Environment published an update to the 2004 Climate Action Plan in 2013. This report provides a summary of progress and examples of successful policies and programs, and outlines a set of actions that can be taken by citizens, businesses, and government. For the energy sector, the document includes a number of areas where the SFPUC has taken action, including moving toward 100 percent GHG-free and renewable electricity in buildings, implementing energy efficiency programs, and implementing the GoSolarSF incentive program. The Strategy also reported on progress in GHG emissions reductions in the municipal sector, due in part to the SFPUC's carbon-free Hetch Hetchy Power and reductions in natural gas use in municipal buildings, a focus of the SFPUC's energy efficiency program.

SFPUC Climate Action Plan Annual Reports

Ordinance 81-08 also required each City department to report annually on its own departmental emissions and emissions reductions. The SFPUC prepared Climate Action Plan annual reports in 2009, 2010, 2011, 2012, 2013, and 2014. The most recent annual report (Climate Action Annual Report Fiscal Year 2012-2013) was prepared in 2014.[44] Each annual report summarizes GHG emissions associated with electricity, natural gas, and fleet fuels consumed by the SFPUC for the previous fiscal year for its own operations, and highlights the SFPUC's activities to reduce GHG emissions. According to the

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[41] ICF International, *Technical Review of the 2012 Community-wide Inventory for the City and County of San Francisco*, January 21, 2015. Biogenic emissions are quantified in the GHG emissions inventory but not typically counted toward total citywide emissions, consistent with ICLEI 2012 U.S. Community Protocol Version 1.0.

[42] SFPUC, *Implementation of Electricity Resource Plan*, August 28, 2015.

[43] San Francisco Department of Environment, *San Francisco Climate Action Strategy, 2013 Update*, October 2013.

[44] SFPUC, *San Francisco Public Utilities Commission Climate Action Annual Report Fiscal Year 2012 – 2013*, March 18, 2014.

2014 report, total GHG emissions from facility energy use (natural gas and electricity) decreased 76 metric tons (2.9 percent) in Fiscal Year 2012-2013 compared to the previous year.

SFPUC Actions to Address Climate Change

Current SFPUC actions to reduce GHG emissions include the following:

- The SFPUC's Renewable Generation program has installed 21 solar photovoltaic projects on municipal facilities, with 8 MW of solar capacity, and continues to plan for additional projects to increase local renewable energy generation. In addition, the SFPUC operates cogeneration plants at the SEP and the Oceanside Water Pollution Control Plant that generate both electricity and process heat, and that are primarily fueled by digester biogas, a by-product of wastewater treatment operations. These facilities generate 2 MW and 1 MW at peak, respectively.
- The SFPUC's GoSolarSF program continues to provide incentives to San Francisco residents, businesses, and nonprofits. In Fiscal Year 2014-2015, $1.9 million in incentives resulted in the installation of 2.2 MW of new local solar generation at over 570 locations in the city.
- The SFPUC's energy efficiency program continues to reduce electricity use and natural gas consumption in municipal buildings year after year and is expanding its focus in the coming year with new program offerings for the private sector.
- The SFPUC is expanding existing GHG-free electricity programs to serve more customers in San Francisco. In spring 2015, the new residents at the Hunters Point Shipyard became San Francisco's newest green power neighborhood, receiving Hetch Hetchy Power for 100 percent of their electric needs. May 2016 marked the launch of the CleanPowerSF program, which is now delivering cleaner energy to San Francisco residents and business through the Green (35 percent renewable) and SuperGreen (100 percent renewable) enrollment options.
- The SFPUC recently opened the College Hill Learning Garden in Bernal Heights. This educational site features kid-friendly interactive features such as solar panels, rain gardens, a mini-green roof, and a composting toilet, all designed to teach children about how they can be stewards of water, energy, food, and waste systems.
- The SFPUC continues to encourage the use of sustainable transportation in all forms, including changing its diesel purchases from petroleum-based diesel and biodiesel to renewable diesel.[45]

2015 Executive Directive 06-02 to Use Renewable Diesel in City Fleet

This Executive Directive was issued in July 2015 and requires all City departments to begin using renewable diesel in their fleets, converting the City's entire municipal fleet from petroleum to renewable diesel. According to the CARB, the full lifecycle emissions of carbon from renewable diesel produced from sustainable sources are more than 60 percent lower than petroleum.[46]

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[45] Biodiesel is a fuel produced from biological feedstock sources including fats, oils and greases. Biodiesel is chemically different from petroleum diesel and renewable diesel (which is chemically indistinguishable from petroleum diesel). Biodiesel is usually blended with petroleum diesel, such as the B20 biodiesel grade used in City fleets.

[46] Office of the Mayor, City and County of San Francisco, *Press Release, Mayor Lee Announces San Francisco to Use Renewable Diesel in City Fleet,* July 21, 2015. Available online at http://sfmayor.org/article/mayor-lee-announces-san-francisco-use-renewable-diesel-city-fleet. Accessed on January 12, 2017.

San Francisco Environment Code, Green Building Requirements

The San Francisco Environment Code sets green building requirements that apply to all new construction in San Francisco. Adopted in 2013, Chapter 7 (Green Building Requirements) of the San Francisco Environment Code adopts the mandatory measures in the state green building code (CALGreen) and requires documentation of compliance with either Leadership in Energy and Environmental Design (LEED®) or GreenPoint Rated standards. The Department of the Environment promulgates guidance, forms, rules, and regulations in accordance with this chapter, and City departments must administer their construction projects in accordance with this chapter. Chapter 7 includes requirements for municipal projects related to LEED® certification, collection of recyclable and compostable materials, construction and demolition debris management, water conservation, energy-efficient lighting, and indoor environmental quality. For example, fluorescent fixtures must meet certain efficiency of lumens per watt of electricity consumed and/or be controlled by an occupancy sensor, and exterior light fixtures must include an automatic timer to prevent lights from operating during daylight hours.

San Francisco Better Roof Requirements for Renewable Energy Facilities Ordinance

This ordinance requires projects like the BDFP (i.e., newly constructed buildings of non-residential occupancy meeting criteria related to size) to install solar photovoltaic systems and/or solar thermal systems in the solar zone (i.e., building roofs, overhangs or other structures meeting certain criteria such as size, slope and orientation).[47] Under the proposed project, the SFPUC is proposing to install solar photovoltaic panels on the maintenance shop roofs consistent with this ordinance.

4.9.3 Impacts and Mitigation Measures

4.9.3.1 Significance Criteria

The project would have a potentially significant impact related to GHG emissions if the project were to:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

4.9.3.2 Approach to Analysis

GHG emissions and global climate change represent cumulative impacts. GHG emissions cumulatively contribute to the significant adverse environmental impacts of global climate change. No single project could generate enough GHG emissions to noticeably change the global average temperature; instead, the combination of GHG emissions from past, present, and future projects and activities across the entire planet have contributed and will continue to contribute to global climate

[47] The solar zone is located on the roof or overhang of a building, or on the roof or overhang of another structure located within 250 feet of the building or on covered parking installed with the building project.

change and associated environmental impacts. Therefore, the GHG emissions impact analysis is a cumulative impact analysis only, and this cumulative analysis does not rely on a list-based approach but rather on adopted regional and statewide guidelines described below and consistent with CEQA Guidelines Section 15130(b)(1)(B).

The BAAQMD has prepared guidelines and methodologies for analyzing GHGs. These guidelines are consistent with CEQA Guidelines Sections 15064.4 and 15183.5, which address the analysis and determination of significant impacts from a proposed project's GHG emissions. CEQA Guidelines Section 15064.4 allows lead agencies to rely on a qualitative analysis to describe GHG emissions resulting from a project. CEQA Guidelines Section 15183.5 allows for public agencies to analyze and mitigate GHG emissions as part of a larger plan for the reduction of greenhouse gases and describes the required contents of such a plan. Accordingly, the following analysis evaluates the project's consistency with AB 32 goals by comparing the project's net changes in non-biogenic GHG emissions to the GHG significance thresholds outlined by the BAAQMD, which is 10,000 $MTCO_2E$ per year for a stationary source. In addition, San Francisco has prepared its own greenhouse gas reduction strategy (described above); the BAAQMD has reviewed this strategy and concluded that "Aggressive GHG reduction targets and comprehensive strategies like San Francisco's help the Bay Area move toward reaching the State's AB 32 goals, and also serve as a model from which other communities can learn."[48]

The following analysis of the project's impact on climate change assesses the project's contribution to cumulatively significant GHG emissions. Because no individual project could emit GHGs at a level that could result in a significant impact on the global climate, this analysis is in a cumulative context, and this section does not include an individual project-specific impact analysis.

4.9.3.3 Impact Evaluation

Impact C-GG-1: The project would generate greenhouse gas emissions, but not at levels that would result in a significant impact on the environment or conflict with any policy, plan, or regulation adopted for the purpose of reducing greenhouse gas emissions. (Less than Significant)

Individual projects such as the BDFP contribute to the cumulative effects of climate change by directly or indirectly emitting GHGs during construction and operational phases.

Construction Impacts

Construction-related GHG emissions would include direct GHG emissions from operation of construction equipment and new vehicle trips over the five-year construction period. Construction-related GHG emissions associated with off-road equipment and on-road trucks were estimated based on a project-specific construction equipment list provided by the SFPUC and on-road haul/delivery truck volume estimates presented in Section 4.6, Transportation and Circulation. **Table 4.9-2** summarizes the project's annual and total construction-related GHG emissions from off-road equipment and on-road trucks. Based on a minimum life span of 22 years for project facilities (2023 to

[48] San Francisco Planning Department, *Letter Regarding Draft GHG Reduction Strategy*, October 28, 2010. Available online at http://www.sf-planning.org/ftp/files/MEA/GHG-Reduction_Letter.pdf. Accessed on March 3, 2016.

2045), the project's annualized construction-related GHG emissions would average 894 $MTCO_2E$. The BAAQMD does not identify a significance threshold for construction-related GHG emissions. However, when the project's construction-related annualized GHG emissions are compared to the BAAQMD's annual threshold for stationary sources of 10,000 $MTCO_2E$, the project's construction-related GHG emissions would remain well below this threshold and would be considered ***less than significant***.

TABLE 4.9-2
PROJECT CONSTRUCTION-RELATED GREENHOUSE GAS EMISSIONS

Year	Source	GHG Emissions ($MTCO_2E$)
Year 1	Off-Road Equipment	3,545
Year 2		3,107
Year 3		2,780
Year 4		2,106
Year 5		1,458
Year 1	On-Road Trucks	1,629
Year 2		797
Year 3		1,656
Year 4		1,432
Year 5		1,246
	Total	19,664

NOTES:
GHG = greenhouse gas; $MTCO_2E$ = metric tons of carbon dioxide-equivalent

Compliance with the Clean Construction Ordinance would reduce the non-biogenic portion of GHG emissions shown above. In addition, implementation of mitigation measures requiring use of renewable diesel fuel (see Section 4.8, Air Quality) would reduce the non-biogenic portion of the above-listed GHG emissions (because GHG emissions associated with renewable diesel are biogenic).

SOURCE: Ramboll Environ, *Air Quality Technical Report, Biosolids Digester Facilities Project Draft EIR*, March 2017 (Table 5).

Indirect GHG emissions are typically associated with emissions by electricity providers for line power, but the source of line power at the SEP that would be used by BDFP facilities is renewable energy from Hetch Hetchy hydropower. Electricity from this source would minimize the potential for project-related indirect GHG emissions.

In addition to the Executive Directive 06-02 requiring use of renewable diesel in all municipal fleets, the project would also be subject to and required to comply with San Francisco Environment Code Chapters 7 and 14 and the Construction Recycled Content Ordinance. Compliance with these regulations would help to further reduce GHG emissions from construction activities, vehicles, and equipment. Recycling and reuse of construction and demolition debris materials would reduce GHG emissions by reducing the energy required to produce new materials and diverting waste from landfills.

Operational Impacts

Operation of the existing solids processing facilities at the SEP currently generates biogenic and non-biogenic GHG emissions. As noted in Section 4.9.2, biogenic emissions result from materials that are derived from living cells and contain carbon that is present in organic materials. Existing operational biogenic GHG emissions were estimated based on digester gas throughput in 2014 in the cogeneration engine, boiler, and waste gas burners (see **Table 4.9-3**). Non-biogenic GHG emissions were estimated based on natural gas throughput in 2014 at the SEP, which is mostly used as a backup (when digester gas is not available) in the cogeneration engine. Table 4.9-3 presents estimated GHG emissions associated with existing operations.

Table 4.9-3 also presents estimated GHG emissions associated with the BDFP under three representative operating conditions: (1) during the transition period in 2023 when limited existing facilities (waste gas burners only) would still operate along with some proposed facilities (proposed waste gas burners, backup steam boilers, and standby diesel engine), as project facilities are gradually brought online; (2) after the transition period (assumed to be in 2023) when existing waste gas burners would be decommissioned and project facilities (proposed turbine, backup steam boilers, waste gas burners, and standby diesel engine) would be in full operation; and (3) full operation of project facilities (proposed turbine, microturbines, backup steam boilers, waste gas burners, and standby diesel engine) in 2045.

When compared to existing conditions, implementation of the BDFP would result in a 120 percent increase in biogenic emissions between 2015 and 2045 and an 11 percent decrease in non-biogenic emissions during this same period. The increase in biogenic emissions is largely attributable to population growth that is projected to occur between 2023 and 2045 and the associated increase in wastewater treatment demand. These increases in biogenic emissions and decreases in non-biogenic emissions would be due mainly to the increase in production and combustion of digester gas at the proposed anaerobic digesters and Energy Recovery Facility (i.e., increased capture of biogas for energy recovery) and elimination of natural gas use at the existing cogeneration engine. Biogenic CO_2 emissions from wastewater solids at the SEP will occur regardless of the project and regardless of whether the organic material decomposes in solids processing facilities at the BDFP or at a land application site (i.e., landfills, composting operation, etc.). Therefore, biogenic emissions are not attributable to the BDFP and the BDFP's projected increase in biogenic emissions is not considered a CEQA impact.

The main difference between the digester gas that would be produced under the BDFP operations and GHG emissions that are currently generated at land application sites from off-hauling of treated solids is that the digester gas generated from biosolids at the BDFP would be used to generate energy, whereas there is no energy capture from GHG emissions at land application sites. With project implementation, BDFP process treatment facilities would increase digester gas production (separate from digester gas increases attributable to population growth) and, in turn, increase production of renewable energy from digester gas. The BDFP energy recovery facilities would generate sufficient levels of electricity by 2045 to power all BDFP facilities and eliminate use of natural gas (non-biogenic) and renewable energy from Hetch Hetchy hydropower (except as backup). Excess power produced by the BDFP could be used for other SEP processes. By eliminating the need for energy from Hetch Hetchy hydropower, the BDFP would make this renewable energy

TABLE 4.9-3
PROJECT OPERATIONAL GREENHOUSE GAS EMISSIONS

Source	GHG Emissions ($MTCO_2E$)[a]			
	Existing Operation (2015)	**Project Transition (2023)**	**Project Full Operation (2023)**	**Project Full Operation (2045)**
Biogenic Sources				
Existing Waste Gas Burners[b]	3,741	7,131	--	--
Existing Cogeneration Engine–Digester Gas[b]	5,975	--	--	--
Existing Hot Water Boiler[b]	4,214	--	--	--
Proposed Turbines (1 duty/1 future standby)	--	--	27,824	27,824
Proposed Backup Steam Boilers (2 standby)	--	--	87	109
Proposed Microturbines (3 duty/1 standby)	--	--	--	2,874
Proposed Waste Gas Burners (2 standby)	--	7,131	1,364	227
Total Biogenic Emissions	13,931	14,261	29,276	31,035
Non-Biogenic Sources				
Existing Cogeneration Engine–Natural Gas	164	--	--	--
Existing Cogeneration Engine – Digester Gas[b]	30	--	--	--
Existing Utility-Provided Electricity	0	--	--	--
Existing Waste Gas Burners[b]	19	36	--	--
Existing Hot Water Boiler[b]	21	--	--	--
Proposed Turbines (1 duty/1 future standby)	--	--	140	140
Proposed Waste Gas Burners (2 standby)	--	36	6.88	1.1
Proposed Backup Steam Boilers (2 standby)	--	89	0.44	0.55
Proposed Microturbines (3 duty/1 standby)	--	--	--	14
Proposed Emergency Diesel Engine (1 standby)	--	50	50	50
Total Non-Biogenic Emissions	234	212	198	207
Net Change in Non-Biogenic Emissions from Existing Conditions	**--**	**(22)**	**(36)**	**(27)**

NOTES:

[a] GHG = greenhouse gas; $MTCO_2E$ = metric tons of carbon dioxide-equivalent; -- = no emissions. Numbers may not add due to rounding.

[b] CO_2 emissions from digester gas combustion in the waste gas burners, cogeneration engine, and boilers are considered biogenic emissions by the CARB; however, CARB considers CH_4 and N_2O emissions to be non-biogenic for the purposes of reporting because the combustion of digester gas results in net additions of CH4 and N2O to the atmosphere, which would otherwise not be generated without this process.

SOURCE: Ramboll Environ, *Air Quality Technical Report, Biosolids Digester Facilities Project Draft EIR*, March 2017 (Table 10, 13a, 13b, 13c, 15).

source available to other users in 2023. Therefore, the project would directly reduce GHG emissions from non-biogenic sources (natural gas), and also indirectly reduce GHG emissions by making more renewable energy from hydropower available to other Hetch Hetchy hydropower customers.

Implementation of the BDFP would also result in a change in non-biogenic emissions associated with truck trips off-hauling biosolids. The biosolids volume generated at the SEP is currently (year 2015) 13,000 dry tons annually, requiring about 7 to 10 haul trips per day. In 2045, *without implementation of the BDFP*, the amount of biosolids generated is projected to be 27,700 dry tons, requiring 14 to 18 haul trips per day. With project implementation, the amount of biosolids generated by the proposed BDFP solids handling facilities is projected to be 24,000 dry tons, requiring 10 to 14 haul trips per day. This reduction in the future number of truck trips would reduce vehicle miles traveled that would otherwise be required to transport biosolids volumes to land application sites or landfills. In addition, the proposed new thermal hydrolysis process/digestion process would also upgrade the quality of the current Class B biosolids produced from the treatment process to Class A biosolids, which would expand the options for beneficial reuse of these materials. These new options for biosolids reuse could be located closer to San Francisco, and thereby reduce travel distances of haul trucks with associated reductions in truck-related GHG emissions.

As indicated in Table 4.9-3, total GHG emissions (biogenic and non-biogenic) from proposed facilities under both full operation scenarios would exceed the 25,000 $MTCO_2E$ threshold, and therefore project facilities would be subject to the CARB's GHG Mandatory Reporting Regulation. The SFPUC would be required to report total GHG emissions (biogenic and non-biogenic) after project implementation, as it currently reports under existing operations. Based on the CARB guidance described in Section 4.9.2.2, the project would not be subject to requirements of the Cap-and-Trade Regulation because over 99 percent of the project's CO_2E emissions would be biogenic. Therefore, the project would be consistent with the mandatory reporting requirements and cap and trade regulations in AB 32. Given the 11 percent reduction in non-biogenic GHG emissions from 2015 levels over the next 30 years, the project would not conflict with the AB 32 goal to reduce GHG emissions to 1990 levels by 2020. This 11 percent reduction in addition to indirect reductions in GHG emissions (i.e., making more renewable energy from hydropower available to other Hetch Hetchy hydropower customers) would also not conflict with state goals to reduce GHG emissions to 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050 (EO S-3-05 and EO B-30-15).

The project would be subject to applicable regulations adopted to reduce operational GHG emissions, as identified in the San Francisco Strategies to Address Greenhouse Gas Emissions. Compliance with the City's Commuter Benefits Program, Emergency Ride Home Program, transportation management programs, Executive Directive 06-02 requiring use of renewable diesel, Clean Construction Ordinance, and bicycle parking requirements would reduce the project's transportation-related emissions. These regulations would reduce GHG emissions from single-occupancy vehicles during operations by promoting the use of alternative transportation modes with zero or lower GHG emissions on a per capita basis.

The project would comply with the applicable energy efficiency requirements of the City's Green Building Requirements for City Buildings related to indoor water use, lighting, and energy use, which would promote energy and water efficiency, thereby reducing the project's energy-related GHG emissions.[49] Additionally, the project would meet the renewable energy criteria of the Green Building Code by increasing use of renewable energy, further reducing the project's energy-related GHG emissions.

The project's waste-related GHG emissions would be reduced through compliance with the City's recycling and composting ordinance, and Green Building Code requirements. These regulations reduce the amount of materials sent to a landfill, reducing GHGs emitted by landfill operations. These regulations also promote reuse of materials, conserving their embodied energy[50] and reducing the energy required to produce new materials.

Compliance with the City's street tree planting requirements would serve to increase carbon sequestration, and proposed planting of landscape trees would help offset the effects associated with the proposed removal of about 90 trees (see Section 2.4.2.3 of the Project Description, Architecture and Landscaping).[51] Compliance with other regulations, including those limiting refrigerant emissions, managing stormwater, and protecting indoor air quality, would reduce emissions of GHGs. Regulations requiring low-emitting finishes would reduce volatile organic compounds (VOCs).[52] Thus, the project would be consistent with San Francisco's Strategies to Address Greenhouse Gas Emissions.[53]

As part of the proposed project, the SFPUC is required to comply with the above regulations, which have proven effective as San Francisco's GHG emissions have measurably decreased when compared to 1990 emissions levels, demonstrating that the City has met and exceeded EO S-3-05, AB 32, and the *Bay Area 2010 Clean Air Plan* GHG reduction goals for the year 2020.

Other existing regulations, such as those implemented through AB 32, will continue to reduce a project's contribution to climate change. In addition, San Francisco's local GHG reduction targets are consistent with the long-term GHG reduction goals of EO S-3-05, EO B-30-15, AB 32, and the *Bay Area 2010 Clean Air Plan*. Therefore, because the project's energy generation would be regulated by AB 32 under the mandatory reporting requirements and the project's non-biogenic emissions would decrease by 11 percent from existing emissions, and because other components of the project would be consistent with the City's GHG reduction strategy, the project is consistent with the GHG reduction goals of EO S-3-05, EO B-30-15, AB 32, and the *Bay Area 2010 Clean Air Plan*, would not

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[49] Although the City's green building requirements for City buildings related to indoor water conservation and energy reduction measures are not applicable to wastewater treatment facilities, the SFPUC proposes to implement these measures to the extent feasible. Compliance with water conservation measures would reduce the energy (and GHG emissions) required to convey, pump, and treat water required for the project.

[50] Embodied energy is the total energy required for the extraction, processing, manufacture, and delivery of building materials to the building site.

[51] GHG emissions reductions from such carbon sequestration effects would gradually increase over time as planted trees grow, and such reductions are not included in existing or project-related operational GHG emissions estimates.

[52] While not a GHG, VOCs are precursor pollutants that form ground level ozone. Increased ground level ozone is an anticipated effect of future global warming that would result in added health effects locally. Reducing VOC emissions would reduce the anticipated local effects of global warming.

[53] San Francisco Planning Department, *Greenhouse Gas Analysis: Compliance Checklist for Biosolids Digester Facilities Project*, April 2017.

conflict with these plans, and would therefore not exceed the applicable GHG threshold of significance. As such, the project would result in a less-than-significant impact with respect to GHG emissions. No mitigation measures are necessary.

Summary of Impact C-GG-1

The project's GHG emissions would not conflict with state, regional, or local GHG reduction plans and regulations, and the project would not contribute considerably to cumulative GHG emissions. As such, the project would result in a ***less-than-significant*** impact with respect to GHG emissions. No mitigation measures are necessary.

Mitigation: None required.

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