REVISED DRAFT

Gerald Desmond Bridge Replacement Project

Environmental Impact Report / Environmental Assessment & Application Summary Report

Prepared for

Caltrans

Port of LONG BEACH
The Green Port

FEBRUARY 2010

The environmental review, consultation, and any other action required in accordance with applicable Federal laws for this project is being, or has been, carried out by Caltrans under its assumption of responsibility pursuant to 23 U.S.C. 327.

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ENVIRONMENTAL IMPACT REPORT/ENVIRONMENTAL ASSESSMENT

The Port of Long Beach

and

STATE OF CALIFORNIA
Department of Transportation

Submitted Pursuant to (State) Division 13, California Public Resources Code
and (Federal) 42 U.S.C. 4332(2)(c)

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LIST OF ACRONYMS AND ABBREVIATIONS

AADT	annual average daily traffic
AAM	annual arithmetic mean
AASHTO	American Association of State and Highway Transportation Officials
AB	Assembly Bill
AC	asphalt concrete
ACHP	Advisory Council on Historic Preservation
ACM	asbestos-containing material
ACTA	Alameda Corridor Transportation Authority
ADA	Americans with Disabilities Act
ADL	aerially deposited lead
ADT	average daily traffic
AEP	Association of Environmental Professionals
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
APCD	Air Pollution Control District
APE	area of potential effects
ARPA	Archaeological Resources Protection Act
ASR	Application Summary Report
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
BEP	Business Emergency Plan
bgs	below ground surface
BHC	Board of Harbor Commissioners
BMPs	best management practices
BOD	biochemical oxygen demand
BP	British Petroleum
BSA	Biological Survey Area
BTA	Bicycle Transportation Account Compliance Document
°C	degrees Celsius
CAA	Clean Air Act
CAAAs	Clean Air Act Amendments
CAAP	Clean Air Action Plan
CAAQS	California Ambient Air Quality Standards
CA FID	California Facility Index Database
Cal-EPA	California Environmental Protection Agency
Cal-Sites	California Sites
Caltrans	California Department of Transportation
CAP	Climate Action Program
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCAR	California Climate Action Registry
CCC	California Coastal Commission
CC/GHG Plan	Climate Change/Greenhouse Gas Strategic Plan
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDMG	California Division of Mines and Geology
CEC	California Energy Commission
CEIDARS	California Emission Inventory and Reporting System
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CERFA	Community Environmental Response Facilitation Act of 1992

CESA	California Endangered Species Act
CFCs	chlorofluorocarbons
CFP	California fully protected species
CFR	*Code of Federal Regulations*
CH_4	methane
CHMIRS	California Hazardous Material Incident Reporting System
CLA	Compton-Los Alamitos
cm	centimeter
CMA	Critical Movement Analysis
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
COLB	City of Long Beach
CORRACTS	Corrective Action Tracking System
CORSIM	Traffic Software Integrated System Corridor Simulation
CORTESE	Cortese Hazardous Waste and Substances Site List
CPI	Consumer Price Index
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CSC	California Department of Fish and Game Species of Concern
CSLC	California State Lands Commission
CSSC	California Species of Special Concern
CTD	conductivity, temperature, and depth
CTP	Clean Trucks Program
cu yd	cubic yard
CVC	California Vehicle Code
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	decibel
dBA	A-weighted decibel
DDT	dichloro-diphenyl-trichloroethane
DE	diesel exhaust
DMI	Danish Maritime Institute
DO	dissolved oxygen
DOGGR	California Department of Conservation, Division of Oil, Gas, and Geothermal Resources
DOT	United States Department of Transportation
DPM	diesel particulate matter
DSAs	disturbed soil areas
DTR	drayage truck registry
DTSC	Department of Toxic Substances Control
EA	Environmental Assessment
EB	eastbound
EBR	eastbound right
EBTR	eastbound through right
EDR	Environmental Data Resources, Inc.
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPFT	Elysian Park Fold and Thrust Belt
ERNS	Emergency Response and Notification System
ESA	Federal Endangered Species Act
°F	degrees Fahrenheit

FBI	Federal Bureau of Investigation
FEE	functional-evaluation earthquake
FEMA	Federal Emergency Management Agency
FEU	forty-foot equivalent unit
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FIRM	Flood Insurance Rate Map
FSTIP	Federal Statewide Transportation Improvement Program
ft	feet
FTA	Federal Transit Administration
FY	fiscal year
GHG	greenhouse gas
g/hp-hr	gram per horsepower-hour
GPP	Green Port Policy
GWh	gigawatt-hours
GWP	global warming potential
ha	hectares
HAPs	hazardous air pollutants
HARP	Hotspots Analysis and Reporting Program
HCM	Highway Capacity Manual
HFCs	hydrofluorocarbons
HHI	health hazard index
HIST UST	Historic UST
HOV	high-occupancy vehicle
HRA	Health Risk Assessment
HPSR	Historic Properties Survey Report
HRER	Historic Resources Evaluation Report
I-110	Interstate 110
I-405	Interstate 405
I-710	Interstate 710
ICTF	Intermodal Container Transfer Facility
ICU	intersection capacity utilization
IHA	Incidental Harassment Authorization
in.	inch
in/yr	inches per year
IP	Port-related Industrial zone
IPCC	Intergovernmental Panel on Climate Change
IR	Installation Restoration
IRIS	Integrated Risk Information System
ISA	Initial Site Assessment
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
IWG	Interagency Working Group on Environmental Justice
kg/mo	kilograms per month
km	kilometers
km/hr	kilometers per hour
kts	knots
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hours
LACFCD	Los Angeles County Flood Control District
LADWP	Los Angeles Department of Water and Power
LAFD	Los Angeles Fire Department
LAHD	Los Angeles Harbor Department
LBFD	Long Beach Fire Department
LBGO	Long Beach Gas and Oil Department
LBGP	Long Beach General Plan
LBGS	Long Beach Generating Station

LBNSY	Long Beach Naval Shipyard
LBP	lead-based paint
Lbs/day	pounds per day
LCFS	low carbon fuel standard
LCPs	Local Coastal Plans
LED	light-emitting diode
L_{eq}	energy equivalent sound level
L_{max}	maximum sound level
LNG	liquefied natural gas
LOS	level of service
LPR	license plate recognition
LST	localized significance threshold
LT	left through
LUST	leaking underground storage tank
L_{xx}	percentile-exceeded sound level
m	meters
M	Richter Magnitude
MATES-II	Multiple Air toxics Exposure Study
MCE	maximum credible earthquake
MBTA	Migratory Bird Treaty Act
MEP	maximum extent practicable
mgd	million gallons per day
μg/L	micrograms per liter
mg/L	milligrams per liter
$\mu g/m^3$	micrograms per cubic meter
mg/m^3	milligrams per cubic meter
MGP	Manufactured Gas Plant
MHW	mean high water
MHWL	mean high water level
mi	miles
ML	local magnitude
MLD	most likely descendent
MLLW	mean lower low water datum
μm	micron
mm	millimeter
mm/yr	millimeters per year
M&N	Moffatt & Nichol
MND	Mitigated Negative Declaration
mpg	miles per gallon
mph	miles per hour
MPO	Metropolitan Planning Organization
MSATs	mobile source air toxics
MSL	mean sea level
MSRC	Marine Spill Response Building
MTA	Metropolitan Transportation Authority
MTBE	methyl tributyl ethylene
MTG	Mercator Transport Group
MW	megawatt
MY	model year
NAAQS	National Ambient Air Quality Standards
NAC	noise abatement criteria
NAHC	Native American Heritage Commission
NATA	National Air Toxics Assessment
NB	northbound
NBL	northbound left
NBR	northbound right
NBT	northbound through

NBTL	northbound through/left
NBTR	northbound through/right
NCHRP	National Cooperative Highway Research Program
NEPA	National Environmental Policy Act
NFRAP	No Further Remedial Action Planned
NHPA	National Historic Preservation Act
NISZ	Newport-Inglewood Structural Zone
NLEV	national low-emission vehicle
nm	nautical miles
NMHC	non-methane hydrocarbons
N_20	nitrous oxide
NO_2	nitrogen dioxide
NO_X	nitrogen oxide
NOAA	National Oceanic and Atmospheric Administration
NOC	Notice of Construction
NOI	Notice of Intent
NOIS	Notice of Initiation of Studies
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NRDC	National Resources Defense Council
NRHP	National Register of Historic Places
NTE	not-to-exceed
NTU	nephelometric turbidity units
O_3	ozone
OCR	optical character recognition
OEHHA	Office of Environmental Health Hazard Assessment
O&M	operating and maintenance
OPR	Office of Planning and Research
OSHA	Office of Safety and Health Administration; Occupational Safe and Health Act
PA	Programmatic Agreement
PAHs	polycyclic aromatic hydrocarbons
Pb	lead
PCBs	polychlorinated biphenyls
PCC	Portland cement concrete
PCE	passenger car equivalent
PCH	Pacific Coast Highway
pc/mi/ln	passenger cars per mile per lane
PDT	Project Development Team
PEAR	Preliminary Environmental Analysis Report
PFCs	perfluorocarbons
PFMMP	Peregrine Falcon Monitoring and Mitigation Program
PHT	Puente Hills Thrust
PID	photoionization detector
PM	particulate matter
$PM_{2.5}$	particulates less than 2.5 microns in diameter
PM_{10}	particulates less than 10 microns in diameter
PMP	Port Master Plan
POAQC	Projects of Air Quality Concern
POLA	Port of Los Angeles
POLB	Port of Long Beach
POM	polycyclic organic matter
Port	Port of Long Beach
Ports	Port of Long Beach and Port of Los Angeles
PPE	personal protective equipment
ppm	parts per million
ppt	parts per thousand

PRC	Public Resources Code
project	Gerald Desmond Bridge Replacement Project
RAP	Relocation Assistance Program
RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Information System
RCRIS-LgGen	Resource Conservation and Recovery Information System Large Generator Database
RCRIS-SmGen	Resource Conservation and Recovery Information System Small Generator Database
RECs	recognized environmental conditions; renewable energy certificates
RELs	reference exposure levels
RFG	reformulated gasoline
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
ROI	region of influence
ROW	right-of-way
RPM	radiation portal monitors
RTG	rubber tire gantry
RTIP	Regional Transportation Improvement Program
RTP	Regional Transportation Plan
RV	recreational vehicle
RVP	Reid vapor pressure
RWQCB	Regional Water Quality Control Board
SAFETEA-LU	Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users
SAP	Sampling and Analysis Plan
SB	southbound; State Bill
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SDC	Caltrans Seismic Design Criteria
SEE	safety-evaluation earthquake
SET	supplemental emissions test
SF_6	sulfur hexafluoride
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SLIC	spills, leaks, investigation, and cleanup
SMB	Santa Monica Bay
SO_2	sulfur dioxide
SO_4	sulfates
SPBS	San Pedro Bay Standards
sq ft	square feet
sq km	square kilometer
sq mi	square mile
SR	State Route
SRAs	source/receptor areas
SS	settleable solids
STIP	State Transportation Improvement Program
Strategic Plan	Metro Bicycle Transportation Strategic Plan
SWEEPS	Statewide Evaluation and Environmental Planning System
SWLF	Solid Waste and Landfill Database
SWMP	Stormwater Management Plan
SWRCB	State Water Resources Control Board
SWPPP	Storm Water Pollution Prevention Plan

TACs	toxic air contaminants
TAP	Technical Advisory Panel
TCMs	Transportation Control Measures
TCWG	Transportation Conformity Working Group
TDC	targeted design constituent
TEA-21	Transportation Equity Act for the 21st Century
TES	threatened, endangered, or special-status
TEU	20-foot equivalent unit
THB	THUMS-Huntington Beach
TIP	Transportation Improvement Plan
TMDL	total maximum daily load
TMP	Transportation Management Plan
TOG	total organic gas
TPH	total petroleum hydrocarbon
TR	through right
TRB	Transportation Research Board
TSA	Department of Homeland Security Transportation Security Division
TSCA	Toxic Substances Control Act
TSD	treat, store, or dispose (hazardous materials)
T/SP	top and side pick
TSS	total suspended solids
TTI	Total Terminal, Inc.
TWG	Technical Working Group
UFP	ultrafine particles
ULCS	Ultra Large Container Vessel
UPRR	Union Pacific Railroad
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	underground storage tank
V/C	volume/capacity
VCP	Voluntary Cleanup Program
VDECS	verified diesel emission control system
VHT	vehicle hours traveled
VMT	vehicle miles traveled
VOCs	volatile organic chemicals
vpd	vehicles per day
VSRP	Vessel Speed Reduction Program
WB	westbound
WCI	Western Regional Climate Action Initiative
WDR	waste discharge requirement
WPCs	Water Pollution Controls
ZOI	zone of influence

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This revised Draft Environmental Impact Report (EIR)/Environmental Assessment (EA) analyzes project-specific impacts of the proposed Gerald Desmond Bridge Replacement Project (project). This document has been prepared by the City of Long Beach acting by and through its Board of Harbor Commissioners (Port of Long Beach [Port or POLB]) as lead agency for the EIR and the California Department of Transportation (Caltrans) as lead agency for the EA, in accordance with Section 6005 of the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) of 2005 (23 United States Code [U.S.C.] 327[a][2][A]), the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321 *et seq*.); the Council on Environmental Quality (CEQ) Regulations implementing NEPA (40 *Code of Federal Regulations* [CFR] 1500-1508); Federal Highway Administration (FHWA) Environmental Regulations (23 CFR 771); and the California Environmental Quality Act of 1970 (CEQA) (Public Resources Code [PRC] 21000 *et seq*. as amended) and implementing guidelines (California Code of Regulations [CCR], Title 14, Section 15000 *et seq.*).

ES 1.1 SUMMARY OF CHANGES TO THE PROJECT FOLLOWING CIRCULATION OF THE JUNE 2004 "DRAFT" EIR/EA

Subsequent to the public comment period for the previously circulated Draft EIR/EA (June 2004), the Port elected to consider two additional alternatives: a bridge rehabilitation alternative and a tolling alternative (using tolls to fund bridge construction and operation). In addition, the Port updated the analysis of existing and future traffic conditions by collecting more recent traffic data and updating the projection of future traffic conditions based on recent forecasts of marine terminal activity and configuration.

The proposed project limits (i.e., new bridge and related improvements, and Southern California Edison [SCE] transmission line relocation) remain the same as that presented in the 2004 Draft EIR/EA; however, the study area was expanded, as described in the 2005 revised Notice of Preparation (NOP), to address the tolling alternative as follows: Willow Street/Sepulveda Boulevard on the north end and Interstate 110 (I-110) on the west end. The tolling alternative was found to have effects beyond these expanded study limits, extending to Interstate 405 (I-405) to the north, I-110/State Route (SR) 91 to the west, and into downtown Long Beach at Pine Avenue to the east. The south end of the project study area has not changed, terminating at Pico Avenue south of the Ocean Boulevard interchange.

Subsequently, the tolling alternative was not carried forward for further consideration as dicussed below in Section ES 1.9 and in Chapter 1, Section 1.7. The study area was then reduced and is now slightly larger than the study area discussed within the 2004 Draft EIR/EA. The study area now extends along Ocean Boulevard from just west of Navy Way/Seaside Avenue on Terminal Island to Pine Avenue in downtown Long Beach. Project limits to the north and south have not changed from the 2004 Draft EIR/EA and extend to 9th Street on SR 710 to the north and to Pico Avenue south of Ocean Boulevard to the south.

The Bridge Rehabilitation Alternative would seismically retrofit the existing bridge by improvements including replacing the bridge deck and expansion joints, adding steel casings at all columns, foundation retrofit, replacing sway bracings, and painting of all steel members. After bridge rehabilitation, roadway operations within the project areas would be the same as existing.

With the addition of the Rehabilitation Alternative, tolling alternative, expanded study area limits, and updated traffic forecasts, the Port elected to update several technical studies supporting this revised Draft EIR/EA. These consisted of the Air Quality Analysis, Traffic Impact Analysis, Noise Study, Natural Environment Study, Community Impact Analysis, Visual Impact Analysis, Water Resources, and Hazardous Waste Initial Site Assessment (ISA). This revised Draft EIR/EA also includes a Health Risk Assessment (HRA). POLB issued the revised NOP in December 2005 and made it available to the public and responsible/ trustee agencies to provide comments regarding the revisions to the proposed project. No comments were received from either the public or responsible/trustee agencies during the public review period of the revised NOP.

ES 1.2 INTENDED USES AND AUTHORIZING ACTIONS

The Port and Caltrans are acting as the lead agencies for the proposed project in accordance with CEQA and NEPA, respectively. The Port and Caltrans have prepared a joint EIR/EA for the proposed project.

This revised Draft EIR/EA includes analysis of the expanded project study area. In addition, the public comments received on the June 2004 Draft EIR/EA have been addressed in the revised Draft EIR/EA.

The purpose of this document is to evaluate the proposed project alternatives, including the No Action Alternative. This revised Draft EIR/EA is being circulated and made available, as required by CEQA and NEPA, to interested and concerned parties, including private citizens, community groups, the business community, elected officials, and public agencies. After the public review and comment period, a Final EIR/EA will provide the basis for decision making by the local and federal lead agencies.

ES 1.2.1 Caltrans Intended Uses

Caltrans is the lead agency for the proposed project under NEPA, primarily because federal funding would be obtained and the affected transportation segment would become part of the National Highway System. Caltrans would approve the project under NEPA on behalf of FHWA under its assumption of responsibility pursuant to 23 U.S.C. 327.

ES 1.2.2 Port of Long Beach Intended Uses

The Port seeks federal and state approvals to proceed with construction of the project. The Port is responsible for the preparation of the joint CEQA and NEPA documentation, pursuant to the respective environmental regulations and guidelines of Caltrans and FHWA.

Subsequent to completion of the Final EIR/EA, the Board of Harbor Commissioners (BHC) would certify the EIR. If the project is appealed to the California Coastal Commission (CCC), then the Port would use the Final EIR/EA to demonstrate compliance with CEQA and NEPA and to justify approval of the project. In the event that the project is approved, the BHC would approve a transportation easement and issue a Harbor Development Permit.

ES 1.3 PROJECT LOCATION AND SETTING

The Gerald Desmond Bridge is one of three bridges connecting surface highways to Terminal Island in the harbor area (see Exhibit ES-1). The bridge is located within the Port in an area zoned industrial. The Port owns most of this land, with several relatively small, privately owned properties located in the Inner Harbor area and northernmost sections of the Port. The bridge crosses the Back Channel and generally runs east-west across Pier D. It is located in three different Planning Districts in the Long Beach Harbor. These include the Northeast Harbor Planning District, the Terminal Island Planning District, and the Middle Harbor Planning District (POLB, 1999).

The proposed project and alternatives are located in the southwest portion of the City of Long Beach at the southern end of Interstate 710 (I-710). I-710 is classified as SR 710 south of Pacific Coast Highway (PCH) in the State of California's Streets and Highways Code. Under the Bridge Replacement Alternatives, the bridge and Ocean Boulevard would become part of SR 710 and would operate as a freeway facility with controlled access. The improvements between the existing SR 710 and SR 47, including the bridge, would be transferred to Caltrans by easement following route adoption and execution of a freeway agreement. It is estimated that the transfer would be completed within 2 years after construction.

The proposed project is over the Back Channel/ Cerritos Channel area of the Port. It is centered along Ocean Boulevard from the intersection of the Terminal Island Freeway (SR 47) at the western end to its eastern terminus at the westerly end of the bridge over the Los Angeles River. The southern limit of the project is located on Pico Avenue approximately 660 feet (ft) (201 meters [m]) south of the Ocean Boulevard interchange. The northern limit of the project is along SR 710, approximately 2,630 ft (801 m) north of Ocean Boulevard, and to the southernmost limit of the SCE tower on Pier A.

ES 1.4 PROJECT OBJECTIVES

The objectives of the proposed project include providing a structurally sound bridge linking Terminal Island and Long Beach/SR 710 over the next hundred years, given that the existing bridge is seismically deficient and could be seriously damaged in a major earthquake. Another objective is to provide sufficient roadway capacity to handle current and projected vehicular traffic volume demand, which the existing bridge cannot

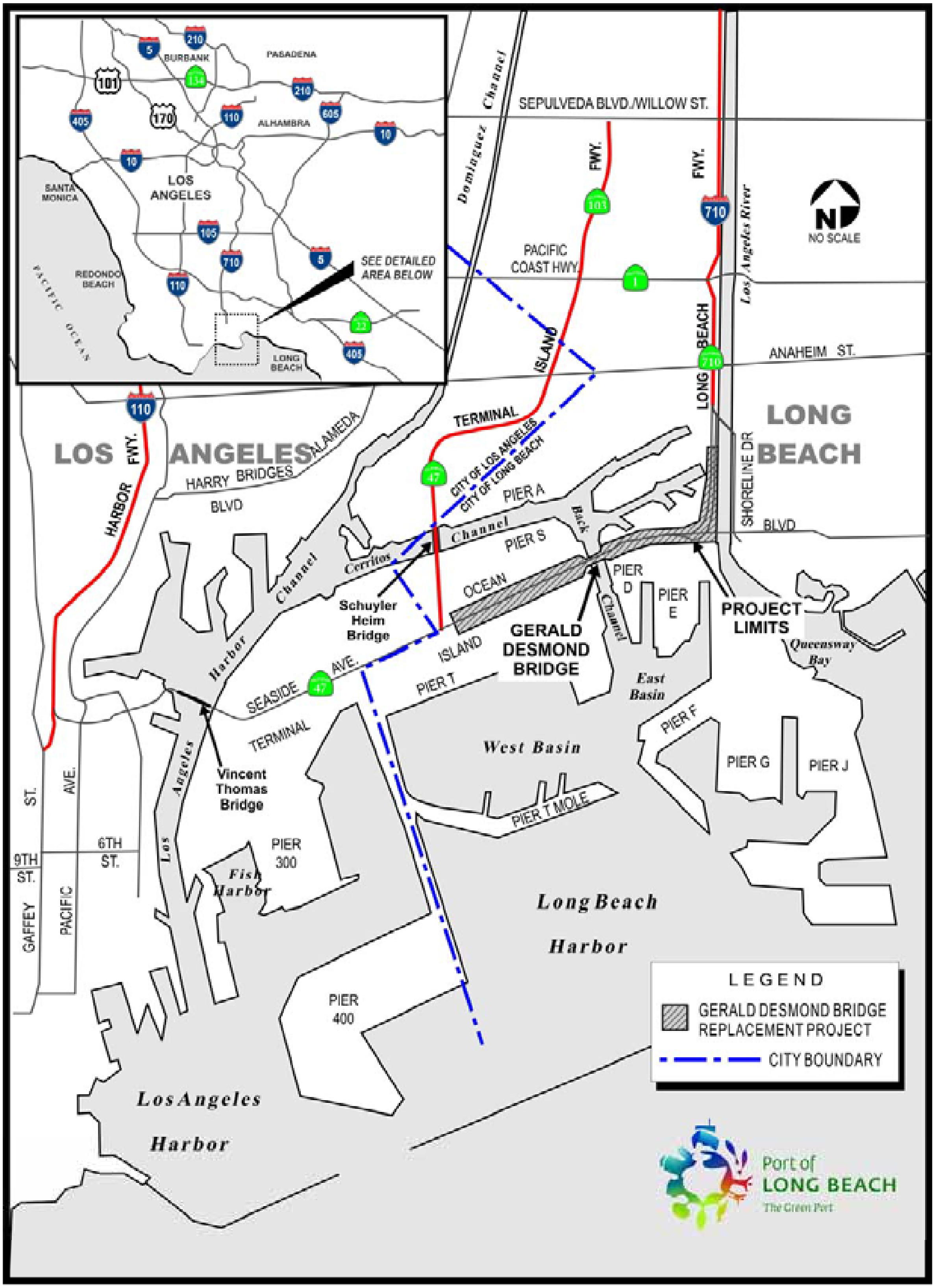

Exhibit ES-1
Gerald Desmond Bridge Replacement Project Vicinity and Project Location Map

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provide with only two through lanes and no outside shoulders. Lastly, the proposed project would provide sufficient vertical clearance for safe navigation through the Back Channel to the Inner Harbor, which the existing bridge, at only 156 ft (47.5 m) above mean high water level (MHWL), does not provide. (See Section 1.1.2.2 for detailed information supporting these objectives.)

The project would replace or rehablitate the existing seismically deficient Gerald Desmond Bridge. Additionally, the North- and South-side Alternative Alignment Alternatives would improve vehicular traffic flow and marine vessel safety for current and future marine vessels requiring passage through the Back Channel. The Bridge Replacment Alternatives would provide additional benefit to the Port and region by handling existing operations and forecasted growth in vehicular traffic, vessel traffic, and goods movement. The project objectives are consistent with similar goals addressed in the Port Master Plan (PMP), as amended.

ES 1.5 PURPOSE AND NEED

The main purpose of the proposed project is to provide a structurally sound/seismically resistant bridge, in addition to improved vehicular capacity and marine vessel safety. The project purpose is consistent with similar goals addressed in the PMP, as amended.

This project is included in the Southern California Association of Governments (SCAG) 2008 Regional Transportation Plan (RTP) and 2008 Regional Transportation Improvement Program (RTIP) for Local Highway Projects (Project ID LA000512).

The current estimated cost of the proposed project for the North- and South-side Bridge Replacement Alternatives and the Rehabilitation Alternative is approximately $983 million, $1.0 billion, and $289.3 million (in 2008 dollars), respectively. The Port would secure funding for the project from federal, state, regional, and local agency resources, and it would continue to pursue public-private partnerships to the extent required to supplement public funds.

ES 1.5.1 Project Purpose

The purpose of the proposed project is four-fold – to provide a bridge that would:

1. Be structurally sound and seismically resistant;
2. Reduce approach grades;
3. Provide sufficient roadway capacity to handle current and future car and truck traffic volumes; and
4. Provide vertical clearance that would afford safe passage of existing container ships and for new-generation larger vessels currently being constructed.

Only the Bridge Replacement Alternatives would meet all four purposes of the project, as well as provide a structure that would meet the transportation needs of the Port and the region for its planned 100-year design life. The Rehabilitation Alternative would still require replacement after its 30-year design life (see Section ES 1.10 for additional discussion comparing the proposed alternatives).

ES 1.5.2 Project Need

The following discussion summarizes the present and projected deficiencies in the Gerald Desmond Bridge that constitute the basic needs for rehabilitation or replacement of the bridge.

Bridge Condition

According to a County of Los Angeles Department of Public Works Bridge Inspection Report dated September 5, 2007, the bridge has a sufficiency rating of 43. Bridges that are found to be structurally deficient or functionally obsolete, as defined by FHWA, with a sufficiency rating of less than 80 are eligible for federal funding for rehabilitation. Bridges are eligible for replacement when they have a sufficiency rating of less than 50 (Caltrans, 2001).

The existing bridge is physically deteriorated. One of the major physical deficiencies of the bridge is that the concrete is spalling off the bridge in many areas. Pieces of fallen concrete weighing several pounds have been found, requiring the Port to install netting underneath the bridge to protect Port facilities and workers below.

The bridge is also seismically deficient. It was designed in the early 1960s and completed in 1968. As with all bridges of that era in high seismic regions, its original construction has seismic performance issues that do not meet current seismic standards required by the American Association of State Highway and Transportation Officials (AASHTO), as well as Caltrans Seismic Design Criteria (SDC). Additional seismic deficiencies that do not meet current AASHTO or SDC requirements include the presence of lap splices at the base of columns and an insufficient amount of confinement reinforcement in the bridge columns. Both of these deficiencies will make it very difficult for the bridge to withstand a major earthquake without incurring significant damage to the columns and potentially threatening overall bridge integrity.

An assessment of the existing bridge was performed to evaluate whether it is in compliance with current AASHTO codes, as well as Caltrans seismic criteria, and to determine the extent of any bridge rehabilitation needed to comply with current codes.

Several reports, including a 2005 Inspection Report, 2002 Load Rating Report, and 1989 Fatigue Memorandum, were reviewed to confirm the condition of the existing bridge and estimate the amount of work and cost associated with bringing it up to current AASHTO and Caltrans standards. A brief summary of findings from these reports is provided below:

- The Inspection Report cited the condition of the deck as “critical,” and the condition of the paint as “extremely poor.” With the existing deck crossing seawater and now being 40 years old, the inspection found it would have to be replaced in the near future to protect the overall structural integrity of the bridge and improve its seismic response. Deck replacement would also necessitate replacement of all expansion joints. To prevent major deterioration of the bridge steel members, painting would also be required in the near future.
- The Load Rating Report indicated that the members of the arch main span were overstressed for all design truck loads and would need to be replaced.

The existing bridge underwent a seismic retrofit study in the early 1990s, followed by a seismic retrofit to improve its seismic performance. To minimize retrofit cost, partial steel column casings were added at select columns, such as Piers 15 and 16, to support the main steel truss span.

Traffic Capacity/Roadway Deficiencies

Capacity

In 2005, which is the NOP baseline year, approximately 38 percent of all traffic on the Gerald Desmond Bridge had an origin or destination in the Ports of Long Beach and Los Angeles (Ports) (Iteris, 2009). Of the approximately 59,700 vehicles per day (vpd) on the bridge, 15,200 or 25 percent were trucks.

The presence of substantial numbers of vehicles other than passenger cars (i.e., heavy-duty trucks) affects traffic flow in two ways: (1) these vehicles occupy more roadway space than passenger cars; and (2) the operational capabilities of these vehicles, including acceleration, deceleration, and maintenance of speed, are inferior to passenger cars and result in the formation of large gaps in the traffic stream, which reduces highway capacity. On long sustained grades and segments where trucks operate considerably slower, formation of these large gaps can have a profound impact on the traffic stream (Iteris, 2009).

The bridge is forecast to carry a substantial amount (39 percent) of non-port, regional through traffic in 2030 (Iteris, 2009). Regional traffic will increase due to several major development projects that have been constructed in downtown Long Beach, such as the Pike at Rainbow Harbor and the proposed San Pedro Waterfront Development in the Port of Los Angeles (POLA).

Year 2030 forecasted traffic volumes without the project are approximately 124,670 total trips per day (including 54,360 trucks or 43.6 percent of the total traffic) on the Gerald Desmond Bridge (Iteris, 2009).

Level of Service (LOS). LOS is defined in six levels, from A through F. Level A is free-flow, high-speed conditions. At Level D, speed and maneuverability are reduced due to congestion, and Level F is a breakdown in flow, with speeds and vehicular throughput potentially dropping to zero. In 2005, peak-hour (i.e., morning, midday, and evening) traffic on the uphill segments (i.e., base of bridge to the crest) of the existing Gerald Desmond Bridge operated at LOS B or C in both the westbound (WB) and eastbound (EB) directions. In 2030, without the project, operations during peak hours are projected to be LOS F WB toward Terminal Island and LOS C EB toward Long Beach (Iteris, 2009).

Deficiencies

The primary roadway deficiencies are the lack of outside shoulders and the steep approach grades.

Shoulders. The lack of shoulders often results in broken-down trucks or passenger vehicles being stuck in the outside lane, effectively blocking or severely restricting the entire traffic flow in that direction of travel until the incident is cleared. The lack of shoulders also makes it more difficult for emergency vehicles and tow vehicles to gain access to the incidents. Providing outside shoulders would improve safety to the emergency responders and traveling public in these situations. The recent addition of climbing lanes on the bridge does not mitigate the need for breakdown shoulders because breakdowns still tie up the outside lanes as wider, slow-moving trucks must negotiate around incidents.

Approach Grades. The long, steep approach grades cause trucks to operate considerably slower, especially when passing, which creates large gaps in the traffic stream and further reduces highway capacity. The current approach grades are 5.5 percent on the west side of the bridge and 6 percent on the east side.

Vertical Clearance

The existing bridge is located over the main federal navigation channel (i.e., Back Channel) that serves the Port. It provides a vertical clearance of 156 ft (47.5 m) above MHWL, which is insufficient for the clearance of some existing container ships, as well as new vessels currently being constructed. The Gerald Desmond Bridge is one of the lowest bridges of any large commercial port in the world.

In addition, the vertical clearance afforded by the SCE transmission lines crossing Cerritos Channel north of the bridge is only 153 ft (46.6 m) above MHWL. These transmission lines would be the primary vertical clearance hazard to navigation if the bridge clearance were to be increased.

ES 1.6 PROJECT BACKGROUND

The existing Gerald Desmond Bridge was constructed in the mid 1960s and seismically upgraded in 1995. It provides four through travel lanes (i.e., two in each direction). On the uphill segments, climbing lanes were added by reconstructing the roadway area of the bridge to handle container trucks and improve LOS on the bridge. This improvement resulted in three ascending lanes and two descending lanes in each travel direction. Each climbing lane ends at the crest of the bridge. The bridge is a steel tied-arch truss structure, in which the horizontal forces of the arch are borne by the bridge deck, rather than the ground or the bridge foundations. The bridge has a 409.5-ft-long (124.8-m-long) suspended span that crosses the deep-water navigable channel connecting the middle and inner harbors of the Port (Parsons-HNTB, 2002a).

As the fifth largest seaport complex in the world, the Ports handle more than 30 percent of U.S. waterborne container cargo (POLB, 2006b). The bridge is a vital link in Port-area goods movement infrastructure because it is the westerly extension of SR 710, which is the primary access route for the Ports and carries approximately 15 percent of all U.S. port-related container traffic (Caltrans *et al.*, 2005).

ES 1.7 PROJECT DESCRIPTION

ES 1.7.1 Bridge Replacement

The proposed project would construct a new bridge across the Back Channel and associated roadway connectors, demolish the existing Gerald Desmond Bridge, and relocate the SCE transmission lines crossing the Cerritos Channel north of the bridge.

The new bridge, excluding approach structures, would be 2,000 ft (610 m) long, and it would be elevated 200 ft (61 m) above the MHWL of the Back Channel. Bridge replacement would also necessitate reconfiguration of adjacent freeway and arterial interchanges.

ES 1.7.2 Bridge Replacement Concepts

A study of the various types of possible bridges determined that a cable-stayed bridge would be the best option. A cable-stayed bridge consists of a continuous girder with one or more towers erected above piers in the middle of the span. From these towers, cables stretch down diagonally (usually to both sides) and support the girder. A design team consisting of Port staff representatives, an architect, and project engineers began the aesthetic design process with a review of the overall design parameters, such as the context of the surrounding site, the bridge roadway geometry, the recommended height and span for the bridge, and the estimated dimensions of the major structural members.

The team next considered aesthetics, cost, constructability, seismic performance, right-of-way (ROW) issues, schedule risk, impact to Port operations, and maintenance.

Based on the results of the design review, four cable-stayed alternatives were chosen for further consideration:

- Single Mast Tower
- Delta Tower
- H-Tower with Vertical Legs
- H-Tower with Slanted Legs

An in-depth study of these four design options was conducted over an 8-month period and included more detailed analysis and design for each alternative. Concepts for architectural lighting of the bridges were developed. Additionally, the potential ROW impacts to third-party properties were more fully defined.

Based on this in-depth study, two design options were selected to be carried forward for further development: Single Mast Tower and H-Tower with Slanted Legs. With further refinements to the bridge concept study, the Port staff elected to proceed with the development of the Single Mast Towers with a steel composite deck.

ES 1.7.3 SCE Transmission Line Relocation

Because the new bridge would be 200 ft (61 m) above the MHWL, in contrast to the existing bridge at 156 ft (47.4 m) above MHWL, the project also requires that the SCE high-voltage transmission towers and lines that cross the Cerritos Channel north of the bridge be raised.

ES 1.8 ALTERNATIVES

The June 2004 Draft EIR/EA evaluated two alignment alternatives (Build Alternatives) and the No Action Alternative. Like the previous document, this revised Draft EIR/EA fully analyzes the North-side Alignment (identified as the preferred alternative), the South-side Alignment, and No Action Alternatives; it adds a fourth alternative, Bridge Rehabilitation, which was not considered in the previous document.

ES 1.8.1 No Action Alternative

Under the No Action Alternative, the Gerald Desmond Bridge would not be replaced or rehabilitated. It would remain in its existing deteriorated condition until a retrofit schedule is established. It would remain with insufficient roadway capacity to handle projected car and truck traffic volumes, and inadequate channel clearance for safe passage of some existing and new-generation container ships.

Under the No Action Alternative, the existing bridge would continue in use as the sole direct connection between SR 710, the City of Long Beach, and Terminal Island. Existing measures to protect against falling structural elements would need to be enhanced as the bridge continued to deteriorate, and the related safety issues would increase in severity. Seismic safety of the channel crossing would not be enhanced with a new or rehabilitated bridge meeting current seismic standards. Increasing traffic volumes would result in steadily deteriorating LOS; this impact would also occur with the Rehabilitation Alternative.

Under the No Action Alternative (as with the Rehabilitation Alternative), the existing SCE transmission lines would not be removed or relocated.

ES 1.8.2 North-side Alignment Alternative (Preferred Alternative)

The North-side Alignment Alternative would provide a new bridge located approximately 140 ft (42.7 m) north of the existing bridge (measured from centerline to centerline). This bridge alignment would have a vertical profile over the Back Channel of 200 ft (61 m) above the MHWL. The roadway grades would be 5 percent in both directions.

The new bridge would be a cable-stayed design. The total bridge length would be 2,000 ft (610 m) long, with a main span opening across the channel of 1,000 feet (306 m), tower to tower. The west and east approach structures would be 3,117 ft (950 m) and 3,035 ft (925 m) in length, respectively.

The bridge cross section and approaches to the new bridge would include the following project features:

- Three 12-ft-wide (3.6-m) lanes in each direction
- A 10-ft-wide (3-m) outside shoulder in each direction
- A 10- to 12-ft-wide (3- to 3.6-m) inside shoulder in each direction
- A 32-inch (in.)-high (81.3-centimeter [cm]) barrier that would run along the outside of each shoulder
- Reconstruction of the existing Horseshoe interchange ramp connectors
- Reconstruction of the existing connectors to SR 710 and the two ramp connections to Pico Avenue

The approach spans would be of concrete box girder construction, either segmental or cast-in-place.

This alignment alternative would use the land between the existing bridge and the Long Beach Generating Station (LBGS) (former SCE plant), and it would require construction of new ramps for the existing Horseshoe interchange. The proposed alignment would transition to join Ocean Boulevard approximately 3,280 ft (1,000 m) east of the channel, and the new connections would join SR 710 approximately 2,630 ft (801 m) north of Ocean Boulevard.

The Horseshoe interchange would use reconfigured ramps to provide access from the WB Gerald Desmond Bridge to Pier T Avenue and from Pier T Avenue to the EB Gerald Desmond Bridge. Additional ramp connections would be provided between Pier T Avenue and both Ocean Boulevard and the one-way frontage roads created by the newly constructed POLB Ocean Boulevard and SR 47 Interchange Project. These ramps would allow full access between Pier T Avenue and Ocean Boulevard in all directions.

At the SR 710 interchange, a new median connection to Ocean Boulevard in downtown Long Beach would be constructed, as would a new pair of connector ramps between SR 710 and the new bridge. A new hook ramp or loop ramp would be used to replace the existing on-ramp between Pico Avenue and the WB Gerald Desmond Bridge. The current ramp between Pico Avenue would be partially reconstructed to join the new connectors from SR 710. This interchange concept would enable trucks traveling to and from SR 710 to remain in the outside lanes, while cars traveling to and from downtown Long Beach via Ocean Boulevard would remain in the inside lanes. This approach would minimize the intermixing of cars and trucks accessing the above facilities. The estimated cost for this alternative is approximately $983 million.

ES 1.8.3 South-side Alignment Alternative

The South-side Alignment Alternative would provide a new bridge located approximately 177 ft (53.9 m) south of the existing bridge (measured from centerline to centerline). As with the North-side Alignment Alternative, this bridge alignment would have a vertical profile over the Back Channel of 200 ft (61 m). The main span bridge design options would be the same as those proposed for the North-side Alignment Alternative. The bridge cross section and approaches to the new bridge would include the same project features as described for the North-side Alignment Alternative.

The proposed alignment would transition to join existing Ocean Boulevard approximately 3,280 ft (1,000 m) west of the channel. This alignment would require reconstruction of all ramps for the existing Horseshoe Interchange and a portion of the existing Pier T terminal main gate facility. The proposed alignment would transition to join existing Ocean Boulevard approximately 3,280 ft (1,000 m) east of the channel, and the new connections would join existing SR 710 approximately 2,820 ft (860 m) north of Ocean Boulevard. The four existing ramp connections to Pico Avenue would have to be reconstructed for this alternative. The interchange design variations used for the North-side Alignment Alternative would also be applied to the South-side Alignment Alternative. The estimated cost for this alternative is approximately $1.0 billon.

ES 1.8.4 Bridge Rehabilitation Alternative

With this alternative, the existing bridge would be rehabilitated to improve its seismic performance and to extend its operational life span. No new traffic lanes would be added, and the height of the bridge would remain at 156 ft (47.5 m) above the MHWL. To comply with current seismic detailing standards for new bridges, the lap splices at the base of the columns would need to be eliminated and the amount of confinement reinforcement increased. Because there are no practical means to accomplish this, the best solution would be to add steel casings at all columns. Lacking a detailed seismic performance study, it is assumed that the casings would be placed along the full height of the columns. These retrofit measures would allow for the level of deformation needed for the bridge to withstand a major earthquake and to comply with Caltrans SDC requirements for capacity protection of column foundations and bent caps.

Main span trussed arch members would likely require strengthening and connection retrofit to meet SDC joint capacity protection requirements. Typical for this type of bridge in the state of California, retrofit measures for truss members include member strengthening and installation of additional bolted through steel plates at truss joints, similar to the retrofit of the existing Carquinez Bridge, San Francisco Oakland Bay Bridge Main Span, and others.

In summary, to bring the existing Gerald Desmond Bridge up to current AASHTO standards and to mitigate continuous bridge deterioration would require the following measures:

- Replacement of the bridge deck
- Replacement of expansion joints
- Replacement of the sway bracings for the main span
- Painting of all steel members
- Seismic retrofit of foundations, columns, bent caps, abutments, and superstructure

The estimated cost for these corrective measures is approximately $289.3 million. The conceptual-level cost could only be determined after the retrofit measures are better defined.

All of the above measures would be consistent with the level of retrofit undergone by major bridges in California, where retrofit measures were designed for a "No Collapse" design criteria. The "No Collapse" criteria imply that the bridge would survive the maximum credible earthquake (MCE) without collapse and loss of life, but it would have a high probability of being condemned after an extreme seismic event such as the MCE. Thus, even with implementation of the above seismic retrofit measures, the existing bridge seismic performance would not be on par with the proposed new bridge. The new bridge would be designed to withstand the MCE with only repairable damage allowed and an ability to be in service within days after the MCE event.

ES 1.9 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD FOR FURTHER ANALYSIS

The June 2004 Draft EIR/EA evaluated several other alternatives, including tunnel options, main span and approach span options, design options, and interchange options, which were all withdrawn from further evaluation. In addition, to those alternatives, this Draft EIR/EA considers a tolling alternative as an alternative evaluated but eliminated from further consideration. The alternates are described and the rationale for their elimination is discussed in Section 1.7 of this document.

ES 1.10 COMPARISON OF ALTERNATIVES

The North-side and South-side Alignment Alternatives would achieve the project's purpose and need. Specifically, these alternatives would:

1. Provide a new bridge that is structurally sound and seismically resistant;
2. Reduce approach grades;
3. Provide sufficient roadway capacity to handle current and future car and truck traffic volumes; and
4. Provide vertical clearance that would afford safe passage of existing container ships and for new-generation vessels currently being constructed.

The North-side Alignment Alternative would impact Port and private properties, including tenant businesses and utilities. It would require demolition of the Port Maintenance Yard and temporary relocation of Fireboat Station No. 20. The North-side Alignment Alternative would result in the conversion of approximately 0.7-acre (0.3-hectare [ha] of privately held Port-related industrial land to public/ transportation use. Privately owned facilities affected include Pacific Pipelines, LLC, LBGS, SCE, Connolly Pacific and Los Angeles County Flood Control District (LACFCD). Potential effects on these properties could include loss of land due to acquisition, modified access due to bridge footings and easements, and relocation/replacement of utilities and/or facilities. The current estimate for the value of the land for the affected private properties is $2.0 million (see Section 2.1.3.2 [Relocations] for further discussion).

The South-side Alignment Alternative would also achieve the project's purpose and need as discussed under the North-side Alignment Alternative. This alternative would impact primarily Port properties, utilities, and tenant businesses. This alternative would require reconfiguration of both the California United Terminals and Total Terminal International, Inc. (TTI) operations on Piers D, E, and T. The Pier E gate at the California United Terminal facility would require relocation and would include reconfiguration of the following elements: entrance and exit roadways, inbound optical character recognition (OCR) devices, receiving gate lanes with pedestals, scales, cameras and queuing area, trouble resolution building and parking area, outbound primary radiation portal monitors (RPM) and OCR, outbound secondary RPM, exit gate lanes with pedestals and cameras, associated underground electrical and communication lines, and pavement markings/ barriers. It is estimated that the reconfiguration on Piers D and E would cost approximately $10.0 million. Reconfiguration of Pier T would result in the permanent loss of 2.4 acres (1-ha) within the TTI terminal storage facility currently used for refrigerated container storage. Additionally, reconfiguration on Pier T would require modification of the following elements: relocation of a portion of the main gate canopy, driver's service building and trouble parking, steel high-mast light poles, chassis storage, and associated utilities, barriers, and pavement markings. It is estimated that the reconfiguration on Pier T would also cost approximately $10.0 million. The South-side Alignment Alternative would also permanently reduce leasable Port acreage by approximately 2.4 acres (1-ha). The estimated present value of lost Port lease revenue would be $7.0 million over a typical 20-year lease (see Section 2.1.3.2 [Relocations] for further discussion).

When comparing the anticipated environmental effects of the North- and Southside Alighment Alternatives, there are no substantial differences in the environmental effects associated with construction and operation of these alternatives.

Under the Rehabilitation Alternative, the bridge would survive an extreme seismic event without collapse and loss of life, but it would have a high probability of being condemned and taken out of service; therefore, even with implementation of the retrofit measures in the Rehabilitation Alternative, at an estimated cost of $289.3 million, the bridge seismic performance would not be on par with a new bridge. Furthermore, bridge rehabilitation would not handle current and future traffic volumes, nor would it provide the vertical clearance needed for safe passage of container ships.

The No Action Alternative would not meet the purpose and need for the proposed project, and it would not eliminate the need for rehabilitation or replacement of the Gerald Desmond Bridge. The No Action Alternative would not improve clearance for the safe passage of container ships or handle current or forecasted traffic volumes. Under the No Action Alternative the bridge would likely be severely damaged during an MCE and would endanger life and property for those using the bridge, ships in the Back Channel, and at adjacent Port and private facilities.

ES 1.10.1 Preferred Alternative

The Port has determined that the North-side Alignment Alternative satisfies the project's purpose and need and is more cost effective to implement. Therefore, after comparing and weighing the benefits and impacts of all the feasible alternatives summarized above, the Port has identified the North-side Alignment Alternative as the preferred alternative, subject to public review. Final identification of a preferred alternative will occur subsequent to the public review and comment period.

ES 1.10.2 Project Approval

After the public circulation period, all comments will be considered, and the Port and Caltrans will select a preferred alternative and make the final determination of the project's effect on the environment. The Port will certify that the project complies with CEQA, prepare findings for all significant impacts identified, prepare a Statement of Overriding Considerations for any impacts that cannot be mitigated below a level of significance, and certify that the findings and Statement of Overriding Considerations have been considered prior to project approval. The Port will then file a Notice of Determination with the State Clearinghouse that will identify whether the project will have significant impacts, mitigation measures were included as conditions of project approval, findings were made, and a Statement of Overriding Considerations was adopted. Similarly, if Caltrans, as assigned by FHWA, determines that the NEPA action does not significantly impact the environment, then Caltrans will issue a Finding of No Significant Impact (FONSI) in accordance with NEPA.

ES 1.11 RIGHT-OF-WAY IMPACTS

Estimates of nonresidential displacements and partial acquisitions were made by reviewing engineering design plans, aerial photographs, and through field reviews. There is no residential acquisition required for the Build Alternatives. Several private properties and Port tenants would be impacted by ROW acquisition and property relocation. As more detailed engineering becomes available during the final design phase, the ROW impacts will be defined. The POLB will comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. 4601, *et seq.*), as amended, for any ROW acquisitions on private property.

ES 1.12 PUBLIC INVOLVEMENT

An NOP/Preliminary Environmental Analysis Report (PEAR) to prepare an EIR/EA and a Notice of Initiation of Studies (NOIS) for the proposed project were issued on October 25, 2002, by POLB. An agency scoping meeting was held on November 12, 2002, at the POLB Administration Building to solicit comments and discussion from responsible and trustee agencies regarding the proposed project. In addition, a public scoping meeting was held at the POLB Administration Building later the same day. Four comment letters were received during the NOP review period and scoping meetings. Issues of concern were traffic, utilities, water resources, and hazardous waste/materials.

The Draft EIR/EA was issued by the Lead Agencies on June 15, 2004, with the public comment period concluding on July 29, 2004. Twelve (12) comments were received during the Draft EIR/EA public review and comment period. Also, a public hearing was held July 19, 2004. These comments have been addressed in this revised Draft EIR/EA. Because the project study area was expanded and Rehabilitation and Toll Operation Alternatives were considered for the build alternatives, the Port issued a revised NOP in December 2005 and made it available to the public and responsible/trustee agencies. No comments were received from either the public or responsible/trustee agencies during the public review of the NOP. The revised Draft EIR/EA, with the updated project information, affords interested parties an opportunity to provide their input on the project for a 45-day public review/comment period. Two public hearings are being held for the project during this revised Draft EIR/EA public review/comment period.

ES 1.13 EIR/EA CONTENTS

A detailed project description is presented in Chapter 1 of this environmental document. The environmental consequences associated with the proposed project on the affected Human, Physical, and Biological Environments, as well as measures to avoid, minimize, and/or mitigate these effects are presented in Chapter 2. Also, included in Chapter 2 is an analysis of potential cumulative impacts of the proposed project. Chapter 3 presents the analysis of project impacts pursuant to CEQA. Chapter 4 summarizes the consultation and coordination undertaken with agencies and the public. Chapter 5 provides a list of preparers for this revised Draft EIR/EA. Chapter 6 contains the distribution list of government agencies and interested parties that received a copy of the Draft EIR/EA during public circulation. Chapter 7 lists the references used for the technical analyses. Chapter 8 contains the Port's Application Summary Report to satisfy PMP and California Coastal Act requirements.

ES 1.14 SUMMARY OF SIGNIFICANT AND ADVERSE IMPACTS AND MITIGATION MEASURES

Table ES-1 summarizes adverse and significant project effects, proposed minimization/mitigation measures and residual effects subsequent to implementation of minimization and mitigation measures.

Table ES-1 Summary of Potentially Adverse/Significant Impacts

North-side Alignment Alternative	South-side Alignment Alternative	Rehabilitation Alternative	Potential Impacts-	Avoidance, Minimization and/or Mitigation Measures	Residual Impacts NEPA	Residual Impacts CEQA
				Traffic and Circulation (see Section 2.1.5)		
√	√	X	A temporary adverse traffic effect attributable to the Bridge Replacement Alternatives would occur at the Pico Avenue and Pier B Street/9th Street intersection during construction Stage 2.	TC-1 Prior to the start of construction Stage 2, the following improvements will be made to the intersection of Pico Avenue, Pier B Street, and 9th Street to mitigate the project's temporary adverse effect during construction at that intersection during Stage 2: Add dual NB right-turn lanes; restripe EB through/right lane to a right-turn lane; provide one (1) EB through lane; and continue two (2) SR 710 SB off-ramp lanes to Pico Avenue.	Minor Impact	Less than Significant
√	√	X	A temporary adverse traffic effect attributable to the Bridge Replacement Alternatives would occur at the Pico Avenue and Pier B Street/9th Street intersection during construction Stages 3 and 4.	TC-2 Prior to the start of construction Stages 3 and 4, the following improvements will be made to the intersection of Pico Avenue, Pier B Street, and 9th Street to mitigate the project's temporary adverse effect during construction at that intersection during Stages 3 and 4: remove NB-SB split-signal phasing; restripe NB through lane to a NB left-turn lane; widen SB approach and provide two (2) left-turn lanes and one (1) through lane; and continue two (2) on-ramp lanes to NB SR 710.	Temporary Adverse	Temporary Significant
√	√	X	A temporary adverse traffic effect attributable to the Bridge Replacement Alternatives would occur at the Pico Avenue and Pier D Street intersection during construction Stages 2, 3, and 4.	TC-3 Prior to the start of construction Stage 2, a traffic signal will be installed at the intersection of Pico Avenue and Pier D Street to mitigate the project's temporary adverse effect during construction at that intersection during Stages 2, 3, and 4. The traffic signal will be permanent and will not be removed after completion of construction of a Bridge Replacement Alternative.	Temporary Adverse	Temporary Significant
√	√	X	A temporary adverse traffic effect attributable to the Bridge Replacement Alternatives would occur at the Pico Avenue and Pier E Street intersection during construction Stages 3 and 4.	TC-4 Prior to the start of construction Stages 3 and 4, the following improvements will be made to the intersection of Pico Avenue and Pier E Street to mitigate the project's temporary adverse effect during construction at that intersection during Stages 3 and 4: permanently signalize the intersection (the signal will not be removed after completion of construction of a Bridge Replacement Alternative); restripe NB through lane to a NB right-turn lane, providing a single NB through lane; add dual free-flow WB right-turn lanes; and continue two (2) EB Ocean Boulevard off-ramp lanes to Pico Avenue.	Minor Impact	Less than Significant
√	√	X	A project-related adverse effect is anticipated at the intersection of Navy Way/Seaside Avenue.	TC-5 During the design phase of a Bridge Replacement Alternative, the Port shall add a third NB left-turn lane to mitigate the project effect at the Navy Way/Seaside Avenue intersection.	Minor Impact	Significant[1]
√	√	X	A project-related adverse effect is anticipated at the intersection of Ocean Boulevard/Magnolia Avenue.	TC-6 The Port will coordinate with the Long Beach City Traffic Engineer and provide funding for restriping and/or signalization improvements at the intersection of Ocean Boulevard and Magnolia Avenue as mitigation for the effect of a Bridge Replacement Alternative at the intersection	Minor	Less than Significant
√	√	X	A temporary adverse traffic effect attributable to the Bridge Replacement Alternatives would occur on WB Ocean Boulevard between the Horseshoe Ramps and the Terminal Island Freeway interchange.	No feasible measures to minimize traffic effects at WB Ocean Boulevard between the Horseshoe Ramps and the Terminal Island Freeway interchange have been identified. However, construction of the SR 47 Flyover as part of the SR 47 project would eliminate the temporary adverse traffic effect.	Temporary Adverse	Temporary Significant
√	√	X	A temporary adverse traffic effect has been identified that would result from construction of the proposed Bridge Replacement Alternatives at the Ocean Boulevard and Terminal Island Freeway interchange.	The two intersections of the Ocean Boulevard ramps (north and south) and the Terminal Island Freeway would have temporary unavoidable adverse effects for 3 years, which is the approximate combined duration of construction Stages 2, 3, and 4 of either of the proposed Bridge Replacement Alternatives..	Temporary Adverse	Temporary Significant
				Hazardous Materials/Wastes (see Section 2.2.3)		
√	√	√	Previously unidentified contaminated soil and groundwater may exist within the construction impact areas that could affect human health or be released to the environment.	HM-1 A Phase II Site Investigation shall be performed in construction areas where excavation will exceed 5 feet (ft) (1.5 meters [m]) below ground surface (bgs), where groundwater may be encountered and in areas where underground storage tanks (USTs) were removed without closure. The results of the Phase II investigation would be incorporated into the Safety Plan to protect construction workers against known contamination in construction areas. A Hazardous Waste Management Plan based on the results of the Phase II investigation will also be incorporated into the Final Design to ensure proper disposal of contaminated materials and contaminated groundwater found in the construction areas.	Minor Impact	Less than Significant
√	√	√	Cross contamination of water-bearing intervals may occur during excavation and bridge pile installation.	HM-2 A risk assessment shall be performed prior to construction to determine how construction activities will impact the water-bearing levels and, as applicable, to determine health risks to construction workers. HM-3 To minimize cross-contamination of the water-bearing zones, the construction contractor shall employ construction techniques to minimize the need for dewatering.	Minor Impact	Less than Significant
√	√	√	Asbestos-containing materials (ACM) may be released to the environment during bridge rehabilitation and building and bridge demolition.	HM-4 The Port shall conduct a survey to screen for ACMs in all affected buildings and the bridge prior to the demolition activities. ACMs will be removed prior to demolition to mitigate any ACM hazard.	Minor Impact	Less than Significant
√	√	√	Soil areas disturbed during construction may contain aerially deposited lead (ADL).	HM-5 Prior to construction, the Port shall test areas within the proposed project corridor where soil may be disturbed for ADL. If ADL levels meet or exceed the action level set forth by the hazardous waste management plan for the project, then ADL-contaminated soils shall be removed in accordance with federal, state, and local regulations.	Minor Impact	Less than Significant
√	√	√	The public/construction workers may be exposed to hazardous materials during construction activities.	HM-6 A Safety Plan will be required to address any exposure to hazardous materials. The Safety Plan will include proper personal protective equipment (PPE) work requirements, soil and air space monitoring requirements, documentation and reporting requirements, and action levels.	Minor Impact	Less than Significant

[1] This intersection is within the POLA and is outside of the Port's Jurisdiction, thus the impact is considered significant and unavoidable; however, with implementation of TC-5 or one of the other POLA projects being considered for this location, this impact would be eliminated (see Section 3.2.1.4.3 for further discussion).

√ - Impact associated with alternative; X – Impact not associated with Alternative

Table ES-1 Summary of Potentially Adverse/Significant Impacts

North-side Alignment Alternative	South-side Alignment Alternative	Rehabilitation Alternative	Potential Impacts-	Avoidance, Minimization and/or Mitigation Measures	Residual Impacts NEPA	Residual Impacts CEQA
√	√	√	According to Port officials, the bridge structure is likely to have lead-based paint (LBP) coatings that would be disturbed by demolition.	HM-7 The contractor shall prepare a Lead Compliance Plan in accordance with California Code of Regulations (CCR) Title 8 Section 1532.1. The Lead Compliance Plan shall be approved by an Industrial Hygienist certified in Comprehensive Practice by the American Board of Industrial Hygiene.	Minor Impact	Less than Significant
√	√	√	The project may require the removal or disturbance of any existing yellow thermoplastic traffic lane striping in the project area.	HM-8 If it is determined that the project would require the removal or disturbance of any existing yellow thermoplastic traffic lane striping in the project area, then Caltrans standard measures shall be implemented to ensure the proper removal, storage, and disposal of the material, as applicable.	Minor Impact	Less than Significant
				Public Health and Safety (see Section 2.2.4)		
√	√	X	An analysis of accident and terrorist vulnerability of the new bridge was recommended by the Gerald Desmond Bridge Technical Advisory Panel (TAP). The intent of this assessment is to address the potential vulnerability of the bridge and develop conceptual modifications to the bridge design as required.	HS-1 An Accident and Terrorist Vulnerability assessment of the build alternative shall be completed and all recommendations incorporated into the project during final design. The assessment will analyze and consider applicable protection measures for the construction and operational phases of the proposed project.	Minor Impact	Less than Significant
√	√	√	Road work associated with the project alternatives could potentially adversely affect emergency response times or interfere with the emergency response services. Also, marine transportation hazards could potentially adversely affect ships navigating through the Back Channel during the bridge construction and demolition phases.	HS-2 The Port shall submit all bridge work schedules to the Long Beach Police and Fire Departments, United States Coast Guard (USCG), and Caltrans at least 2 weeks prior to initiation of work to provide adequate time for the agencies to plan for alternate routes in case of emergencies.	Minor Impact	Less than Significant
√	√	√	Project construction may affect business operations and access.	HS-3 Prior to initiation of construction activities, the Port shall notify all businesses, tenants, and utility companies (i.e., SCE, gas, water, oil, and telecommunications) within the project area of the proposed work schedules and associated roadway and ramp closures.	Minor Impact	Less than Significant
√	√	√	Temporary delays within the Back Channel may occur during construction and demolition.	HS-4 The Port shall notify all marine transportation and recreational boating companies 2 weeks prior to initiation of planned work activities potentially affecting normal operations within the Back Channel. HS-5 The Port shall regularly notify USCG and all Port tenants of scheduled work over the Back Channel during construction and demolition of the project.	Minor Impact	Less than Significant
√	√	√	Possible exposure of workers to hazardous situations and materials during project construction and demolition.	HS-6 The contractor shall prepare an emergency response and health and safety plan in accordance with all applicable federal, state, and OSHA standards. The plan should address potential emergency situations and assure the safety and health of workers by setting and enforcing standards to reduce occupational injuries and accidents. The Port will review and approve the plans prior to initiation of construction activities.	Minor Impact	Less than Significant
				Air Quality (see Section 2.2.5)		
√	√	X	Construction emissions associated with the North- and South-Side Alignment Alternatives would exceed South Coast Air Quality Management District (SCAQMD) nitrogen oxide (NO_x) thresholds.	AQ-C1: Construction processes shall adhere to all applicable SCAQMD rules and regulations concerning the operation of construction equipment and dust control. AQ-C2: Construction equipment shall be properly tuned and maintained in accordance with manufacturer's specifications. AQ-C3: During construction, trucks and vehicles in loading and unloading queues must be kept with their engines off when not in use to reduce vehicle emissions. Construction emissions shall be phased and scheduled to avoid emissions peaks, where feasible, and discontinued during second-stage smog alerts. AQ-C4: To the extent feasible, use electricity from power poles rather than temporary diesel or gasoline power generators. AQ-C5: As part of the Port's commitment to promote the Green Port Policy and implement CAAP, the proposed project construction would employ all applicable control measures included in the CAAP and relevant clean air technologies. Project heavy-duty construction equipment would use clean fuels, such as ultra-low sulfur fuel, or compressed natural gas and oxidation catalysts. AQ-C6: Construction activities that affect traffic flow on the arterial roadways shall be scheduled to off-peak hours to the extent possible. Additionally, construction trucks shall be directed away from congested streets or sensitive receptor areas. AQ-C7: During the construction period, temporary traffic controls, such as flaggers, and improved signal flow for synchronization to maintain smooth traffic flow, shall be provided. AQ-C8: Trucks used for construction prior to 2015 shall use engines with the lowest certified NO_X emission levels, but not greater than the 2007 NO_X emission standards. AQ-C9: Where feasible, construction equipment shall meet the EPA Tier 4 non-road engine standards. The equipment with Tier 4 engine standards becomes available starting in year 2011.	Temporarily Adverse during Construction Years 1,2 and 3	Temporarily Significant during Construction Years 1, 2 and 3

√ - Impact associated with alternative; X – Impact not associated with Alternative

Table ES-1 Summary of Potentially Adverse/Significant Impacts

North-side Alignment Alternative	South-side Alignment Alternative	Rehabilitation Alternative	Potential Impacts-	Avoidance, Minimization and/or Mitigation Measures	Residual Impacts NEPA	Residual Impacts CEQA
√	√	X	Operational emissions associated with the North- and South-Side Alignment Alternatives would exceed South Coast Air Quality Management District (SCAQMD) nitrogen oxide (NO_x) thresholds.	There are no feasible mitigation measures to address NO_x operational emissions for transportation projects. Vehicle emissions are regulated at the federal and state levels. Reduction of operational vehicle emissions will come from three overarching strategies: more efficient vehicles, lower-carbon fuels, and reduction of vehicle use or VMT. Reduced emission in the transportation sector will be achieved through regulations, market mechanisms, incentives, and land use policy. It should be noted that a portion of the operational exceedance would be attributable to construction emissions associated with the demolition of the Gerald Desmond Bridge subsequent to opening the new bridge. The construction emissions included as part of the opening year have been mitigated to the maximum extent practicable as discussed in Measures AQ-C1 through AQ-C9.	Temporarily Adverse during Opening Year Minor Impact in 2030	Temporarily Significant during Opening Year Less than Significant in 2030
√	√	X	Exceedance of SCAQMD NO_x construction and operational thresholds would result in cumulative air quality impacts	CEQA (AQ)-1: **Cumulative Air Quality Impact Reduction Program.** To help reduce cumulative air quality impacts associated with the Gerald Desmond Bridge Replacement Project, the Port will require the project to provide funding in support of the Schools and Related Sites Guidelines for the Port of Long Beach Grant Programs and Healthcare and Seniors Facility Program Guidelines for the Port of Long Beach Grant Programs. The contribution to be made to the Port of Long Beach Schools and Related Sites and Healthcare and Seniors Facility Grant Programs will be determined at the completion of the public comment period for the environmental document, based on the alternative selected for implementation. The distribution of these funds to potential applicants and projects will be determined through a public evaluation process and approved by the Board of Harbor Commissioners. The timing of the payments pursuant to this mitigation measure shall be made by the latter of the following two dates: (1) the date that the Port issues a Notice to Proceed or otherwise authorizes the commencement of construction on the project; or (2) the date that the Gerald Desmond Bridge Replacement Project Final EIR/EA is conclusively determined to be valid, either by operation of PRC Section 21167.2 or by final judgment or final adjudication.	Temporary Adverse	Significant
				Biological Environment (see Section 2.3)[2]		
√	√	X	Potentially adverse impacts to the resident peregrine falcons include behavior modification caused by construction activities and changes in perch preferences and/or nesting sites associated with demolition of the Gerald Desmond Bridge.	BR-1: **Artificial Nest Boxes (Peregrine Falcon):** A minimum of two nesting ledges with artificial nest boxes will be installed on the new bridge in different locations prior to demolition of the existing bridge. The boxes will be available prior to the nesting season. The new nest locations will be approved by CDFG and will be selected to minimize disturbance to the extent feasible. Should the peregrine falcons not use the new bridge for nesting despite the nest boxes, alternate suitable nesting sites are available in the project vicinity (e.g., hotels, silos, bridges, Long Beach City Hall).	Minor Impact	Less than Significant
√	√	X	Potentially adverse impacts to the resident peregrine falcons include behavior modification caused by construction activities and changes in perch preferences and/or nesting sites associated with demolition of the Gerald Desmond Bridge.	BR-2: **Precluding Nesting on the Existing Bridge (Peregrine Falcon)***:* Once the nest boxes are in place on the new bridge, and a minimum of 2 months prior to initiation of demolition activities within 500 ft (152 m) of the exiting nesting locations, measures and/or structures approved by CDFG to discourage nesting at the previously used nest sites would be implemented under the supervision of a CDFG-approved raptor biologist. If existing nest sites are occupied, then exclusion activities could not occur until 30 days after the last young leaves the nest, or until nest abandonment, whichever occurs first (see No Work Zone under BR-3 Monitoring Program).	Minor Impact	Less than Significant
√	√	X	Potentially adverse impacts to the resident peregrine falcons include behavior modification caused by construction activities and changes in perch preferences and/or nesting sites on the Gerald Desmond Bridge.	BR-3: **Monitoring Program (Peregrine Falcon):** The proposed monitoring program is based on measures from the Peregrine Falcon Monitoring and Mitigation Program (PFMMP) for the Gerald Desmond Bridge (BioResource Consultants, 1998) used from 1998 through 2004. Modified measures from the 1998 PFMMP as proposed for the North- and South-side Alignment Alternatives are provided below. A mitigation and monitoring plan will be prepared and submitted to CDFG for concurrence prior to initiation of construction activities. • *Timing of Monitoring:* A raptor biologist will initiate monitoring at least 1-year prior to the beginning of construction and at least 2 months prior to nest site selection, generally January to mid-February. Monitoring will continue through the breeding season, which generally extends through mid-July. Monitoring will occur at the existing and new bridge and begin prior to the placement of artificial nest boxes on the new bridge and prior to attempts to preclude nesting at the existing bridge. Monitoring during construction will continue once weekly during the breeding season until the breeding season or construction is complete, whichever occurs first. • Post-construction monitoring will occur for 3 years after construction. Surveys will be conducted once monthly from January through July to document peregrine falcon nesting at the new bridge. • *Biological Monitor:* A raptor biologist with several years of experience observing peregrine falcon behavior and approved by the Port, Caltrans, and CDFG will be selected to conduct the monitoring. • *Monitoring Effort:* All monitoring will be conducted with the use of binoculars and/or spotting scope and document peregrine falcon activity in the vicinity of the existing and new bridge. Monitoring during construction will require an average of 8 to 12 hours of observation per week to determine whether peregrine falcons are exhibiting normal breeding behavior and are nesting on the old bridge, or if they have relocated to an alternate nesting site. If peregrines attempt to nest on the existing bridge while construction activities are occurring, then a qualified peregrine monitor will observe the pair for a minimum of 16 hours per week to determine the effect of the construction on peregrine behavior. This level of effort will continue as long as incubating peregrines or nestlings under the care of adults occupy the nesting site. If the young fledge, then the observations will continue for a minimum of 30 days after the last young leaves the nest ledge. If the raptor biologist reports that the peregrines are exhibiting behavior that may indicate potential nest abandonment, then visual screens or other methods as approved by CDFG would be implemented at the nesting locations. If nest abandonment occurs, then the Port, in coordination with CDFG, will determine the feasibility of creating temporary nesting ledges at alternate locations in areas with less intense construction activities.	Minor Impact	Less than Significant

[2] On August 6, 2009 the California Fish and Game Commission voted to remove the peregrine falcon from the State's list of endangered species. Currently the ruling is under review by the State Office of Administrative Law. Pending approval of the ruling, the peregrine falcon would be removed from the endangered species list, but would remain a "fully protected" species. The final ruling on the matter may or may not result in a change in either/both the impact findings and/or proposed mitigation pertaining to the species. This information is expected to be available in time for inclusion in the final environmental document.

√ - Impact associated with alternative; X – Impact not associated with Alternative

Table ES-1 Summary of Potentially Adverse/Significant Impacts

North-side Alignment Alternative	South-side Alignment Alternative	Rehabilitation Alternative	Potential Impacts-	Avoidance, Minimization and/or Mitigation Measures	Residual Impacts NEPA	Residual Impacts CEQA
				Nesting on the new structures shall be discouraged until construction of the new bridge is completed. The Port, in coordination with CDFG, will develop measures to be implemented by a raptor biologist, where feasible, or under the direction of a raptor biologist, where precluded by construction site safety concerns, to discourage nesting. Such measures may include continued removal of nesting materials or installation of CDFG-approved exclusion devices. • *No Work Zone:* During construction of the new bridge and prior to exclusion efforts for bridge demolition activities, the existing nest ledges and boxes would be available for nesting. If a nesting attempt is made on the new bridge while under construction, then a "No Work Zone" of approximately 250 ft (76 m) will be enforced until the raptor biologist implements CDFG-approved methods to discourage nesting on the areas under construction. Prior to exclusion activities on the existing bridge, nesting ledges on the new bridge will be available for use. During demolition, if falcons attempt to nest on the existing bridge, despite efforts to deter nesting, then a "No Work Zone" of approximately 250 ft (76 m) will be enforced until the raptor biologist implements CDFG-approved methods to further exclude nesting on the Gerald Desmond Bridge during demolition activities. Should a nest be successfully established within the construction area during construction of the new bridge or demolition of the Gerald Desmond Bridge, the Port will instruct construction crews to adhere to a "No Work Zone" around the nest site. The Port will coordinate with USFWS and CDFG to obtain permission to remove the nest in accordance with the Migratory Bird Treaty Act (MBTA). This "No Work Zone" will extend around the nest for a radius of approximately 250 ft (76 m) and be maintained until removal of the nest is authorized – 30 days after the last young leaves the nest or until nest abandonment, whichever occurs first. Demolition activities can continue at other locations outside of the "No Work Area." • *Reporting:* Quarterly reports summarizing monitoring observations of nesting peregrines, including breeding behavior, nest data, disturbances, and reproductive success, will be submitted during construction of the new bridge. During demolition, post-construction monitoring reports will be prepared to provide details on placement of artificial nest boxes and exclusion activities and use of the nesting ledges on the new bridge. Reports will be prepared by the raptor biologist and submitted to the Port, Caltrans, and CDFG.		
√	√	X	Potentially adverse impacts to the resident bat species include behavior modification caused by construction activities and changes in roost preferences and/or roosting sites on the Gerald Desmond Bridge.	BR-4: **Placement of Bat Boxes:** Bat roosting boxes on the new bridge will be made available a minimum of 2 months prior to demolition activities within 500 ft (152 m) of active roosts at the existing bridge. Bat roosting boxes will be designed and built during construction of the new bridge, which is scheduled to occur before demolition of the existing bridge, to be ready for placement once the under-bridge structures are complete. The location and design of artificial roosts will also consider the temperature measured at roosts on the existing bridge during the preconstruction period. A variety of designs and recommendations are available (Langenstein *et al.,* 1998; Keeley and Tuttle, 1999). • In addition to, or in lieu of, bat roosting boxes, the new bridge may be designed to incorporate potential roosts as part of the structure (Exhibit 2.3.5-5), or such structures may be designed and added to the new bridge post-construction (Exhibit 2.3.5-6). Bats prefer roosting sites with crevices 0.5- to 1.25 in. (1.27 to 3.175 cm) wide (Keeley and Tuttle, 2000). Bats also use soffits if they are left open; therefore, bridge design could also include soffits that could be left open without damaging the bridge or hindering access for maintenance or other ongoing bridge work. One such type of artificial roost is the Texas bat-abode, which has an external panel on either side and 1- by 2-in. (2.5- by 5.1-cm) wooden spacers sandwiched between 0.5- to 0.75-in. (1.2- to 1.9-cm) plywood partitions (Exhibit 2.3.5-6). The internal partitions will be designed to provide crevices 0.75-in. (1.9 cm) wide and at least 12 in. (31 cm) deep. Smooth roost surfaces need to be textured to provide footholds for bats on one or both sides of each plywood partition, creating irregularities at least every 0.125-in. (0.3-cm). Footholds for bats are constructed of rough-sided paneling, or panels coated with polyurethane or epoxy paint sprinkled with rough grit, or attaching plastic mesh with silicone caulk or rust-resistant staples.	Minor impact	Less than Significant
√	√	X	Potential impacts associated with the elimination of bat roosting sites	BR-5: **Precluding Roosting on the Existing Bridge:** Prior to demolition, bats must be excluded from the existing bridge. Methods for excluding bats include use of a chemical repellant (i.e., naphthalene), use of floodlights, high-frequency noise, and placement of physical barriers such as nets to prevent bats from using roost sites (Greenhall, 1982). The exclusion method will be approved by the Port, Caltrans, and CDFG. The mechanical exclusion device is considered the safest and the most reliable (Exhibits 2.3.5-2 through 2.3.5-4). These barriers are commonly screens of mesh, hardware cloth, or wire, with mesh openings no greater than 0.25-in. (0.64-cm). The best time for bat proofing is November through March, after juvenile bats have learned to fly (Bat Conservation and Management, Inc., 2005). Exclusion work will be performed by contractors approved by Caltrans as experienced with excluding bats on bridges. This exclusion process may require 1 to 2 weeks, or potentially longer, given the size of the existing bridge. Bat exclusion via netting is accomplished by first affixing mesh netting over known entry points using I-bolts, which allows bats to exit the bridge but not return. Bats returning to the bridge would first return to their normal point of entry, and then they would seek new roosts once they have determined that it is not possible to return to their old roosting site. This process will be monitored by a CDFG-approved bat biologist each night for at least 7 consecutive nights, or until no bats are observed to exit the structure from known roosting areas at nightfall. During this time, monitoring will be performed to ensure that bats do not discover and use new roosts on the existing bridge and that no bats become entangled in netting. If any new roosts are discovered on the existing bridge, they will be covered with mesh according to the above procedure. Very small crevices or fissures in the bridge may be sealed using caulk or a similar filling agent. Should numerous bats still be observed exiting the bridge at night after installation of exclusion cloth, it may be necessary to add another exclusion method, such as floodlights illuminating access points or crevices used by attract bats (bats will not roost in a well-lit area).	Minor Impact	Less than Significant
√	√	√	Various sensitive species of bats may be displaced during rehabilitation or construction and demolition activities.	BR-6: **Bat Monitoring Program:** A monitoring program will be implemented throughout the construction phases of the project, as applicable. CDFG concurrence on the proposed monitoring program will be obtained prior to initiation of bat monitoring/ survey activities. All surveys/monitoring will be conducted by an approved CDFG bat biologist. Preconstruction monitoring will focus on bat species identification, locations of bat roosts, and documentation of roost characteristics based on Fenton (2003) and O'Shea *et al.* (2003). If CDFG species of special concern are identified, the Port will coordinate with CDFG and incorporate additional monitoring/protection measures as applicable.	Minor Impact	Less than Significant

√ - Impact associated with alternative; X – Impact not associated with Alternative

Table ES-1 Summary of Potentially Adverse/Significant Impacts

North-side Alignment Alternative	South-side Alignment Alternative	Rehabilitation Alternative	Potential Impacts-	Avoidance, Minimization and/or Mitigation Measures	Residual Impacts NEPA	Residual Impacts CEQA
				Timing of Monitoring: Bat preconstruction surveys will be initiated a minimum of 1-year prior to the initiation of construction. The surveying and monitoring regime will consist of quarterly monitoring surveys, including a survey in June (i.e., prime bat roosting season). Each survey will include daytime and nighttime surveys (see Monitoring Effort) focused on identifying specific locations of bat roosts and roost access points. One month prior to the initiation of demolition of the existing bridge, the frequency of preconstruction surveys at the existing bridge and new bridge will increase to once weekly. This will coincide with placement of bat roosts on the new bridge. Quarterly construction monitoring will be completed. If CDFG sensitive bat species are identified during the preconstruction surveys or during quarterly surveys, then monthly monitoring during the bat breeding season will be completed and will focus on construction effects on bats. If it is determined that construction disturbance is affecting CDFG sensitive species, then the Port will coordinate with CDFG to incorporate additional protection measures, as applicable. Monitoring during the demolition phase will focus on ensuring that all bats have been excluded after installing the bat boxes on the new bridge and prior to initiating demolition activities. Subsequent to installation of exclusion devices, roosting areas will be monitored for 7 consecutive nights, or until no bats are observed to exit the structure from known roosting areas at nightfall. During this time, monitoring will be performed to ensure that no bats become entangled in netting and that the bats do not discover and use new roost areas on the existing bridge. If any new roosts are discovered, exclusion netting will be installed, and the monitoring process will continue until bats have been excluded from the bridge. Post-construction monitoring will be conducted quarterly for 3 years and will document use of new bat roosts. • *Biological Monitor:* A qualified bat biologist thoroughly familiar with Anabat^{TM} equipment and approved by CDFG, Caltrans, and the Port will conduct all bat monitoring and supervise the design and placement of new bat roosts and bat exclusion methods and devices. • *Monitoring Effort*: The quarterly surveys will be performed during appropriate lunar/weather conditions and focus on identifying active bat roosts on the existing bridge. Each quarterly survey will include one survey during the day to search for urine staining and accumulation of bat feces or guano, and one evening/night survey period using a sonic bat device (i.e., Anabat^{TM} or Sonobat^{TM}). Several visits may be required per survey to determine specific roost locations and roost access points, and information necessary for designing bat exclusion devices on the existing bridge. During the quarterly preconstruction surveys, once the specific locations of bat roosts are determined, temperatures of existing roosting sites will be recorded so that selection of the location and type of artificial roosts on the new bridge can ensure duplication to the extent feasible of the thermal regime at existing bat roosts. Monitoring during construction and demolition will focus on whether construction activities are disturbing bats at the existing and new bridge. If disturbances to bats are documented, and monitoring has identified the presence of maternity roosts or CDFG sensitive species, then the Port will coordinate with CDFG to identify measures to minimize effects on the maternity roosts and sensitive species. • *Reporting:* Quarterly reports summarizing the monitoring efforts and observations at the new and existing bridge will be prepared and submitted to the Port, Caltrans, and CDFG. Following construction, a final report will be prepared and include the name of the bat monitor, survey methods and dates, survey times and weather conditions, the type of artificial bat roosts used at the new bridge, and exclusion devices at the existing bridge. The final report will also include photos and detailed observations, and a conclusions and recommendations section for agency use in future projects.		
√	√	X	Potential impacts to cormorants associated with SCE transmission line relocation.	BR-7: Initial construction activities for the new transmission towers/lines shall not begin during the nesting season (April through August) if double-crested cormorants have active nests on the transmission towers. Construction activities associated with the transmission tower/lines will be initiated prior to or after the breeding season or after the young have fledged	Minor Impact	Less than Significant
√	√	X	Potential impacts to migratory birds associated with potential night time construction and installation of new lighting for operation.	BR-8 Construction and operational bridge lighting during and following construction will be designed to minimize the potential for bird collisions with the bridge structure. Lighting types known to minimize adverse effects (i.e., low-pressure sodium lights, high-pressure sodium lights, or light-emitting diode [LED] lights) will be used, and lighting types known to be disruptive to migrating wildlife, such as mercury vapor lamps (Jones, 2000), will be avoided. Additionally, lighting will be shielded to ensure that light is focused where it is needed, focusing lighting inward and minimizing the amount of lighting used to the maximum extent possible.	Minor Impact	Less than Significant
X	X	√	Potentially adverse impacts to the resident peregrine falcons include behavior modification caused by construction activities and changes in perch preferences and/or nesting sites associated with demolition of the Gerald Desmond Bridge.	BR-1b: **Artificial Nest Boxes:** Prior to the final design phase, the Port, in coordination with CDFG, will select temporary locations for alternate nesting sites on the Gerald Desmond Bridge that would minimize the amount of disturbance within 250 ft (76 m) of new perch locations. Construction will be phased to complete adjacent seismic retrofit activities and painting operations at the new nesting locations outside of the nest site selection and breeding periods. Subsequent to completing the adjacent seismic retrofit activities, the temporary nesting ledges will be installed, and be continually available for use.	Minor Impact	Less than Significant
X	X	√	Potentially adverse impacts to the resident peregrine falcons include behavior modification caused by construction activities and changes in perch preferences and/or nesting sites associated with demolition of the Gerald Desmond Bridge.	BR-2b: **Precluding Nesting on the Existing Bridge:** To ensure no mortality of peregrines due to construction-related mishaps associated with bridge deck replacement, CDFG-approved exclusion methods will be installed at existing nest sites under the supervision of a CDFG-approved raptor biologist before initiating rehabilitation activities. Exclusion will occur prior to the nest site selection or after the breeding season. Due to the proximity of the bridge deck replacement activities to the existing nest sites, exclusion devices will remain until completion of the rehabilitation activities.	Minor Impact	Less than Significant

√ - Impact associated with alternative; X – Impact not associated with Alternative

Table ES-1 Summary of Potentially Adverse/Significant Impacts

North-side Alignment Alternative	South-side Alignment Alternative	Rehabilitation Alternative	Potential Impacts-	Avoidance, Minimization and/or Mitigation Measures	Residual Impacts NEPA	Residual Impacts CEQA
X	X	√	Potentially adverse impacts to the resident peregrine falcons include behavior modification caused by construction activities and changes in perch preferences and/or nesting sites associated with demolition of the Gerald Desmond Bridge.	BR-3b: **Monitoring Program:** The proposed monitoring program is based on measures from the PFMMP for the Gerald Desmond Bridge (BioResource Consultants, 1998) used from 1998 through 2004. Modified measures from the 1998 PFMMP, as proposed for the Rehabilitation Alternative, are provided below. A mitigation and monitoring plan will be prepared and submitted to CDFG for concurrence prior to initiation of rehabilitation activities. • *Timing of Monitoring:* A raptor biologist will initiate monitoring at least 1-year prior to the beginning of rehabilitation and at least 2 months prior to nest site selection, generally January to mid-February. Monitoring will continue through the breeding season, which generally extends through mid-July. Monitoring will occur at the existing nesting locations and at the alternate nesting locations after placement of artificial nest boxes. Monitoring during construction will continue once weekly during the breeding season until the breeding season or construction is complete, whichever occurs first. Post-construction monitoring will occur for 3 years after construction. Surveys will be conducted once monthly from January through July to document peregrine falcon nesting at the existing sites. • *Biological Monitor:* A raptor biologist with several years of experience observing peregrine falcon behavior and approved by the Port, Caltrans, and CDFG will be selected to conduct the monitoring. • *Monitoring Effort:* All monitoring will be conducted with the use of binoculars and/or spotting scope and document peregrine falcon activity in the vicinity of the bridge. Monitoring during bridge rehabilitation will require an average of 8 to 12 hours of observation per week to determine whether peregrine falcons are exhibiting normal breeding behavior and are nesting at the temporary locations, or if they have relocated to an alternate nesting site. If peregrines attempt to nest at the temporary nesting locations during rehabilitation activities, then a qualified peregrine monitor will observe the pair for a minimum of 16 hours per week to determine the effect of the construction on peregrine behavior. This level of effort will continue as long as incubating peregrines or nestlings under the care of adults occupy the nesting site. If the young fledge, then the observations will continue for a minimum of 30 days after the last young leaves the nest ledge. If the raptor biologist reports that the peregrines are exhibiting behavior that may indicate potential nest abandonment, then visual screens or other methods approved by CDFG would be implemented at the nesting locations. Nesting on the Gerald Desmond Bridge in locations other than the temporary nesting locations shall be discouraged until rehabilitation activities are complete. The Port, in coordination with CDFG, will develop measures to be implemented by a raptor biologist, where feasible. or under the direction of a raptor biologist, where precluded by construction site safety concerns, to discourage nesting within areas under construction. Such measures may include continued removal of nesting materials or installation of additional CDFG-approved exclusion devices. • *No Work Zone:* During bridge rehabilitation activities, alternate nest ledges and boxes will be available for nesting. If a nesting attempt is made at a new location that would be under construction during the nesting season, then a “No Work Zone” of approximately 250 ft (76 m) will be enforced until the raptor biologist implements CDFG-approved methods to discourage nesting at the new location. Should a nest be successfully established within the construction area during bridge rehabilitation, the Port will instruct construction crews to adhere to a “No Work Zone” around the nest site. The Port will coordinate with USFWS and CDFG to obtain permission to remove the nest in accordance with the MBTA. This “No Work Zone” will extend around the nest for a radius of approximately 250 ft (76 m) and be maintained until removal of the nest is authorized or 30 days after the last young leaves the nest, or until nest abandonment, whichever occurs first. Rehabilitation activities can continue at other locations outside of the “No Work Area.” • *Reporting:* Quarterly reports summarizing monitoring observations of nesting peregrines, including breeding behavior, nest data, disturbances, and reproductive success, will be submitted during bridge rehabilitation activities. During post-construction monitoring, quarterly reports will provide details on nesting attempts, breeding behavior, and reproductive success. Reports will be prepared by the raptor biologist and submitted to the Port, Caltrans, and CDFG.	Minor Impact	Less than Significant
X	X	√	Potentially adverse impacts to the resident bat species include behavior modification caused by construction activities and changes in roost preferences and/or roosting sites on the Gerald Desmond Bridge.	BR-5b: **Precluding Roosting on the Existing Bridge:** Prior to beginning construction activities on each section of the bridge, bats will need to be excluded from that section. Bat proofing will occur outside of the breeding season (October 30 through March 1) after juvenile bats have learned to fly. Bat exclusion will be staged to ensure that roosting sites in areas not currently under construction will be available at all times during the project to minimize the potential effects on bats. Exclusion methods for the Rehabilitation Alternative will be the same as discussed under BR-5.	Minor Impact	Less than Significant
X	X	√	Potentially adverse impacts to the resident bat species include behavior modification caused by construction activities and changes in roost preferences and/or roosting sites on the Gerald Desmond Bridge.	BR-6b: **Bat Monitoring Program:** A monitoring program will be implemented throughout the project, as applicable. CDFG concurrence on the proposed monitoring program will be obtained prior to initiation of bat monitoring/survey activities. All surveys/monitoring will be conducted by an approved CDFG bat biologist. Preconstruction monitoring will focus on bat species identification and locations of bat roosts and access points. If CDFG species of special concern are identified during preconstruction surveys, then the Port will coordinate with CDFG and incorporate additional monitoring and protection measures, as applicable. During exclusion activities, monitoring of the exclusion devices will occur to ensure that entanglement of bats is not occurring. Monitoring will continue as long as bats are observed exiting the existing bridge. Subsequent to exclusion, monitoring during bridge rehabilitation activities will continue, focusing on locations where additional exclusion may be required. Post-construction monitoring will document re-colonization of the bridge and former roost areas. • *Timing of Monitoring:* Preconstruction surveys will be initiated a minimum of 1-year prior to the initiation of bridge rehabilitation activities. The surveying and monitoring regime will consist of quarterly monitoring surveys, including a survey in June (i.e., prime bat roosting season). One month prior to rehabilitation activities, surveys will increase to weekly and consist of daytime and nighttime surveys (see Monitoring Effort) focused on species identification, identifying specific locations of bat roosts, access points, and roost characteristics. Monitoring during the bat exclusion phase will focus on ensuring that all bats have been excluded prior to initiating bridge rehabilitation activities. Subsequent to installation of exclusion devices, roosting areas will be monitored for 7 consecutive nights or until no bats are	Minor Impact	Less than Significant

√ - Impact associated with alternative; X – Impact not associated with Alternative

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North-side Alignment Alternative	South-side Alignment Alternative	Rehabilitation Alternative	Potential Impacts-	Avoidance, Minimization and/or Mitigation Measures	Residual Impacts NEPA	Residual Impacts CEQA
				observed to exit the structure from known roosting areas at nightfall. During this time, monitoring will be performed to ensure that no bats become entangled in netting and that the bats do not discover and use new roost areas on the existing bridge. If any new roosts are discovered, then exclusion netting will be installed, and the monitoring process will continue until bats have been excluded from the bridge. Post-construction monitoring will be conducted quarterly for 3 years to document the post-construction bat re-colonization of the bridge. • *Biological Monitor:* A qualified bat biologist, thoroughly familiar with Anabat™ equipment and approved by CDFG, Caltrans, and the Port, will conduct all bat monitoring and supervise the design and placement of bat exclusion methods and devices. • *Monitoring Effort:* The quarterly surveys will be performed during appropriate lunar/weather conditions and focus on identifying active bat roosts on the existing bridge. Each quarterly survey will include one survey during the day to search for urine staining and accumulation of bat feces or guano, and one evening/night survey period using a sonic bat (i.e., Anabat™ or Sonobat™). Several visits may be required per survey to determine specific roost locations and roost access points, and information necessary for designing bat exclusion devices for the bridge. Monitoring during construction will focus on the presence of bats in the bridge area and to identify areas that would require further exclusion. • *Reporting:* Quarterly reports summarizing the monitoring efforts and observations will be prepared and submitted to the Port, Caltrans, and CDFG. Following construction, a final report will be prepared and include the name of the bat monitor, survey methods and dates, survey times and weather conditions, and exclusion devices used. The final report will also include photos and detailed observations, and conclusions and recommendations for agency use in future projects.		
√	√	X	Potential impacts to nesting double-crested cormorants during initiation of construction activities for new transmission towers/lines.	BR7: Initial construction activities for the new transmission towers/lines shall not begin during the nesting season (April through August) if double-crested cormorants have active nests on the transmission towers. Construction activities associated with the transmission tower/lines will be initiated prior to or after the breeding season or after the young have fledged.	Minor Impact	Less than Significant
X	X	√	Potential impacts to migratory birds associated with night time construction lighting during bridge rehabilitation.	BR-8b: Bridge lighting during construction will be designed to minimize the potential for bird collisions with the bridge structure. Lighting will be shielded to ensure that light is focused inward on the construction area and minimize spillover that could affect migratory birds.	Minor Impact	Less than Significant
√	√	√	Potential for project to spread invasive species.	BR-9: Project landscaping will be limited to slopes near the bridge ramps and will follow the provisions set forth in Executive Order (EO) 13112, which mandates preventing the introduction of and controlling the spread of invasive plant species on highway rights-of-way (ROWs). No invasive species listed in the National Invasive Species Management Plan or the State of California Noxious Weed List shall be used in the landscaping plans for the proposed project.	Minor Impact	Less than Significant
Climate Change (see Section 3.3)[3]						
√	√	X	Project-related increases in greenhouse gas (GHG) emissions are considered an unavoidable significant project impact.	There are no feasible mitigation measures to address GHG for transportation projects. GHG transportation emission reductions will come from three overarching strategies: more-efficient vehicles, lower-carbon fuels, and reduction of vehicle use or VMT. The GHG emission reductions in the transportation sector will be achieved through regulations, market mechanisms, incentives, and land use policy.	N/A	Significant
√	√	X	Project-related increases in GHG emission would contribute to regional cumulative increases in GHG emissions and are considered an unavoidable significant project impact.	CEQA (GHG)-1: **Greenhouse Gas Emission Reduction Program Guidelines (GHG Program).** To partially address the cumulative GHG impacts of the Gerald Desmond Bridge Replacement Project, the Port will require this project to provide funding for the GHG Program. The contribution to be made to the Port of Long Beach GHG Grant Program will be determined at the completion of the public comment period for the environmental document, based on the alternative selected for implementation. This contribution will be used to pay for measures pursuant to the GHG Emission Reduction Program Guidelines, which include, but are not limited to, generation of green power from renewable energy sources, ship electrification, goods movement efficiency measures, cool roofs to reduce building cooling loads and the urban heat island effect, building upgrades for operational efficiency, tree planting for biological sequestration of CO_2, energy-saving lighting, and purchase of renewable energy certificates (RECs). The timing of the payments pursuant to this mitigation measure shall be made by the latter of the following two dates: (1) the date that the Port issues a Notice to Proceed or otherwise authorizes the commencement of construction on the project; or (2) the date that the Gerald Desmond Bridge Replacement Final EIR/EA is conclusively determined to be valid, either by operation of PRC Section 21167.2 or by final judgment or final adjudication. At the project level, there are common measures that have the potential to reduce GHG emissions. These measures include using reclaimed water, landscaping, energy-efficient lighting, and idling restrictions.	N/A	Significant

[3] Climate change analysis is not required by Caltrans pursuant to NEPA. Climate change impacts and mitigation were developed by the Port pursuant to CEQA.

√ - Impact associated with alternative; X – Impact not associated with Alternative

Chapter 1

Project Description and Alternatives

CHAPTER 1
PROJECT DESCRIPTION AND ALTERNATIVES

1.1 INTRODUCTION

The proposed project is located in the southwest portion of Long Beach at the southern end of State Route (SR) 710 in Los Angeles County (Exhibit 1-1). This joint revised Draft Environmental Impact Report (EIR)/Environmental Assessment (EA) analyzes project-specific impacts of the proposed Gerald Desmond Bridge Replacement Project (project). This document has been prepared by the City of Long Beach acting by and through its Board of Harbor Commissioners (Port of Long Beach [Port or POLB]) as lead agency for the EIR and the California Department of Transportation (Caltrans) as lead agency for the EA, in accordance with Section 6005 of the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) of 2005 (23 United States Code [U.S.C.] 327[a][2][A]), the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321 *et seq.*); the Council on Environmental Quality (CEQ) Regulations implementing NEPA (40 *Code of Federal Regulations* [CFR] 1500-1508); Federal Highway Administration (FHWA) Environmental Regulations (23 CFR 771); and the California Environmental Quality Act of 1970 (CEQA) (Public Resources Code [PRC] 21000 *et seq*. as amended) and implementing guidelines (California Code of Regulations [CCR], Title 14, Section 15000 *et seq.*).

Chapter 1 of this document presents the project objectives and the purpose and need for the proposed project, as well as discussion on the project alternatives and project history. Chapter 2 analyzes the potential effects of the project pursuant to NEPA. Chapter 3 utilizes the analysis in Chapter 2 and provides supplemental analysis, as applicable, to make a determination of significance of the potential impacts pursuant to CEQA. One of the primary differences between NEPA and CEQA is the way significance is determined. With NEPA, it is the magnitude of the impact that is evaluated, and no judgment of its individual significance is deemed important. NEPA does not require that a determination of significant impacts be stated in environmental documents. With NEPA, significance is used to determine whether an Environmental Impact Statement (EIS) or some lower level of documentation would be required. NEPA requires that an EIS be prepared when the proposed federal action (project) as a whole has the potential to "significantly affect the quality of the human environment." This determination of significance is based on context and intensity of the project and its potential effects. The Project Development Team (PDT) has determined that the proposed project, as a whole, would not have the potential to significantly affect the quality of the human environment; therefore, an EA has been prepared pursuant to NEPA. Information supporting this determination is provided in Chapter 2.

CEQA, on the other hand, does require the lead agency to identify each "significant effect on the environment" resulting from the project and ways to mitigate each significant effect. If the project may have a significant effect on any environmental resource, then an EIR must be prepared. Each and every significant effect on the environment must be disclosed in the EIR and mitigated if feasible. In addition, the CEQA Guidelines list many mandatory findings of significance that also require preparation of an EIR. There are no types of actions under NEPA that parallel the findings of mandatory significance of CEQA. Some impacts determined significant under CEQA may not be of sufficient magnitude to be determined significant under NEPA. Based on the determination that the project may have a significant effect on environmental resources, an EIR has been prepared for the proposed project pursuant to CEQA.

1.1.1 Project Objectives

The objectives of the proposed project include providing a structurally sound bridge linking Terminal Island and Long Beach/SR 710 over the next hundred years, given that the existing bridge is seismically deficient and could be seriously damaged in a major earthquake. Another objective is to provide sufficient roadway capacity to handle current and projected vehicular traffic volume demand, which the existing bridge cannot provide with only two through lanes and no shoulders. Lastly, the proposed project would provide sufficient vertical clearance for safe navigation through the Back Channel to the Inner Harbor, which the existing bridge, at only 156 feet (ft) (47.5 meters [m]) above mean high water level (MHWL), does not provide. (See Section 1.1.2.2 for detailed information supporting these objectives.)

The project would replace or rehabilitate the existing seismically deficient Gerald Desmond Bridge. Additionally, the North- and South-side

Alignment Alternatives would improve vehicular traffic flow and marine vessel safety. The Bridge Replacement Alternatives would provide additional benefit to the Port and region by handling existing operations and forecasted growth in vehicular traffic, vessel traffic, and goods movement. The project objectives are consistent with similar goals addressed in the Port Master Plan (PMP), as amended.

1.1.2 Purpose and Need

This project is included in the Southern California Association of Governments (SCAG) 2008 Regional Transportation Plan (RTP) and 2008 Regional Transportation Improvement Program (RTIP) for Local Highway Projects (Project ID LA000512).

The current estimated cost of the proposed North- and South-side Bridge Replacement Alternatives and the Rehabilitation Alternative is approximately $983 million, $1.0 billion, and $289.3 million (in 2008 dollars), respectively. The Port would secure funding for the project from federal, state, regional, and local agency resources, and it would continue to pursue public-private partnerships to the extent required to supplement public funds.

1.1.2.1 Project Purpose

Based on the overall project objectives in Section 1.1.1 and the specific needs and deficiencies described below, the purpose of the proposed project is four-fold – to provide a bridge that would:

1. Be structurally sound and seismically resistant;
2. Reduce approach grades;
3. Provide sufficient roadway capacity to handle current and future car and truck traffic volumes; and
4. Provide vertical clearance that would afford safe passage of existing container ships and for new-generation larger vessels currently being constructed.

Only the Bridge Replacement Alternatives would meet all four purposes of the project, as well as provide a structure that would meet the transportation needs of the Port and the region for its planned 100-year design life. The Rehabilitation Alternative would still require replacement after its 30-year design life (see Section 1.8 for additional discussion comparing the proposed alternatives).

1.1.2.2 Project Need

The following discussion summarizes the present and projected deficiencies in the existing Gerald Desmond Bridge. These deficiencies explain the need for replacement of the bridge.

Bridge Condition

According to a County of Los Angeles Department of Public Works Bridge Inspection Report dated September 5, 2007, the bridge has a sufficiency rating of 43. Bridges that are found to be structurally deficient or functionally obsolete, as defined by FHWA, with a sufficiency rating of less than 80 are eligible for federal funding for rehabilitation. Bridges are eligible for replacement when they have a sufficiency rating of less than 50 (Caltrans, 2001).

The existing bridge is physically deteriorated. One of the major physical deficiencies of the bridge is that the concrete is spalling off the bridge in many areas. Pieces of fallen concrete weighing several pounds have been found, requiring the Port to install netting underneath the bridge to protect Port facilities and workers below.

The bridge is also seismically deficient. It was designed in the early 1960s and completed in 1968. As with all bridges of that era in high seismic regions, its original construction has seismic performance issues that do not meet current seismic standards required by the American Association of State Highway and Transportation Officials (AASHTO), as well as Caltrans Seismic Design Criteria (SDC). Additional seismic deficiencies that do not meet current AASHTO or SDC requirements include the presence of lap splices at the base of columns and an insufficient amount of confinement reinforcement in the bridge columns. Both of these deficiencies will make it very difficult for the bridge to withstand a major earthquake without incurring significant damage to the columns and potentially threatening overall bridge integrity.

An assessment of the existing bridge was performed to evaluate whether it is in compliance with current AASHTO codes, as well as Caltrans seismic criteria, and to determine the extent of any bridge rehabilitation needed to comply with current codes.

Several reports, including a 2005 Inspection Report, 2002 Load Rating Report, and 1989 Fatigue Memorandum, were reviewed to confirm the condition of the existing bridge and estimate the amount of work and cost associated with bringing it up to the current AASHTO and Caltrans

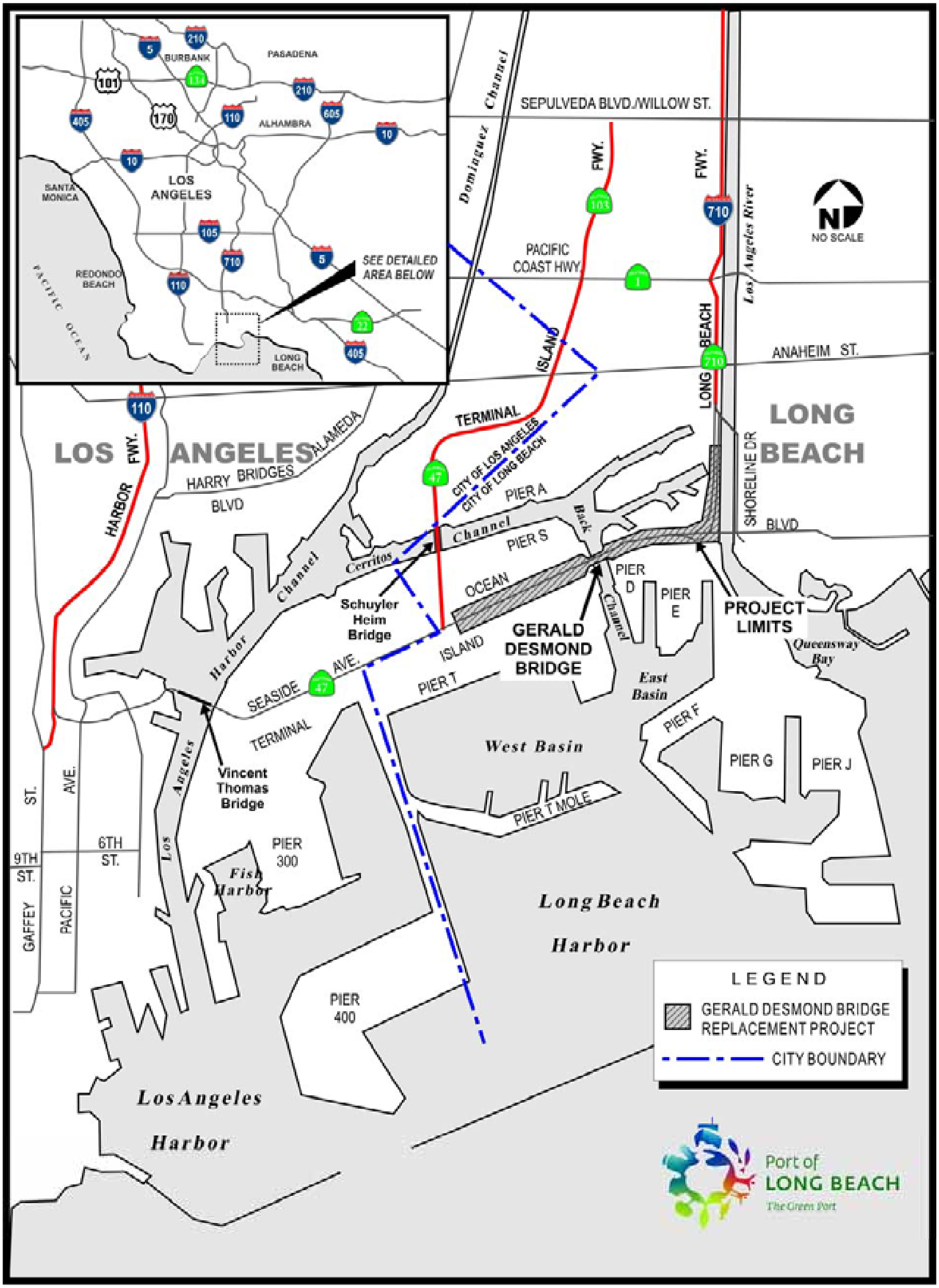

EXHIBIT 1-1
Project Vicinity and Project Location Map

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standards. A brief summary of findings from these reports is provided below:

- The Inspection Report cited the condition of the deck as "critical" and the condition of the paint as "extremely poor." With the existing deck crossing seawater and now being 40 years old, the inspection found it would have to be replaced in the near future to protect the overall structural integrity of the bridge and improve its seismic response. Deck replacement would also necessitate replacement of all expansion joints. To prevent major deterioration of the bridge steel members, painting would also be required in the near future.
- The Load Rating Report indicated that the members of the arch main span were overstressed for all design truck loads and would need to be replaced.

The existing bridge underwent a seismic retrofit study in the early 1990s, followed by a seismic retrofit to improve its seismic performance. To minimize retrofit cost, partial steel column casings were added at select columns, such as Piers 15 and 16, to support the main steel truss span.

Traffic Capacity/Roadway Deficiencies

Capacity

In 2005, which is the Notice of Preparation (NOP) baseline year, approximately 38 percent of all traffic on the Gerald Desmond Bridge had an origin or destination in the Port of Long Beach and Port of Los Angeles (Ports) (Iteris, 2009). Of the approximately 59,700 vehicles per day (vpd) on the bridge, 15,200 or 25 percent were trucks (see Table 1-1).

The presence of substantial numbers of vehicles other than passenger cars (i.e., heavy-duty trucks) affects traffic flow in two ways: (1) these vehicles occupy more roadway space than passenger cars; and (2) the operational capabilities of these vehicles, including acceleration, deceleration, and maintenance of speed, are inferior to passenger cars and result in the formation of large gaps in the traffic stream, which reduces highway capacity. On long sustained grades and segments where trucks operate considerably slower, formation of these large gaps can have a profound impact on the traffic stream (Iteris, 2009).

The bridge is forecast to carry a substantial amount (39 percent) of non-port, regional through traffic in 2030 (Iteris, 2009). Regional traffic will increase due to several major development projects that have been constructed in downtown Long Beach, such as the Pike at Rainbow Harbor and the proposed San Pedro Waterfront Development in the Port of Los Angeles (POLA).

Year 2030 forecasted traffic volumes without the project are approximately 124,670 total trips per day (including 54,360 trucks or 43.6 percent of the total traffic) on the Gerald Desmond Bridge (Iteris, 2009). Table 1-1 summarizes the daily traffic and truck percentages over the project planning years.

Table 1-1
Daily Truck Percentages

Year	Daily Trucks	Percent Trucks	Daily Traffic
2005	15,200	25	59,700
2015 No Action	22,790	30	77,070
2015 Build	26,100	30	86,730
2030 No Action	54,360	44	124,670
2030 Build	59,730	44	135,930

Level of Service (LOS)

LOS is defined in six levels, from A through F. Level A is free-flow, high-speed conditions. At Level D, speed and maneuverability are reduced due to congestion, and Level F is a breakdown in flow, with speeds and vehicular throughput potentially dropping to zero. In 2005, peak-hour (i.e., morning, midday, and evening) traffic on the uphill segments (i.e., base of bridge to the crest) of the existing Gerald Desmond Bridge operated at LOS B or C in both the westbound (WB) and eastbound (EB) directions. In 2030, without the project, operations during peak hours are projected to be LOS F WB toward Terminal Island and LOS C EB toward Long Beach (Iteris, 2009).

Deficiencies

The primary roadway deficiencies are the lack of outside shoulders and the steep approach grades.

Shoulders: The lack of shoulders often results in broken-down trucks or passenger vehicles being stuck in the outside lane, effectively blocking or severely restricting the entire traffic flow in that direction of travel until the incident is cleared. The lack of shoulders also makes it more difficult for emergency vehicles and tow vehicles to gain access to the incidents. Providing outside shoulders would improve safety to the emergency responders and traveling public in these situations. The recent addition of climbing lanes on the bridge does not mitigate the need for breakdown shoulders because breakdowns still tie up the outside lanes as wider, slow-moving trucks must negotiate around incidents.

Approach Grades: The long, steep approach grades cause trucks to operate considerably slower, especially when passing, which creates large gaps in the traffic stream and further reduces highway capacity. The current approach grades are 5.5 percent on the west side of the bridge and 6 percent on the east side.

Vertical Clearance

The existing bridge is located over the main federal navigation channel (i.e., Back Channel) that serves the Port. It provides a vertical clearance of 156 ft (47.5 m) above MHWL, which is insufficient for the clearance of some existing container ships, as well as new vessels currently being constructed. The Gerald Desmond Bridge is one of the lowest bridges in any large commercial port in the world.

In addition, the vertical clearance afforded by the Southern California Edison (SCE) transmission lines crossing Cerritos Channel north of the bridge is only 153 ft (46.6 m) above MHWL. These transmission lines would be the primary vertical clearance hazard to navigation if the bridge clearance were to be increased.

1.2 SUMMARY OF CHANGES TO THE PROJECT FOLLOWING CIRCULATION OF THE JUNE 2004 DRAFT EIR/EA

Subsequent to the public comment period for the previously circulated Draft EIR/EA in June 2004, the Port elected to consider two additional alternatives: a bridge rehabilitation alternative and a tolling alternative (i.e., using tolls to fund bridge construction and operation). In addition, the Port updated the analysis of existing and future traffic conditions by collecting more recent traffic data and updating the projection of future traffic conditions based on recent forecasts of marine terminal activity and configuration.

The Bridge Rehabilitation Alternative would seismically retrofit the existing bridge by replacing the bridge deck and expansion joints, adding steel casings at all columns, foundation retrofit, replacing sway bracings, and painting of all steel members. After bridge rehabilitation, roadway operations within the project area would be the same as existing.

The proposed project limits (i.e., new bridge and related improvements, and SCE transmission line relocation) remain the same as that presented in the 2004 Draft EIR/EA; however, the study area was expanded, as described in the 2005 revised NOP, to address the tolling alternative as follows: Willow Street/Sepulveda Boulevard on the north end and Interstate 110 (I-110) on the west end. The tolling alternative was found to have effects beyond these expanded study limits, extending to Interstate 405 (I-405) to the north, I-110/SR 91 to the west, and into downtown Long Beach at Pine Avenue to the east (see Section 1.7.1). The south end of the project study area has not changed, terminating at Pico Avenue south of the Ocean Boulevard interchange.

Subsequently, the tolling alternative was not carried forward for further consideration, as discussed in Section 1.7. The study area was then reduced and is now slightly larger than the study area discussed within the 2004 Draft EIR/EA. The study area now extends along Ocean Boulevard from just west of Navy Way/Seaside Avenue on Terminal Island to Pine Avenue in downtown Long Beach. Project limits to the north and south have not changed from the 2004 Draft EIR/EA and extend to 9th Street on SR 710 to the north and to Pico Avenue south of Ocean Boulevard to the south.

With the addition of the tolling alternative, the rehabilitation alternative, the expanded study area limits, and updated traffic forecasts, the Port elected to update several technical studies supporting this revised Draft EIR/EA. These consisted of the Air Quality Analysis, Traffic Impact Analysis, Noise Study, Natural Environment Study, Visual Impact Analysis, Water Resources, and Hazardous Waste Initial Site Assessment (ISA). This revised Draft EIR/EA also includes a Health Risk Assessment (HRA). POLB issued the revised NOP in December 2005 and made it available to the public and responsible/ trustee agencies to provide comments regarding the revisions to the proposed project. No comments were received from either the public or responsible/trustee agencies during the public review period of the revised NOP.

Table 1-2 summarizes the major differences between the June 2004 Draft EIR/EA and this revised Draft EIR/EA for the Gerald Desmond Bridge Replacement Project.

Table 1-2
Summary of Key Differences between 2004 Draft EIR/EA and 2009 Revised Draft EIR/EA

Subject	2004 Draft EIR/EA	2009 Revised Draft EIR/EA
Alternatives	Analyzed a North-side Alignment Alternative, a South-side Alignment Alternative, and the No Action Alternative.	Analyzes a North-side Alignment Alternative, a South-side Alignment Alternative, a Bridge Rehabilitation Alternative, and the No Action Alternative. Also considers a Toll-Operation Alternative, but is not carried forward for further analysis (see Section 1.7.1).
Study Limits	Route 710 approximately 2,630 ft (801 m) north of Ocean Boulevard on the north end; the Terminal Island Freeway (SR 47) intersection on the west end; Los Angeles River on the east end; and Pico Avenue south of the Ocean Boulevard interchange on the south end.	The study limits are expanded along Ocean Boulevard to Navy Way/Seaside Avenue to the west and Pine Avenue in downtown Long Beach to the east.
New Bridge Vertical Clearance	Considered both 185-ft (56-m) and 200-ft (61-m) vertical clearance options.	Considers only a 200-ft (61-m) vertical clearance option, concluding that the 185-ft (56-m) clearance option does not provide sufficient vertical clearance for the design ship.[1]
Traffic Study, Air Quality Study, Noise Study, and Energy Analysis	Forecasted project effects to 2025 design year.	Forecasts project effects to 2030 design year. Also includes 2015 interim/opening year horizon, specifically for analysis of traffic and air quality effects.
CEQA Baseline	Compared traffic and relevant environmental effects based on analysis of future 2025 Build versus No Action Alternatives.	Compares traffic and relevant environmental effects to 2005 conditions (CEQA baseline – date of revised NOP).
Traffic Forecasts	Based on the previous traffic study, 70 percent of all traffic generated at the Ports was reported to use the Gerald Desmond Bridge. This equated to approximately 55,030 vpd, with 36 percent truck use during peak hours. By 2020, the number of containers in both ports was estimated to increase by approximately 276 percent. Forecasted traffic volumes were approximately 79,180 trips per day (including 27,700 trucks or 35 percent of total traffic) under the No Action Alternative and 88,690 under the Build Alternative on the Gerald Desmond Bridge by 2025.	Current traffic forecasts indicate that approximately 38 percent of all traffic generated at the Ports used the Gerald Desmond Bridge in 2005 (NOP baseline year). This equates to approximately 59,700 vpd with 25 percent truck use. Forecasted daily traffic volumes are approximately 124,670 (including 54,360 trucks or 44 percent of the total traffic) in 2030 under the No Action Alternative and 135,930 (including 59,730 trucks or 44 percent of total traffic) in 2030 under the Build Alternative.
Traffic Baseline	Existing year was 2002.	Existing year is 2005. As a consequence, the “existing condition” LOS analysis is different.
Traffic Operations	Two (2) intersections were analyzed for impacts.	Eleven (11) intersections are analyzed for impacts.
Traffic Analysis Methodology	The operational analysis for Ocean Boulevard was conducted using the Highway Capacity Manual (HCM) procedures. The HCM method cannot model	The operational analysis for Ocean Boulevard uses CORSIM (Corridor Simulation) software developed by FHWA. CORSIM tracks each vehicle independently through the modeled

[1] The Danish Maritime Institute (DMI) performed a study of the next generation of cargo vessels expected to be coming online. The purpose of the study was to define the design ship to use for establishing the height of the replacement bridge, given the proposed 100-year design life for the new bridge. The DMI recommended a 12,500 twenty-foot equivalent unit (TEU) ship as the design ship for the bridge replacement (FORCE Technology-DMI, 2002). This vessel has a vertical clearance of 180 ft (54.5 m). The design team concluded that a 5-ft (1.5-m) clearance was sufficient for the 100-year life of the new bridge and dropped the 185-ft (56-m) alternative from further consideration.

Table 1-2
Summary of Key Differences between 2004 Draft EIR/EA and 2009 Revised Draft EIR/EA

Subject	2004 Draft EIR/EA	2009 Revised Draft EIR/EA
	a discontinuous lane (i.e., the truck climbing lane), resulting in the existing bridge being analyzed with two lanes in each direction. Also, the HCM method is limited to 25 percent trucks, so the additional truck percentage was analyzed by converting the additional trucks to passenger car equivalents (PCEs).	network of roadways. The method accounts for upstream and downstream segment operational effects on each roadway, whereas the HCM treats each segment in isolation. CORSIM can model a discontinuous lane, resulting in the existing bridge being analyzed with the truck climbing lanes (see below). (Use of CORSIM resulted in analysis with three lanes on the bridge upgrade and two lanes on the downgrade.) Also, the CORSIM model has no limitation on truck percentage.
Traffic LOS Analysis[2]	Bridge – Existing (4-lane): • WB LOS F (AM) • WB LOS F (Midday) • WB LOS F (PM) • EB LOS F (AM) • EB LOS F (Midday) • EB LOS F (PM) Bridge – 2025 No Action (4-lane): • EB LOS F (AM) • EB LOS F (Midday) • EB LOS F (PM) Pico Avenue/Pier E Street/EB Ocean Boulevard Ramps (2025 No Action): • LOS B (AM) • LOS C (Midday) • LOS D (PM) New Bridge – 2025: • WB LOS D (AM) • WB LOS D (Midday) • WB LOS D (PM) • EB LOS D (AM) • EB LOS D (Midday) • EB LOS D (PM) New Ramp Junctions – 2025: • Pico Avenue to SR 710 Connector: – LOS B (AM) – LOS C (Midday) – LOS B (PM) • Off-ramp from SR 710 Connector to Pico Avenue: – LOS C (AM) – LOS C (Midday) – LOS C (PM) Pico Avenue/Pier E Street Intersection – 2025: • LOS B (AM) • LOS C (Midday) • LOS D (PM)	Bridge – Existing (4-lane with climb lanes): • WB LOS C (AM) • WB LOS C (Midday) • WB LOS C (PM) • EB LOS C (AM) • EB LOS C (Midday) • EB LOS C (PM) Bridge – 2030 No Action (4-lane with climb lanes): • EB LOS C (AM) • EB LOS C (Midday) • EB LOS C (PM) Pico Avenue/Pier E Street/EB Ocean Boulevard Ramps (2030 No Action): • LOS C (AM) • LOS C (Midday) • LOS E (PM) New Bridge – 2030: • WB LOS C (AM) • WB LOS C (Midday) • WB LOS C (PM) • EB LOS D (AM) • EB LOS C (Midday) • EB LOS D (PM) New Ramp Junctions – 2030: • Pico Avenue to SR 710 Connector: – LOS B (AM) – LOS B (Midday) – LOS B (PM) • Off-ramp from SR 710 Connector to Pico Avenue: – LOS B (AM) – LOS C (Midday) – LOS C (PM) Pico Avenue/Pier E Street Intersection – 2030: • LOS A (AM) • LOS A (Midday) • LOS C (PM)

[2] Differences between the 2004 and 2009 Draft EIR/EA LOS are attributable to addition of PierPASS in later analysis (which reduced daytime truck volumes), change of the forecast year from 2025 to 2030, and new forecasts incorporating improvements made to the forecasting model, including throughput of TEUs at the ports, rail use, truck traffic data by shift, empty container traffic, an updated SCAG model forecast, a change in the existing year, and updated trip distribution.

Table 1-2
Summary of Key Differences between 2004 Draft EIR/EA and 2009 Revised Draft EIR/EA

Subject	2004 Draft EIR/EA	2009 Revised Draft EIR/EA
Water Resources	Identified three (3) locations where treatment best management practices (BMPs) were proposed. The potential treatment BMPs identified were media filters, multi-chambered treatment trains, or detention basins.	Proposes eight (8) locations for treatment BMPs. The potential treatment BMPs identified are media filters and biofiltration swales.
Utilities and Service Systems – SCE Transmission Tower and Line Relocation	Disclosed it would be necessary to raise or otherwise relocate the SCE transmission towers and lines between the Long Beach Generating Station (LBGS) and Pier A. No specific plan was developed.	Discloses that it will be necessary to raise or otherwise relocate the SCE transmission towers and lines between the LBGS and Pier A. A detailed analysis was completed and recommended Option 3 as the most feasible solution for relocating the transmission lines.
NEPA Lead Agency	Approved by FHWA, as lead agency under NEPA.	Caltrans will be lead agency under NEPA due to passage of the Surface Transportation Project Delivery Pilot Program (Section 6005), under SAFETEA-LU.

1.3 PROJECT DESCRIPTION

1.3.1 Bridge Replacement

As previously noted, the proposed project would construct a new bridge across the Back Channel and associated roadway connectors, demolish the existing Gerald Desmond Bridge, and relocate the SCE transmission lines crossing Cerritos Channel north of the bridge (see Exhibit 1-2).

The new bridge, excluding approach structures, would be 2,000 ft (610 m) long, and it would be elevated 200 ft (61 m) above the MHWL of the Back Channel (see Section 1.6 for a detailed description). Bridge replacement would also necessitate reconfiguration of adjacent freeway and arterial interchanges.

1.3.2 Bridge Replacement Concepts

A study of the various types of possible bridges determined that a cable-stayed bridge would be the best option. A cable-stayed bridge consists of a continuous girder with one or more towers erected above piers in the middle of the span. From these towers, cables stretch down diagonally (usually to both sides) and support the girder. A design team consisting of Port staff representatives, an architect, and project engineers began the aesthetic design process with a review of the overall design parameters, such as the context of the surrounding site, the bridge roadway geometry, the recommended height and span for the bridge, and the estimated dimensions of the major structural members.

The team next considered aesthetics, cost, constructability, seismic performance, right-of-way (ROW) issues, schedule risk, impact to Port operations, and maintenance.

Based on the results of the design review, four cable-stayed alternatives were chosen for further consideration (see Exhibits 1-3 and 1-4):

- Single Mast Tower
- Delta Tower
- H-Tower with Vertical Legs
- H-Tower with Slanted Legs

An in-depth study of these four design options was conducted over an 8-month period and included more detailed analysis and design for each alternative. Concepts for architectural lighting of the bridges were developed. Additionally, the potential ROW impacts to third-party properties were more fully defined.

Based on this in-depth study, two design options were selected to be carried forward for further development: Single Mast Tower and H-Tower with Slanted Legs. With further refinements to the bridge concept study, the Port staff elected to proceed with the development of the Single Mast Tower with a steel composite deck.

1.3.3 SCE Transmission Line Relocation

Because the new bridge would be 200 ft (61 m) above the MHWL, in contrast to the existing bridge at 156 ft (47.4 m) above MHWL, the project also requires that the SCE high-voltage transmission towers and lines that cross the Cerritos Channel north of the bridge be raised (see Section 2.1.4 [Utilities and Service Systems] and Appendix I). The vertical clearance afforded by the existing transmission lines is approximately 153 ft (46.6 m); therefore, the transmission lines would be the primary vertical clearance hazard to navigation if the bridge is raised. Exhibit 1-5 shows the location of the existing SCE transmission lines, Gerald Desmond Bridge, and other relevant features.

1.4 PROJECT BACKGROUND

The existing Gerald Desmond Bridge was constructed in 1968 and seismically upgraded in 1995. It provides four through travel lanes (i.e., two in each direction). On the uphill segments, climbing lanes were added by reconstructing the roadway area of the bridge to handle container trucks and improve LOS on the bridge. This improvement resulted in three ascending lanes and two descending lanes in each travel direction. Each climbing lane ends at the crest of the bridge. The bridge is a steel tied-arch truss structure, in which the horizontal forces of the arch are borne by the bridge deck, rather than the ground or the bridge foundations. The bridge has a 409.5-ft-long (124.8-m-long) suspended span that crosses the deep-water navigable channel connecting the middle and inner harbors of the Port (Parsons-HNTB, 2002a).

As the fifth largest seaport complex in the world, the Ports handle more than 30 percent of U.S. waterborne container cargo (POLB, 2006a). The bridge is a vital link in Port-area goods movement infrastructures because it is the westerly extension of SR 710, which is the primary access route for the ports and carries approximately 15 percent of all U.S. port-related container traffic (Caltrans *et al.*, 2005).

1.5 PROJECT LOCATION AND SETTING

The Gerald Desmond Bridge is one of three bridges connecting surface highways to Terminal Island in the harbor area. The bridge is located within the Port in an area zoned industrial. All land within the project limits is developed for port-related uses, and there is no special habitat or other environmental resource in the area. All areas surrounding the site are designated as industrial or commercial land use by Wilmington's Community Plan. There are several residences located east and north within 1-mile (mi) (1.6 kilometers [km]) of the site. The nearest receptor is the Golden Shores recreational vehicle (RV) park located approximately 0.3-mi (483 m) southeast of the eastern boundary of the project, across the Los Angeles River.

The Port owns most of this land, with several relatively small, privately owned properties located in the Inner Harbor area and northernmost sections of the Port. The bridge crosses the Back Channel and generally runs east-west across Pier D. It is located in three different Planning Districts in the Long Beach Harbor. These include the Northeast Harbor Planning District, the Terminal Island Planning District, and the Middle Harbor Planning District (POLB, 1999).

The proposed project and alternatives are located in the southwest portion of Long Beach at the southern end of Interstate 710 (I-710). I-710 is classified as SR 710 south of Pacific Coast Highway (PCH) in the State of California's Streets and Highways Code. Under the Bridge Replacement Alternatives, the bridge and Ocean Boulevard, would become part of SR 710 and would operate as a freeway facility with controlled access. The improvements between the existing SR 710 and SR 47, including the bridge, would be transferred to Caltrans by easement following route adoption and execution of a freeway agreement. It is estimated that the transfer would be completed within 2 years after construction.

The proposed project is in the Back Channel/Cerritos Channel area of the Port. It is centered along Ocean Boulevard from the intersection of the Terminal Island Freeway (SR 47) at the western end to its eastern terminus at the westerly end of the bridge over the Los Angeles River. The southern limit of the project is located on Pico Avenue approximately 660 ft (201 m) south of the Ocean Boulevard interchange. The northern limit of the project is along SR 710, approximately 2,630 ft (801 m) north of Ocean Boulevard, and to the southernmost SCE tower on Pier A. Ocean Boulevard spans the Back Channel via the Gerald Desmond Bridge. The Ocean Boulevard/ Gerald Desmond Bridge portion of the project is located in the Middle Harbor and Terminal Island Harbor Planning Districts of the Port, and the SR 710 portion is located in the Northeast Harbor Planning District.

1.6 ALTERNATIVES

The June 2004 Draft EIR/EA analyzed two alignment alternatives (Build Alternatives) and a No Action Alternative. Like the previous document, this revised Draft EIR/EA fully analyzes the North-side Alignment Alternative (identified as the preferred alternative [see Section 1.8.1.1]), the South-side Alignment Alternative, and the No Action Alternative; it adds a fourth alternative, Bridge Rehabilitation, which was not considered in the previous document. Exhibit 1-6 shows the North-side Alignment Alternative, and Exhibit 1-7 depicts the South-side Alignment Alternative.

View of Gerald Desmond Bridge Looking Southwest

View of Gerald Desmond Bridge and SCE Transmission Towers Looking Southeast

Exhibit 1-2

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Single Mast Tower

Delta Tower

**Exhibit 1-3
Bridge Design Options**

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H-Tower with Vertical Legs

H-Tower with Slanted Legs

Exhibit 1-4
Bridge Design Options

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Exhibit 1-5
EXISTING CONDITIONS

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EXHIBIT 1-6

Port of LONG BEACH

GERALD DESMOND BRIDGE REPLACEMENT PROJECT

NORTH-SIDE ALIGNMENT ALTERNATIVE

SCALE ______ SHEET ______ OF ______
SPECIFICATION NUMBER ______
DRAWING NUMBER ______

DRAWN DMP DATE 03/28/08
DESIGNED ______ P.E. NO. ______
PROJ. MGR. ______ P.E. NO. ______
SECT. HEAD ______ P.E. NO. C

ASS'T CHIEF HARBOR ENGR. P.E. NO. C-25677 DATE ______
CHIEF HARBOR ENGINEER P.E. NO. C-43065 DATE ______

MARK | DATE | BY | REVISIONS

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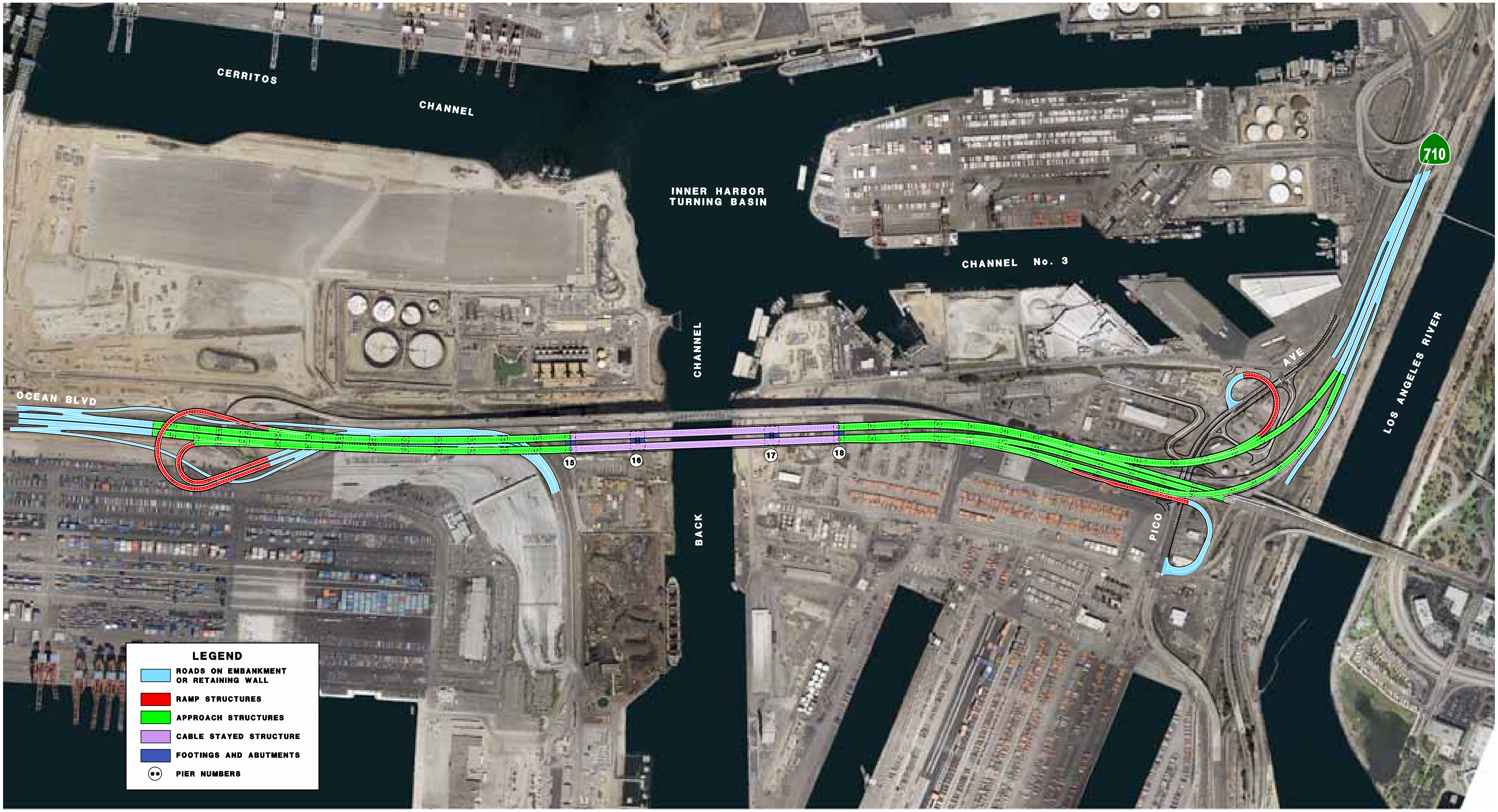

1:8000

EXHIBIT 1-7

GERALD DESMOND BRIDGE REPLACEMENT PROJECT

SOUTH-SIDE ALIGNMENT ALTERNATIVE

Port of LONG BEACH

SCALE ______ SHEET ______ OF ______
SPECIFICATION NUMBER
DRAWING NUMBER

DRAWN DWP DATE 03/28/08
DESIGNED ______ P.E. NO. ______
PROJ. MGR. ______ P.E. NO. ______
SECT. HEAD ______ P.E. NO. C-______

ASS'T CHIEF HARBOR ENGR. P.E. NO. C-25677 DATE ______
CHIEF HARBOR ENGINEER P.E. NO. C-43065 DATE ______

MARK | DATE | BY | REVISIONS

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USER: p0033148

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1.6.1 Bridge Replacement Alternatives

1.6.1.1 North-side Alignment Alternative (Preferred Alternative)

The North-side Alignment Alternative would provide a new bridge located approximately 140 ft (42.7 m) north of the existing bridge (measured from centerline to centerline). This bridge alignment would have a vertical profile over the Back Channel of 200 ft (61 m) above the MHWL. The roadway grades would be 5 percent in both directions.

The new bridge would be a cable-stayed design. The total bridge length would be 2,000 ft (610 m) long, with a main span opening across the channel of 1,000 ft (306 m), tower to tower. The west and east approach structures would be 3,117 ft (950 m) and 3,025 ft (925 m) in length, respectively.

The bridge cross section and approaches to the new bridge would include the following project features:

- Three 12-ft-wide (3.6-m) lanes in each direction
- A 10-ft-wide (3-m) outside shoulder in each direction
- A 10-ft (3-m) to 12-ft-wide (3.6-m) inside shoulder in each direction
- A 32-inch (in.)-high (81.3-centimeter [cm]) barrier that would run along the outside of each shoulder
- Reconstruction of the existing Horseshoe interchange ramp connectors
- Reconstruction of the existing connectors to SR 710 and the two ramp connections to Pico Avenue

The approach spans would be of concrete box girder construction, either segmental or cast-in-place.

This alignment alternative would use the land between the existing bridge and the LBGS (former SCE plant), and it would require construction of new ramps for the existing Horseshoe interchange. The proposed alignment would transition to join Ocean Boulevard approximately 3,280 ft (1,000 m) east of the channel, and the new connections would join SR 710 approximately 2,630 ft (801 m) north of Ocean Boulevard.

The Horseshoe interchange would use reconfigured ramps to provide access from the WB Gerald Desmond Bridge to Pier T Avenue and from Pier T Avenue to the EB Gerald Desmond Bridge. Additional ramp connections would be provided between Pier T Avenue and both Ocean Boulevard and the one-way frontage roads created by the newly constructed POLB Ocean Boulevard and SR 47 Interchange Project. These ramps would allow full access between Pier T Avenue and Ocean Boulevard in all directions.

At the SR 710 interchange, a new median connection to Ocean Boulevard in downtown Long Beach would be constructed, as would a new pair of connector ramps between SR 710 and the new bridge. A new hook ramp or loop ramp would be used to replace the existing on-ramp between Pico Avenue and the WB Gerald Desmond Bridge. The current ramps between Pico Avenue would be partially reconstructed to join the new connectors from SR 710. This interchange concept would enable trucks traveling to and from SR 710 to remain in the outside lanes, while cars traveling to and from downtown Long Beach via Ocean Boulevard would remain in the inside lanes. This approach would minimize the intermixing of cars and trucks accessing the above-mentioned facilities. The estimated cost for this alternative is approximately $983 million.

1.6.1.2 South-side Alignment Alternative

The South-side Alignment Alternative would provide a new bridge located approximately 177 ft (53.9 m) south of the existing bridge (measured from centerline to centerline). As for the North-side Alignment Alternative, this bridge alignment would have a vertical profile over the Back Channel of 200 ft (61 m). The main span bridge design options would be the same as those proposed for the North-side Alignment. The bridge cross section and approaches to the new bridge would include the same project features as described for the North-side Alignment Alternative.

The proposed alignment would transition to join existing Ocean Boulevard approximately 3,280 ft (1,000 m) west of the channel. This alignment would require reconstruction of all ramps for the existing Horseshoe interchange and a portion of the existing Pier T terminal main gate facility. The proposed alignment would transition to join existing Ocean Boulevard approximately 3,280 ft (1,000 m) east of the channel, and the new connections would join existing SR 710 approximately 2,820 ft (860 m) north of Ocean Boulevard. The four existing ramp connections to Pico Avenue would have to be reconstructed for this alternative. The interchange design variations used for the North-side Alignment Alternative would also be applied to the South-side Alignment Alternative. The estimated cost for this alternative is approximately $1.0 billion.

1.6.1.3 Proposed Construction and Phasing

Construction of the new bridge, for either the North-side Alignment Alternative or the South-side Alignment Alternative, would take approximately 48 months, in five overlapping phases (Table 1-3; Phase 6 Gerald Desmond Bridge demolition would take 15 months, as discussed in Section 1.6.1.4). Construction is currently estimated to commence in September 2011 and terminate by September 2015, but the actual schedule is contingent upon the completion of final design and the availability of funding for the project.

At this time, it is envisioned that there would be two potential contractor staging areas. One could be located in or around the lumberyard located on the southwest side of the existing Gerald Desmond Bridge on Pier T Avenue, and the other at the current location of the Port Maintenance Yard on the east side of the existing bridge on Broadway. The Port Maintenance Yard is proposed to be relocated prior to construction of the new bridge.

Construction Phasing

Each construction phase is anticipated to take approximately 1-year (Table 1-3), but it is expected that the latter part of each phase would overlap with the beginning of the next phase, so that the total construction time would be approximately 48 months.

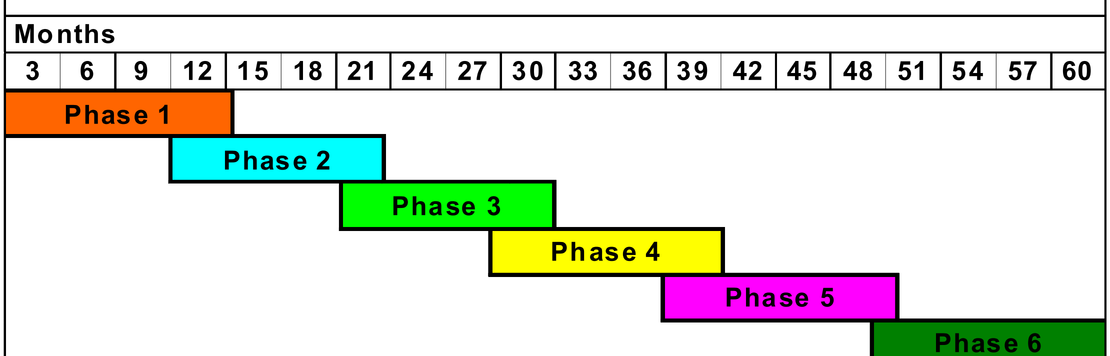
Phase 1:

In the first phase, the utilities in the project area would be relocated, and the railroad that parallels Ocean Boulevard on Pier S would be realigned. A WB ramp would be constructed to connect Pier T Avenue to SR 47, replacing the existing WB lane. Traffic would be diverted to the new ramp. Detour routes would be installed at Ocean Boulevard and the WB Ocean Boulevard/Pico Avenue on- and off-ramps. The inner left lane of southbound (SB) traffic on Harbor Scenic Drive would be maintained during construction of a SB on-ramp connecting Harbor Scenic Drive with Ocean Boulevard. Buildings and appurtenances at the Port Maintenance Yard facility would be demolished and removed in this phase for the North-side Alignment Alternative only. Relocation of the Port Maintenance Yard operations would temporarily be moved to an interim site and separately permitted by the Port. Ultimately, the Maintenance Yard would be co-located with the Administration Building Complex, as identified in the Final EIR for the Administration Building and Maintenance Facility Project. This phase would also involve the bridge Pier 16 foundation construction, including excavation, sheet pile installation, cast-in-steel shell pile placement, and construction of footings.

Phase 2:

The second phase would involve routing traffic onto the detour routes installed in Phase 1, establishing additional detours and temporary closures, and beginning work on the new main-span bridge and high-level approaches. This phase would also involve preparatory roadway work at each interchange. The following tasks describe construction of the main span and high-level approaches (see Exhibits 1-6 and 1-7 for the locations of the bridge piers referred to below):

Table 1-3
Draft Construction Schedule: Gerald Desmond Bridge Replacement



Phase 1: Utilities
Phase 2: Detours and Main Span
Phase 3: SR 710/Horseshoe Interchange
Phase 4: Connectors and Main Span
Phase 5: Tie-ins
Phase 6: Demolition (15 Months)

- Task 1 – Main-span tower construction at Pier 16, proceeding from the foundation to the top of the tower.
- Task 2 – Construction of the steel composite deck at Pier 16.
- Task 3 – Bridge Pier 17 foundation construction; Pier 17 construction activities would follow Pier 16 construction by approximately 6 months and would involve similar activities.
- Task 4 – Main-span tower construction at Pier 17.
- Task 5 – Construction of steel composite deck at Pier 17.
- Task 6 – Bridge Pier 15 foundation construction; foundation construction would follow Pier 17 construction by approximately 6 months and would involve similar activities.
- Task 7 – Bridge Pier 15 construction; bridge pier construction would occur approximately midway during main span construction and involve construction of columns and pier cap.
- Task 8 – Bridge Pier 18 foundation construction; foundation construction would follow Pier 15 construction by approximately 6 months and would involve similar activities.
- Task 9 – Bridge Pier 18 construction; bridge pier construction would follow Task 8 Bridge Pier 15 construction by approximately 6 months and would involve similar activities.
- Task 10 – Main-span superstructure completion, including structure closure, deck overlay, and traffic barrier construction.
- Task 11 – High-level approach foundation construction would start in parallel with the main span construction, involving similar activities for main span foundation construction with smaller diameter piles.
- Task 12 – High-level approach columns construction would follow and stagger as each foundation is complete.
- Task 13 – High-level approach superstructure construction would follow using the balanced cantilever segmental construction method. Cast-in-place or precast segments may be used.

Phase 3:

In the third construction phase, a portion of the SR 710 and Horseshoe interchange structures on either side of the channel would be reconstructed. A portion of Harbor Scenic Drive roadway would be constructed.

Phase 4:

The fourth phase would involve removal and reconstruction of the EB mainline curve to northbound (NB) SR 710, the WB Horseshoe off-ramp, and the east and west tie-ins of the EB mainline. A retaining wall would be constructed at the south side of Ocean Boulevard near SR 47. During this phase, the WB Ocean Boulevard traffic would be shifted onto the new Gerald Desmond Bridge, and one lane of traffic on EB Ocean Boulevard would be maintained. The remaining portion of Harbor Scenic Drive would also be constructed.

Phase 5:

In this last construction phase, the final tie-ins with the existing ramps and mainline curves would be constructed, equipment would be demobilized, all detours would be removed, and final grading would be completed. In this phase, WB and EB Ocean Boulevard traffic would be utilizing the new Gerald Desmond Bridge.

1.6.1.4 Proposed Demolition and Phasing

Existing Bridge Demolition

Demolition of the existing bridge in Phase 6 would be the same for either the North-side Alignment Alternative or the South-side Alignment Alternative. Demolition would be completed in approximately 15 months. It would include removal of the main steel truss spans, the steel plate girder approaches, and the ramps, including both superstructure and bents.

No explosives would be allowed for removing any part of the bridge. Space under the bridge would be available to allow sections of the superstructure to be lowered onto the ground for more efficient demolition and removal. The navigational channel under the main span may be temporarily closed during demolition. The suspension spans of the truss spans can be lowered onto barges, towed to shore, and off-loaded to the same space under the bridge used for demolition and removal of the sections over land. Substructure columns would be removed to an elevation 2 ft (0.6-m) below existing grade, leaving the existing pile caps and piles in place. Steel salvaged from the demolition would become the property of the demolition contractor to offset some of the cost. Lead-based paint (LBP), asbestos-containing materials (ACM), or any other hazardous materials would be handled and disposed of in accordance with federal, state, and local laws and ordinances.

Demolition of Main Steel Truss Spans

Stage 1:

The main span truss structure would be removed beginning with the "suspended" portion of the deck, which is located over the channel. The concrete deck slab and steel floor beams supporting the deck slab would be removed progressively from midspan toward each end of the suspended portion of the span. The truss members and lateral sway bracing would not be removed at this stage to ensure stability during deck removal.

Stage 2:

Once the deck was removed in the suspended portion of the bridge, the suspended truss section would be cut loose from the remaining truss and suspenders and lowered onto a barge as one unit. This section would be disassembled at a remote site.

Stage 3:

With the suspended section now removed, removal of the remaining deck slab and floor beams would progress from the suspended span toward the ends of the main span truss. As for the suspended span, the truss and sway bracing would remain in place for stability during this process.

Stage 4:

Once all of the deck is removed, the remaining truss would be disassembled beginning near the midspan section over the channel and progressing toward each end of the truss. It is likely that large sections of the truss would be cut loose and lowered to the ground where they would be cut up and transported offsite. Temporary support towers would be used for the anchor spans, as needed, to stabilize the existing truss as sections were removed.

Stage 5:

The temporary support towers and existing concrete columns would be removed to 2 ft (0.6-m) below the finished ground elevation.

Demolition of Steel Plate Girder Approaches and Ramp

Stage 1:

The concrete deck of the approach spans would be saw cut and removed.

Stage 2:

The steel plate girders at every other span would be cut off near the hanger assembly and removed.

Stage 3:

The remaining steel plate girders would be removed.

Stage 4:

The concrete columns would be removed down to 2 ft (0.6-m) bgs.

During all phases of construction and demolition over the Back Channel, protective netting would be utilized to prevent debris from falling into the channel. Heavy construction activities over the channel would be coordinated with shipping activities to ensure safety for vessels and construction workers.

All demolition materials would be recycled to the extent feasible, in accordance with the City of Long Beach Construction and Demolition Recycling Program.

Other Demolition Requirements

Both the North- and South-side Alignments would require demolition and/or relocation of adjacent structures within the proposed new bridge alignments. The North-side Alignment would affect several buildings on Port-administered property and one building on privately owned property. The South-side Alignment would affect several buildings on Port-administered land. The environmental consequences related to demolition and/or relocation of adjacent facilities are addressed in Chapter 2. A determination of significance of the potential environmental consequences resulting from the proposed alternatives pursuant to CEQA is provided in Chapter 3.

1.6.1.5 SCE Transmission Line Relocation

The proposed project, with either of the bridge replacement alternatives, also includes raising the SCE lines (12.5 kilovolt [kV], 66-kV, and 220-kV) that cross the Cerritos Channel from Pier S to Pier A, north of the bridge (see Section 2.1.4 [Utilities and Service Systems] and Appendix I). The timing of the transmission line relocation is not known at this stage of project development, but it can be assumed that this action would not be required until the bridge replacement is completed.

The recommended option for raising the SCE lines is to construct new towers on Piers S and A next to the existing towers. The new towers would increase the clearance over the Back Channel from 153 ft to 200 ft. Subsequent to construction of the new towers, all lines would be relocated to the new towers (see Exhibit 2.1.4-1 for the proposed configuration under this scenario). Although the transmission lines would be relocated to the new towers, the existing towers, which have been determined to be eligible for listing on the National Register of Historic Places (NRHP) (see concurrence letter from State Historic Preservation Officer [SHPO], July 21, 2003, Appendix C) would remain in place.

1.6.2 Bridge Rehabilitation Alternative

With this alternative, the existing bridge would be rehabilitated to improve its seismic performance and to extend its operational life span. No new traffic lanes would be added, and the height of the bridge would remain at 156 ft (47.5 m) above the MHWL. To comply with current seismic detailing standards for new bridges, the lap splices at the base of the columns would need to be eliminated and the amount of confinement reinforcement increased. Because there are no practical means to accomplish this, the best solution would be to add steel casings at all columns. Lacking a detailed seismic performance study, it is assumed that the casings would be placed along the full height of the columns. These retrofit measures would allow for the level of deformation needed for the bridge to withstand a major earthquake and to comply with Caltrans SDC requirements for capacity protection of column foundations and bent caps.

Main span trussed arch members would likely require strengthening and connection retrofit to meet SDC joint capacity protection requirements. Typical for this type of bridge in the state of California, retrofit measures for truss members include member strengthening and installation of additional bolted through steel plates at truss joints, similar to the retrofit of the existing Carquinez Bridge, San Francisco Oakland Bay Bridge Main Span, and others.

In summary, to bring the existing Gerald Desmond Bridge up to current AASHTO standards and to mitigate continuous bridge deterioration would require the following construction activities:

- Replacement of the bridge deck
- Replacement of expansion joints
- Replacement of the sway bracings for the main span
- Painting of all steel members
- Seismic retrofit of foundations, columns, bent caps, abutments, and superstructure

The bridge rehabilitation activities would occur within the footprint of the existing bridge. This alternative would not require demolition of any structures on adjacent properties and would also not require any modifications to the SCE towers. The estimated cost for these corrective measures is approximately $289.3 million.

All of the above measures would be consistent with the level of retrofit undergone by major bridges in California, where retrofit measures were designed for a “No Collapse” design criteria. The “No Collapse” criteria imply that the bridge would survive the maximum credible earthquake (MCE) without collapse and loss of life, but it would have a high probability of being condemned after an extreme seismic event such as the MCE. Thus, even with implementation of the above seismic retrofit measures, the existing bridge seismic performance would not be on par with the proposed new bridge. The new bridge would be designed to withstand the MCE with only repairable damage allowed and an ability to be in service within days after the MCE event. Although seismic safety of the channel crossing would be enhanced with a rehabilitated bridge, forecasted increases in future traffic volumes would still result in steadily deteriorating levels of service.

1.6.3 No Action Alternative

Under the No Action Alternative, the Gerald Desmond Bridge would not be replaced or rehabilitated. It would remain in its existing deteriorated condition until a retrofit schedule is established. It would remain with insufficient roadway capacity to handle projected car and truck traffic volumes, and inadequate channel clearance for safe passage of some existing and new-generation container ships.

Under the No Action Alternative, the existing bridge would continue in use as the sole direct connection between SR 710, Long Beach, and Terminal Island. Existing measures to protect against falling structural elements would need to be enhanced as the bridge continues to deteriorate, and the related safety issues would increase in severity. Seismic safety of the channel crossing would not be enhanced with a new or rehabilitated bridge meeting current seismic standards. Increasing traffic volumes would result in steadily deteriorating levels of service.

Under the No Action Alternative (as with the Rehabilitation Alternative), the existing SCE transmission lines would not be removed or relocated.

1.7 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD FOR ANALYSIS

The June 2004 Draft EIR/EA evaluated several other alternatives, including tunnel options, main span and approach span options, design options, and interchange options, that were all withdrawn from further evaluation. In addition, a Toll-Operation Alternative was considered in this revised Draft EIR/EA; however, it was withdrawn from further evaluation based on the findings discussed below. The rationale for withdrawal of the Toll-Operation Alternative, as well as the other alternatives previously considered, is discussed in this section.

1.7.1 Toll-Operation Alternative

A tolling alternative was considered because the Port is looking at various funding sources (including federal, state, and local sources) to help pay for the cost of the new bridge. This alternative was considered given that tolling is used on many northern California bridges as a primary revenue source; therefore, POLB and POLA jointly sponsored a Terminal Island Traffic and Toll Revenue Study to assess the following options:

1. Tolling the Gerald Desmond Bridge replacement structure alone; and
2. Tolling all three bridges that provide access to Terminal Island (i.e., Gerald Desmond replacement, Vincent Thomas, and Schuyler Heim) in a toll district.

The Toll-Operation Alternative was introduced in the revised NOP, and it has the same footprint as the North-side Alignment Alternative. Under this alternative, vehicles that enter/leave Terminal Island from any of the three bridges (i.e., Gerald Desmond replacement, Vincent Thomas, or Schuyler Heim) would be assessed a toll in each direction. Except for the toll element, which would involve placement of sensors on all three bridges, the bridge design features would be the same as described for the North-side Alignment Alternative.

The Toll-Operation Alternative would utilize both automatic License Plate Recognition (LPR) and transponder technologies, and it would operate without toll booths. The LPR technology would assess tolls to the vehicles that do not have a transponder.

1.7.1.1 Implications of Toll-Operation Alternative

The Gerald Desmond Bridge Traffic Study identified substantial traffic diversions from this alternative (Iteris, 2009). The following provides a summary of both the traffic diversion and environmental issues associated with the Toll-Operation Alternative.

1.7.1.2 Traffic Diversion

The 2030 traffic diversion impacts associated with this alternative compared to the North-side Alignment Alternative (non-toll) and the No Action Alternative for a series of key roadway links are summarized below. Year 2030, rather than the 2015 opening year horizon, was analyzed due to higher forecast traffic volumes in 2030 simulating the worst-case scenario.

- I-405: This freeway would experience an increase of approximately 1,500 to 2,600 autos, or approximately 3 to 5 percent, directionally during the peak periods. Truck volumes would increase roughly 3 to 4 percent.
- I-110: This freeway would experience an increase in auto volumes of up to 20 percent, or nearly 3,500 vehicles in one direction during the PM peak period. Truck volumes would increase up to 41 percent during all peak periods.
- SR 710: This freeway would experience a decrease in auto volumes of up to 16 percent directionally, which equates to nearly 3,500 autos during the PM peak period. Truck volumes would decrease up to 7 percent directionally, or approximately 1,200 trucks during the peak period.
- SR 91: This freeway would experience an increase of nearly 2,000 autos directionally during the PM peak period, which represents a 5 percent increase. Truck volumes would increase more than 340 vehicles in one direction, which is an increase of more than 18 percent in truck flow.
- SR 47/103: This freeway would experience an 11 to 28 percent decrease in auto volumes near Terminal Island and a decrease in truck volume of up to 13 percent.
- PCH and Anaheim Street: These local arterials would experience an increase in auto volumes from 500 to 1,000 vehicles during the peak periods. Between SR 710 and SR 47, auto volumes on both facilities would increase

up to 24 percent directionally. Truck volumes on both of these routes would increase approximately 10 percent.

- Ocean Boulevard/Seaside Avenue: The traffic modeling results indicate an auto volume decrease of approximately 40 to 45 percent, or up to 5,400 peak-period vehicles in each direction. The drop in auto volumes would be similar on both the Vincent Thomas Bridge and the replacement bridge. Truck volumes would drop 12 percent, or 485 peak-period trucks, on the replacement bridge.

Due to the traffic diversion discussed above, the following roadway segments would require mitigation in the form of an additional travel lane in each direction:

- I-405 between SR 710 and I-110
- I-110 south of SR 91
- SR 91 between SR 710 and I-110
- Anaheim Street between 9th Street and I-110
- PCH between SR 47/103 and I-110

The above improvements equate to approximately 41.2 lane miles of additional capacity needed on the freeways and 13.6 additional lane miles on the arterials. To provide the additional lane capacity along the arterials, existing on-street parking would be restricted during the peak periods. At locations where on-street parking is already restricted during the peak periods, or there is insufficient width to handle the additional lane, then outside widening would be necessary and ROW impacts would occur.

1.7.1.3 Environmental Effects

The Toll-Operation Alternative would result in substantial unavoidable adverse impacts to the environment, when compared with the non-toll North-side Alignment Alternative, which would be necessitated by the widening of major arterials and freeway segments in the affected areas to handle the traffic diversion that would occur. The following discussion highlights the expected ROW and land use impacts due to this traffic diversion.

- Anaheim Street: Widening would lead to environmental impacts, including ROW acquisitions and relocations, hazardous wastes exposure, community impacts, utility relocations, and use of Section 4(f) properties (i.e., public parks and recreation areas, which are protected under the U.S. Department of Transportation Act of 1966). Approximate ROW displacements would be as follows:
  - 10 residential apartment complexes, primarily on the north side. These apartment complexes range in size from 10 to 50 units. They are set back approximately 6 to 10 ft (1.8 to 3 m) from the edge of the street. Given the demographics of this area, with a higher population of low-income and minority residents, these apartment complexes would likely be inhabited by a higher percentage of low-income residents, who are subject to federal environmental justice provisions.
  - 50 businesses (e.g., used car sales, fast food, auto parts, check cashing, adult entertainment uses, liquor stores, and small retail).
  - 40 auto wrecking yards/auto repair and gas stations.
  - Saints Peter and Paul School ball field located on the south side of Anaheim Street. This would be a potential Section 4(f) use.
- PCH: Widening would lead to environmental impacts, including ROW acquisitions, hazardous wastes, community impacts, utilities, and Section 4(f) use. Approximate ROW displacements would be as follows:
  - 10 residential apartment complexes. These apartment complexes range in size from 10 to 30 units. They are set back approximately 6 to 10 ft (1.8 to 3 m) from the edge of the street. Given the demographics of this area, with a higher population of low-income and minority residents, these apartment complexes would likely be inhabited by a higher percentage of low-income residents, who are subject to federal environmental justice provisions.
  - 35 businesses (e.g., used car sales, fast food, motels, auto parts, check cashing, adult entertainment, liquor stores, and small retail).
  - 30 auto wrecking yards/auto repair and gas stations.
  - Banning High School is located on the north side of PCH, and Banning Park is located on the south side, both near Avalon Boulevard. There would be impacts to the ball field that is adjacent to PCH, which could constitute a Section 4(f) use.

  - Senior Citizen Community Center, which is located near Eubank Avenue, could be impacted by the street widening.

- I-110, I-405, and SR 91: Widening these freeways to handle traffic diversion from the tolling alternatives would likely require acquisition of adjacent residential and commercial properties at arterial interchanges.

1.7.2 Tunnel Options

Two types of tunnels were evaluated: (1) a concrete immersed tube tunnel; and (2) a bored tunnel through grouted soils. While both tunnel options were determined to be constructible, they were found to have more Port operational problems than any of the bridge options that were considered. The tunnel alternatives would cost approximately 3.5 times more to construct than either the North- or South-side Alignment Alternatives. In addition, the cost of the operation and maintenance of the tunnel alternative would be approximately 2 times the cost of the bridge alternative (Parsons Brinckerhoff Quade & Douglas, Inc., 2001). The tunnel options would have required Back Channel closure during construction.

Environmental impacts included containment and disposal of contaminated bay muds, hazardous materials control, and a new source of air pollution at the tunnel portals. In addition, water infiltration of tunnels and approaches below the water table would have been inevitable; therefore, the system would require a drainage system (Parsons Brinckerhoff Quade & Douglas, Inc., 2001).

The design of a tunnel would have required a 6 percent grade, 1-percent greater than the bridge alternative, which would have slowed down truck traffic. Also, the tunnel roadway would have been narrower than that of the bridge, as full-width shoulders could not have been handled. A tunnel option would have required work to be performed from barges in the Back Channel. This would have impeded access for vessels trying to reach piers in the Inner Harbor. The channel would have been closed at various times during the approximate 5 years of construction. Channel closures and access restrictions would have caused a slowdown in Port operations, as cargo would not have been loaded/unloaded to and from the vessels in a timely manner. Several existing piers and other facilities would have had their access blocked by the construction as well.

For the above reasons, tunnel options were withdrawn from further consideration as infeasible. Detailed information on the above tunnel options is presented in the Draft Alternative Bridge Evaluation Study (Parsons-HNTB, 2002b).

1.7.3 Bridge Design Options

A variety of bridge and approach span options were examined, and they are described in the Draft Alternative Bridge Evaluation Study (Parsons-HNTB, 2002b). Potential environmental impacts of the main-span and approach span options were not examined, but they would not have differed among the options considered or from those identified for the build alternatives studied in detail. Several options were determined to be unsuitable for the project, as noted below.

1.7.3.1 Main-Span Options

Five types of main-span bridges were examined: movable bridge, steel box girder, cable-stayed, steel truss, and steel tied arch. Additionally, a suspension bridge crossing was considered but not pursued because a conventional suspension bridge would not be possible at the location of the Gerald Desmond Bridge due to poor soil conditions, while a self-anchored suspension bridge would be prohibitively expensive compared to a cable-stayed bridge for a project of this type.

The movable bridge was determined to be unsuitable for the Gerald Desmond Bridge site due to its impacts to traffic operations, large annual operating and maintenance (O&M) costs, susceptibility to seismic events, and restrictions on horizontal navigation clearance. A movable bridge would also cause substantial disruptions to Port operations. The steel box girder was also found to be unsuitable, as it requires more structural depth than the other options, resulting in the need for more than 600 ft (183 m) in additional approach span length on each end of the bridge.

Preliminary design was performed on the cable-stayed, steel truss, and steel tied arch bridges so that estimated costs could be calculated and weighed along with the aesthetics and maintenance requirements of each bridge, as well as their possible impact upon Port operations. The cable-stayed bridge was found to be the most suitable option for the new bridge, as it had the lowest cost, required the least maintenance, would affect Port operations the least during its construction, and was most aesthetically pleasing. Consequently, the steel truss and steel tied-arch options were also removed from further consideration.

1.7.3.2 Approach Span Options

Five types of approach spans were evaluated: pre-cast concrete bulb-tee girder, concrete segmental box girder, cast-in-place concrete box girder, steel I-girder, and steel box girder. Preliminary design was performed for each approach span to determine the size of bridge members and quantities so that estimated costs could be calculated. The approach span options were then compared on the basis of cost, aesthetics, maintenance requirements, and impact on Port operations. Based on the above analysis, concrete segmental box girders were selected for the high-level approaches, and cast-in-place concrete box girders were selected for the low-level approaches.

1.7.4 Horseshoe Interchange Variations

Two variations were examined for integrating the new bridge with a reconstructed Horseshoe interchange: the “Modified Parclo” interchange and the “Modified Diamond” interchange. Potential environmental impacts of the Horseshoe interchange variations were not examined, but they would not have differed among the variations considered or from those identified for the build alternatives studied in detail.

A "Parclo" interchange ("partial-cloverleaf") provides grade separation for the through lanes of two intersecting roadways, typically a local street crossing a freeway, and it provides a combination of ramps and traffic signal-controlled intersections to facilitate traffic flow between the two roads. A Parclo interchange provides two loop-ramps located in opposite quadrants such that both off-ramps from the freeway (in both directions) are handled by loop ramps. The on-ramps are provided using "direct ramps" that terminate at signalized intersections on the local street. Conversely, a Parclo may also be configured to have the loop ramps serve the on-ramps in both directions, and the other movements facilitated using ramps that terminate at signalized intersections on the local cross street. A "Modified Parclo" is a variation for the standard Parclo configuration such that one or more of the typical ramps or typical configuration is modified in some way.

A "Diamond" interchange provides grade separation for the through lanes of two intersecting roadways, typically a local street crossing a freeway, and it provides a combination of ramps and two traffic signal-controlled intersections at the intersection of the ramps with the cross street to facilitate traffic flow between the two roads. The left- and right-turn movements to the on-ramps and from the off-ramps are facilitated at the traffic signal-controlled ramp/local street intersections. A "Modified Diamond" is a variation of a "Standard Diamond" configuration where one or more of the ramps or the typical geometry is modified in some way.

The "Modified Parclo" and "Modified Diamond" designs for the Horseshoe interchange were called "modified" because the cross street (i.e., Pier T Avenue) is parallel to Ocean Boulevard; hence, providing ramps and interconnection between the two roadways did not result in standard "Parclo" or "Diamond" configurations.

1.7.4.1 Modified Parclo

The “Modified Parclo” interchange would use a loop ramp from WB Ocean Boulevard to provide access to Pier T Avenue, carrying traffic off of the new bridge and then under Ocean Boulevard to meet Pier T Avenue. An on-ramp for accessing EB Ocean Boulevard from Pier T Avenue, similar to the current ramp, would also be established. Additional ramp connections would be provided between Pier T Avenue and both Ocean Boulevard and the one-way frontage roads created by the Ocean Boulevard and SR 47 Interchange Project. These ramps would allow for full access between Pier T Avenue and Ocean Boulevard in all directions. Due to the additional ROW impacts to Pier S associated with the loop ramp, this alternative was removed from further consideration.

1.7.4.2 Modified Diamond

The “Modified Diamond” interchange would use diamond ramps from the WB replacement bridge to a new road that would pass underneath the elevated Ocean Boulevard, and from that road to the EB replacement bridge. This new road would provide access to the new Pier T Avenue and would be linked by a one-way frontage road to the signalized intersection at the end of SR 47 to the west. Due to the additional delays created by the new intersections with this alternative and the operational inefficiencies to the trucks accessing the Pier T terminal facility at this interchange, the “Modified Diamond” was removed from further consideration.

1.7.5 Route 710 Interchange Variations

Two variations were examined for integrating the new bridge with a reconstructed Route 710 interchange: the “Mainline Connection to Route 710” and the “Connector Connection to Route 710.” Potential environmental impacts of the

Route 710 interchange variations were not examined, but they would not have differed among the variations considered or from those identified for the build alternatives studied in detail.

1.7.5.1 Mainline Connection to Route 710

The “Mainline Connection to Route 710” design variation called for the construction of a new six-lane mainline connector between the median of Route 710 and new connector ramps to downtown Long Beach via Ocean Boulevard. The new connections to downtown Long Beach would be relocated to/from the right of the new bridge. Elevated hook ramps supported on bridge structures would replace the existing WB ramps from the replacement bridge to Pico Avenue. The existing hook ramps for the EB replacement bridge would remain in place. Due to the unmitigatable LOS F operating conditions that would occur at the merge of the Ocean Boulevard ramps to/from downtown Long Beach, this design variation was removed from further consideration.

1.7.5.2 Connector to Route 710

The “Connector to Route 710” would replace the existing two-lane connector from the EB Gerald Desmond Bridge to NB Route 710 with a new 2-lane connector at the same location. The existing 2-lane connector from SB Route 710 to the WB Gerald Desmond Bridge would be retained, as would the current ramps between EB Ocean Boulevard and Pico Avenue. The existing diamond ramp from Pico Avenue to WB Ocean Boulevard would be replaced by a loop ramp. This variation, known as the “minimum service alternative,” would also require 6 percent approach grades on the new bridge and be limited to a vertical clearance of 185 ft (56 m). Due to the desire to provide improved truck operations on the new bridge (i.e., having approach grades of less than 6 percent), this alternative was removed from further consideration.

1.8 COMPARISON OF ALTERNATIVES

The North-side Alignment Alternative would achieve the project’s purpose and need. Specifically, this alternative would:

1. Provide a new bridge that is structurally sound and seismically resistant;
2. Reduce approach grades;
3. Provide sufficient roadway capacity to handle current and future car and truck traffic volumes; and
4. Provide vertical clearance that would afford safe passage of existing container ships and for new-generation vessels currently being constructed.

The North-side Alignment Alternative would affect Port and private properties, including tenant businesses and utilities. It would require demolition of the Port Maintenance Yard and temporary relocation of Fireboat Station No. 20. The North-side Alignment Alternative would result in the conversion of approximately 0.7-acre (0.3-hectare [ha]) of privately held Port- related industrial land to public/transportation use. Privately owned facilities affected include Los Angeles County Flood Control District (LACFCD); LBGS; SCE; Connolly Pacific; and Pacific Energy Resources. Potential effects on these properties could include loss of land due to acquisition, modified access due to bridge footings and easements, and relocation/replacement of utilities and/or facilities. The current estimate for the value of the land for the affected private properties is $2.0 million (see Section 2.1.3.2 [Relocations], for further discussion).

The South-side Alignment Alternative would also achieve the project’s purpose and need as discussed under the North-side Alignment Alternative. This alternative would impact primarily Port properties, utilities, and tenant businesses. This alternative would require reconfiguration of both the California United Terminals and Total Terminal International, Inc. (TTI), operations on Piers D, E, and T. The Pier E gate at the California United Terminal facility would require relocation and would include reconfiguration of the following elements: entrance and exit roadways, inbound optical character recognition (OCR) devices, receiving gate lanes with pedestals, scales, cameras and queuing area, the trouble resolution building and parking area, outbound primary radiation portal monitors (RPMs) and OCR devices, outbound secondary RPM, exit gate lanes with pedestals and cameras, and associated underground electrical, communication lines, and pavement markings/barriers. It is estimated that the reconfiguration on Piers D and E would cost approximately $10.0 million. With demolition of the existing bridge, there would be no loss of leasable Port acreage in the Middle Harbor area. Reconfiguration of Pier T would result in the permanent loss of 2.4 acres (1-ha) within the TTI terminal storage facility currently used for refrigerated container storage. Additionally, reconfiguration on Pier T would require modification to the following elements: relocation of a portion of the main gate canopy, driver's service building and trouble parking, steel high mast light poles, chassis storage, and associated utilities, barriers, and pavement markings. It is estimated that the reconfiguration on Pier T would also cost approximately $10.0 million. The estimated present value of 2.4 acres (1-ha) of lost Port lease revenue would be $7.0 million over a typical 20-year lease (see Section 2.1.3.2 [Relocations], for further discussion).

Under the Rehabilitation Alternative, the bridge would survive an extreme seismic event without collapse and loss of life, but it would have a high probability of being condemned and taken out of service. Thus, even with implementation of the retrofit measures in the Rehabilitation Alternative, at an estimated cost of $289.3 million, the bridge seismic performance would not be on par with a new bridge. Furthermore, bridge rehabilitation would not handle future traffic volumes, nor would it provide the vertical clearance needed for safe passage of container ships. Also, a life-cycle cost analysis for the project was completed to evaluate the costs of bridge rehabilitation versus replacement over a 130-year time horizon. The two scenarios evaluated in the life-cycle cost included the following:

A. Build the new bridge now, which would open to traffic in 2015 and have a design life of 100 years. Rehabilitation of the new bridge would take place in 2115, which would extend its service life to 2145.

B. Rehabilitate and seismically retrofit the existing bridge now to meet current AASHTO code requirements with completion in 2015, which would extend its service life to 2045. Replace the rehabilitated bridge in 2045 with a new bridge identical to the one assumed in Scenario A. The new bridge would have a design life of 100 years, thus lasting until 2145.

The results of the life-cycle cost analysis showed that the Bridge Rehabilitation Alternative (Scenario B) has a greater net present value cost ($208 million) than the Bridge Replacement Alternatives (Scenario A).

The No Action Alternative would not meet the purpose and need for the proposed project and would not eliminate the need for rehabilitation or replacement of the Gerald Desmond Bridge. The No Action Alternative would not improve clearance for the safe passage of container ships or handle current or forecasted traffic volumes. Under the No Action Alternative, the bridge would likely be severely damaged during an MCE and would endanger life and property for those using the bridge, ships in the Back Channel, and adjacent Port and private facilities.

1.8.1.1 Preferred Alternative

The Port has determined that the North-side Alignment Alternative satisfies the project's purpose and need and is more cost effective to implement. Therefore, after comparing and weighing the benefits and impacts of all the feasible alternatives summarized above, the Port has identified the North-side Alignment Alternative as the preferred alternative, subject to public review. Final identification of a preferred alternative will occur subsequent to the public review and comment period.

1.9 PERMITS AND APPROVALS NEEDED

Table 1-4 lists the permits, reviews, and approvals that would be required for project construction.

Table 1-4
Permits and Approvals

Agency	Permit/Approval	Comment
Federal		
FHWA	Air Quality Conformity	
U.S. Coast Guard (USCG)	Bridge Permit (Section 9, Rivers and Harbors Appropriations Act)	
State		
California Department of Fish and Game (CDFG)	California Endangered Species Act (CESA) Incidental Take Permit	Required only if listed bats are present during preconstruction surveys
Caltrans	EA and Project Report Approval Encroachment Permits	
California Coastal Commission (CCC)	Coastal Development Permit	Required only if local Coastal Development Permits are appealed
State Historic Preservation Officer (SHPO)	Consultation; Concurrence under Section 106 (National Historic Preservation Act [NHPA])	
Regional Water Quality Control Board (RWQCB)	Section 402 National Pollutant Discharge Elimination System (NPDES) Permit (Clean Water Act [CWA]) Report of Waste Discharge	
Southern California Association of Governments (SCAG)	Transportation Conformity Working Group ($PM_{2.5}$/ PM_{10}) approval	
State Water Resources Control Board (SWRCB)	Compliance with Statewide NPDES General Permit for Storm Water Discharges Associated with Construction Activity (General Permit), Order No. 99-08-DWQ, NPDES No. CAS000002	
SWRCB	Compliance with Caltrans Statewide NPDES Storm Water Permit, Order No. 99-06-DWQ, NPDES No. CAS000003	
California Department of Conservation – Division of Oil Gas and Geo Thermal Resources (DOGGR)	Approval of plan to relocate, abandon, and/or reabandon oil wells within the construction footprint	
California Public Utilities Commission (CPUC)	Compliance with CPUC General Order 131-D regarding relocation of transmission towers	
Local		
City of Long Beach	Discretionary approvals	
Port of Long Beach	Harbor Development Permit	

Chapter 2

Affected Environment, Environmental Consequences, and Avoidance, Minimization and/or Mitigation Measures

Section 2.1

Human Environment

CHAPTER 2
AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES, AND AVOIDANCE, MINIMIZATION AND/OR MITIGATION MEASURES

Chapter 2 evaluates potential effects on environmental resources resulting from the proposed construction, demolition, and operation of the Gerald Desmond Bridge Replacement, Rehabilitation, and No Action Alternatives. Presented for each environmental topic analysis are the following subject areas:

- Affected Environment
- Environmental Consequences
- Avoidance, Minimization and/or Mitigation Measures

When the project effects on the environment are found to be potentially adverse, pursuant to NEPA, then avoidance, minimization, and/or mitigation measures are identified. A Minimization/ Mitigation Monitoring Program is provided in Appendix H. Unavoidable adverse effects of the project are discussed if the residual effects after avoidance and minimization would still be considered adverse. Environmental analyses presented in this chapter are primarily based on a series of technical studies prepared for environmental topics of concern for the project, including:

- Air Quality Technical Study[3] (Parsons, 2009)
- Draft Project Study Report (Parsons-HNTB, 2002a)
- Historic Properties Survey Report (Parsons, 2003f)
- Initial Site Assessment (Diaz Yourman & Associates, 2008)
- Natural Environment Study (Parsons, 2009)
- Noise Technical Study (Parsons, 2009)
- Traffic Analysis Report (Iteris, 2009)
- Visual Impact Assessment (Parsons-HNTB, 2008)
- Water Resources (Parsons, 2009)

During the preparation of this revised Draft EIR/EA, several technical studies that were prepared for the June 2004 Draft EIR/EA were updated to reflect changes to the existing environment, addition of the tolling alternative and associated expanded study area, addition of the Rehabilitation Alternative, and the Port's new environmental protocols. The technical studies that were updated consist of Air Quality, Traffic Analysis, Natural Environment Study, Noise, Water Resources, and Visual Impact Assessment.

The above technical studies are incorporated by reference into this EIR/EA document, and they are available for review at the Port office (contact Ms. Stacey Crouch at 562-590-4160) and Parsons office (contact Mr. Jeffery Bingham at 949-233-8912).

As part of the scoping and environmental analysis conducted for the proposed project, the following environmental issues were considered, but no potential for adverse effects was identified. Consequently, there is no further discussion in this document regarding the following issues:

- Wild and Scenic Rivers: There are no wild and scenic rivers within the project study area. No impacts to wild and scenic rivers would result from the proposed project.
- Farmlands/Timber/Agricultural Resources: The proposed project is not located on existing farmland or on land within the immediate vicinity of agricultural operations; therefore, the project would not have the potential to affect any farmlands or other agricultural operations. No impacts to agricultural resources would result from the proposed project.
- Paleontology: The land on which the project would be built roughly coincides with the former shoreline; thus, it would be unlikely to contain fossils. Furthermore, the area is heavily subsided and over the past 100 years has been covered by up to 30 ft (9 m) of imported structural fill and stabilizing materials, and it has been redeveloped several times as the Port has grown and modernized. Accordingly, it is highly unlikely that impacts to paleontological resources would result from the proposed project.

[3] This and all "Parsons" references are referring to Parsons-HNTB joint venture.

2.1 HUMAN ENVIRONMENT

2.1.1 Land Use, Recreation, and Coastal Zone

Within this section, land use effects are evaluated based on consistency with local and regional plans, as well as compatibility with existing and planned development and land uses.

2.1.1.1 Regulatory Setting

City of Long Beach General Plan

Land use within the project study area, as discussed in Chapter 1, is designated by the City of Long Beach General Plan. The Long Beach Harbor area falls within General Plan Land Use District Number 12. This district includes existing freeways, the Port, and the Long Beach Airport. The General Plan indicates that the water and land use designations within the harbor area are separately formulated and adopted by due process known as the Specific Plan of the Long Beach Harbor (also known as the PMP, as amended). The General Plan indicates that the responsibilities for planning within legal boundaries of the harbor lie with the Board of Harbor Commissioners.

Port Master Plan

The PMP has nine designated land uses and four designated water uses consisting of:

- Primary Port facilities
- Hazardous cargo facilities
- Port-related industries and facilities
- Ancillary Port facilities
- Commercial recreational facilities
- Federal use
- Oil and gas production
- Utilities
- Non-Port-related areas
- Anchorage area
- Maneuvering areas
- Navigable corridors
- Recreational/sportfishing

The PMP Land Use Element has six goals for developing policies involving future Port development and expansion. The goals are also shaped by the influences of the California Coastal Act, legislative grants of the Tide and Submerged Lands, City of Long Beach Charter, Municipal Code, and the City of Long Beach General Plan (POLB, 1999). The land use goals noted in this element include:

Goal 1: Consolidate similar and compatible land and water areas.

Goal 2: Encourage maximum use of facilities.

Goal 3: Improve internal circulation involving roadways and rail.

Goal 4: Provide for the safe cargo handling and movement of vessels within the Port.

Goal 5: Develop land for primary Port facilities and Port-related uses.

Goal 6: Protect, maintain, and enhance the overall quality of the coastal development.

The Land Use Element also provides a summary of long-range plans for cargo facility and infrastructure requirements to the year 2020. The long-range plans are informational discussions that would not be considered by the California Coastal Commission (CCC) as a submission for certification (POLB, 1999).

Coastal Zone Management Act

The Coastal Zone Management Act of 1972 (CZMA) is the primary federal law enacted to preserve and protect coastal resources. The CZMA sets up a program under which coastal states are encouraged to develop coastal management programs. States with an approved coastal management plan are able to review federal permits and activities to determine if they are consistent with the state's management plan.

California has developed a coastal zone management plan and has enacted its own law, the California Coastal Act of 1976, to protect the coastline. The policies established by the California Coastal Act are similar to those for the CZMA; they include the protection and expansion of public access and recreation; the protection, enhancement, and restoration of environmentally sensitive areas; the protection of agricultural lands; the protection of scenic beauty; and the protection of property and life from coastal hazards. The CCC is responsible for implementation and oversight under the California Coastal Act.

Uses of land and water within the Ports have been outlined in the PMP (POLB, 1999). The first PMP was prepared to conform with the California Coastal Act of 1976, and it was finalized in June 1978. Thereafter, the PMP has been amended several times. The latest amended PMP was approved by the Board of Harbor Commissioners in 1999.

2.1.1.2 Affected Environment

The Gerald Desmond Bridge is located within the Port in an area zoned Port-related Industrial (IP, see Exhibit 2.1.1-1). The Port owns most of this land; however, there are several relatively small privately owned and operated landholdings located in the Inner Harbor area and northernmost sections of the Port (see Exhibit 2.1.1.-2). The Gerald Desmond Bridge crosses the Back Channel and generally runs east-west dividing Pier D into two separate sections. The Gerald Desmond Bridge encroaches upon approximately 92 acres (37 ha) of three different Planning Districts in the Long Beach Harbor (see Exhibit 2.1.1-3). These include the Northeast Harbor Planning District, the Terminal Island Planning District, and the Middle Harbor Planning District (POLB, 1999).

The Northeast Planning District is the oldest part of the Long Beach Harbor and contains privately owned land – Pier C and a portion of Pier S. Permitted land uses include primary port facilities; port-related industries and facilities that do not require access to berthing facilities or water frontage; hazardous cargo facilities; ancillary port facilities; oil production uses; navigable corridors; utilities; and non-port-related uses.

The Terminal Island Planning District consists of property that was originally occupied by the U.S. Naval Complex. With the closure of the naval facilities in 1997, the Port currently has title to or a lease for most of the former Naval Complex property. Most of this land has been rededicated to be part of the Pier T complex. The Terminal Planning District also includes Pier S. Permitted land uses within the District include primary port facilities; port-related industries and facilities that do not require access to berthing facilities or water frontage; hazardous cargo facilities; ancillary port facilities; oil production uses; navigable corridors; utilities, including the LBGS; and federal uses, such as the Navy Fuel Depot on the Pier T Mole.

The Middle Harbor Planning District is bound on the north by the Gerald Desmond Bridge and Ocean Boulevard. This Planning District includes Piers D, E, and a portion of F. Permitted land uses include primary port facilities; port-related industries and facilities that do not require access to berthing facilities or water frontage; ancillary port facilities; oil production uses; and utilities.

Parks and Recreation Facilities

San Pedro Bay supports recreational uses such as marinas, sportfishing facilities, and other public access areas (Exhibit 2.1.1-4). Most public and commercial recreational opportunities are located by design within the Queensway Bay Planning District. The District acts as a buffer between the higher-industrialized inner port complex and the waterfront recreation activities of the Port and City of Long Beach (POLB, 1999).

Recreational amenities within the area include the Long Beach Marina, Queen Mary, Queensway Bay, Golden Shore RV Resort, public fishing access on the eastern side of Pier J, and Long Beach Sportfishing on Berth 55. None of these recreational facilities and attractions or any parks, recreational hiking, or biking trails are located within the immediate project vicinity.

Recreational boating is the major water-related recreational activity within Long Beach Harbor. The City's three marinas include more than 5,800 slips for boats between 18 and 80 ft (5.5 and 24 m) long, and they have an overall 20.6 percent slip vacancy rate.

Several recreational boating organizations, including yacht clubs, sponsor boating activities within Long Beach Harbor and San Pedro Bay. Private boats provide fishing and scuba diving opportunities year-round throughout San Pedro Bay. Queen's Wharf Sportfishing, located at the terminus of Channel 3, is a major sportfishing landing in the Long Beach area. Several major tour boat companies based in San Pedro Bay operate cruises to Santa Catalina Island and conduct harbor tours. No public boat ramps or dockside facilities are located within the immediate vicinity of the proposed project site or along the Back Channel; however, boats chartered from Long Beach Sportfishing pass under the Gerald Desmond Bridge several times a day.

Section 4(f) Resources: Public park and recreational resources may be eligible for special consideration under Section 4(f) of the Department of Transportation Act of 1966, codified in federal law at 49 U.S.C. 303. Section 4(f) declares that "it is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites." Resource criteria for special consideration under Section 4(f) require that the resource is a public park, recreation, wildlife and waterfowl refuge, or historic site.

No public parks, recreation, or wildlife and waterfowl refuges were identified within the proposed project footprint.

2.1.1.3 Environmental Consequences

Evaluation Criteria

An adverse effect upon land use would occur if the project:

- Introduces an activity that would be inconsistent with existing zoning regulation
- Results in activities conflicting with existing surrounding uses
- Is incompatible with nearby conforming areas, as determined by intensity, degradation of circulation through delay, inhibiting access, or nuisance activities
- Results in uses that jeopardize public safety
- Is inconsistent with the PMP

An adverse effect on recreation would occur if the project would:

- Be in conflict with the land use plan and policy outlined in the PMP and the California Coastal Act of 1976
- Be in conflict with any applicable habitat conservation plan or natural community conservation plan
- Permanently impair or indirectly affect parks or access to and from a park, recreational area, or wildlife/water fowl refuge

No Action Alternative

Under the No Action Alternative, the Gerald Desmond Bridge would continue in use in its existing condition. No construction activities would occur under this alternative, and there would be no changes to the existing land uses, or coastal zone access/resources along the footprint of the Gerald Desmond Bridge or recreational opportunities within the San Pedro Bay. The existing bridge footprint covers approximately 92 acres (37 ha).

Construction and Demolition Impacts

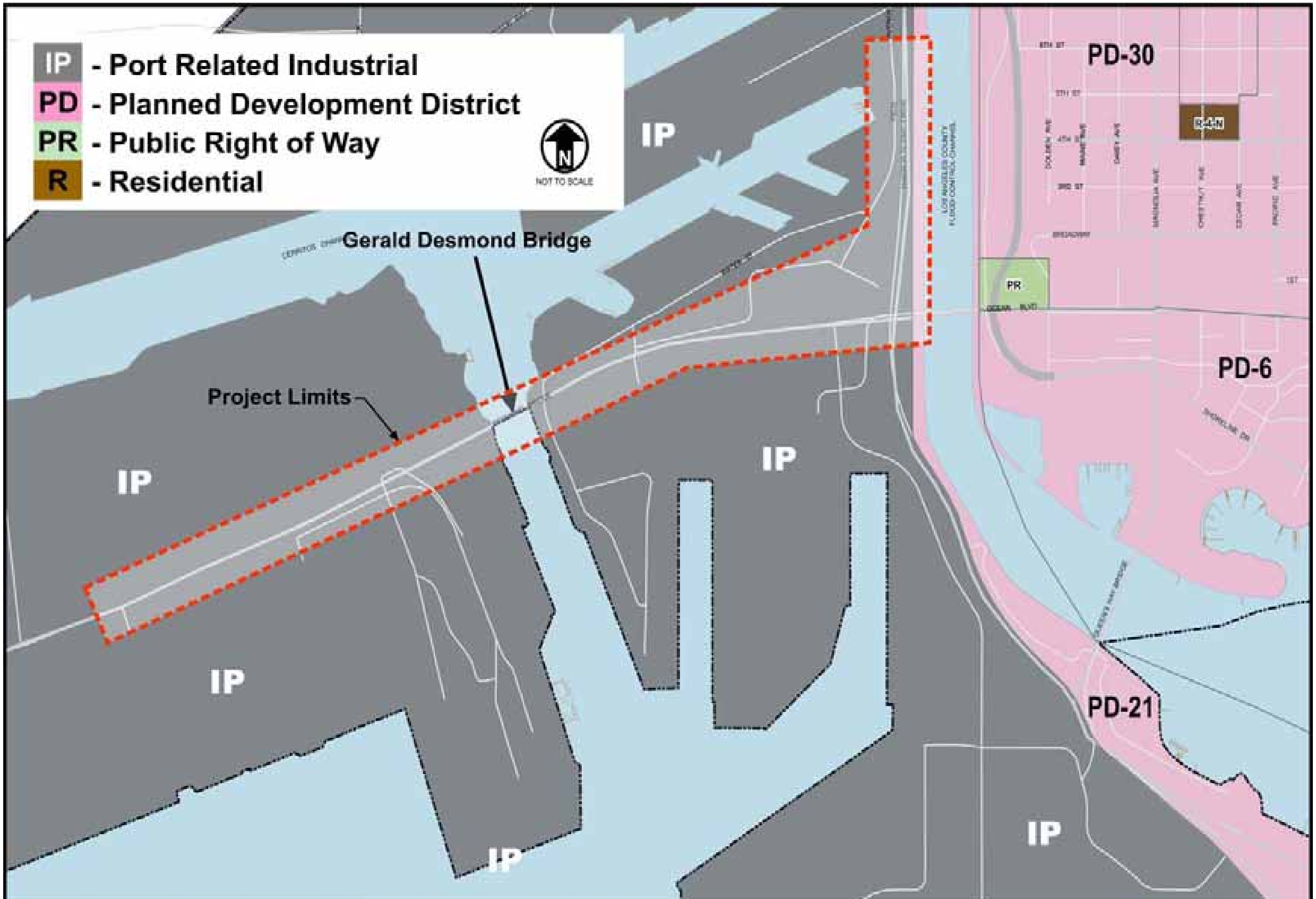
<u>North-side Alignment Alternative</u>

Compatibility with Existing Land Use and Recreation: Impacts associated with construction and demolition activities would be considered temporary, being confined to the construction phase. The proposed project would be constructed, as discussed in Chapter 1, in six phases over a period of approximately 62 months (including demolition of the existing Gerald Desmond Bridge). Construction of the new bridge would take approximately 48 months. Full demolition of the existing bridge would begin upon completion of the new bridge. Demolition of the Gerald Desmond Bridge and structures would take an additional 15 months. The footprint of the proposed bridge and roadways would be approximately 124 acres (50 ha).

The North-side Alignment Alternative would be located within and adjacent to an existing transportation corridor. Excavation, grading, pile-driving, and other activities related to construction of roadway and bridge structures would result in temporary direct and indirect land use effects. Large areas within the construction footprint would be required exclusively for construction and would result in restricted, reduced, or modified land use. Facilities adjacent to the construction footprint would experience site-specific disruptions to land use, primarily related to construction traffic, site access modifications/disruptions, and increases in ambient noise and air pollutants (see Sections 2.2.5 [Air Quality] and 2.2.6 [Noise]). The entire alignment proposed under this alternative would be constructed within an existing industrial area zoned for Port-related industries (see Exhibit 2.1.1-1). Potential effects on facility operations within the project area are discussed in Section 2.1.3.2 (Relocations). The construction/demolition effects on land use would be short-term and/or intermittent and limited to daytime hours. Thus, construction and demolition land use effects would not be considered adverse.

No park or recreation facilities would be used for construction staging or material laydown. The parks and recreation facilities located within 0.5-mi of project area include Cesar Chavez Park, located 0.5-mi (0.8-km) east of the project area, Queen's Wharf Sportfishing, Golden Shore Ramp Relocation Site, Golden Shore RV Resort, and Queen's Landing (see Exhibit 2.1.1-4). Potential construction effects on these areas would be temporary and would not likely affect recreational enjoyment of these areas. Thus, construction and demolition effects on recreational land use would not be considered adverse.

The North-side Alignment Alternative would not result in new or incompatible land uses. The alignment would pass through existing ROWs and industrial areas. No residential neighborhoods are located within the project area. The nearest residential areas are located more than 0.5-mi (0.8-km) from the proposed project area. Residential areas are located to the east of the Los Angles River and to the north of Anaheim Street. Construction and demolition activities would be conducted in accordance with typical measures to minimize effects on adjacent facilities



GERALD DESMOND BRIDGE REPLACEMENT PROJECT
Zoning Map

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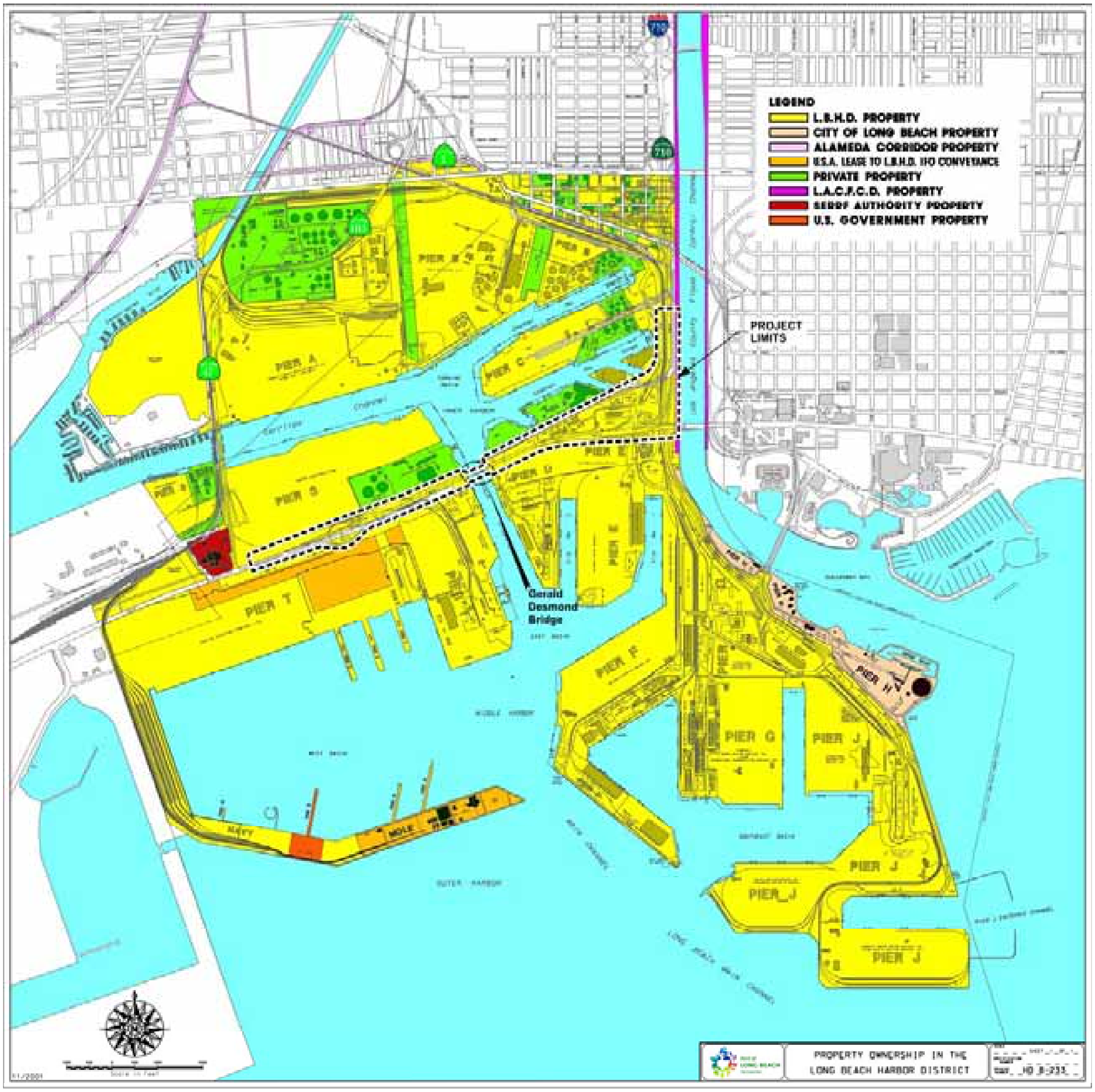

EXHIBIT 2.1.1-2

Property Ownership Map

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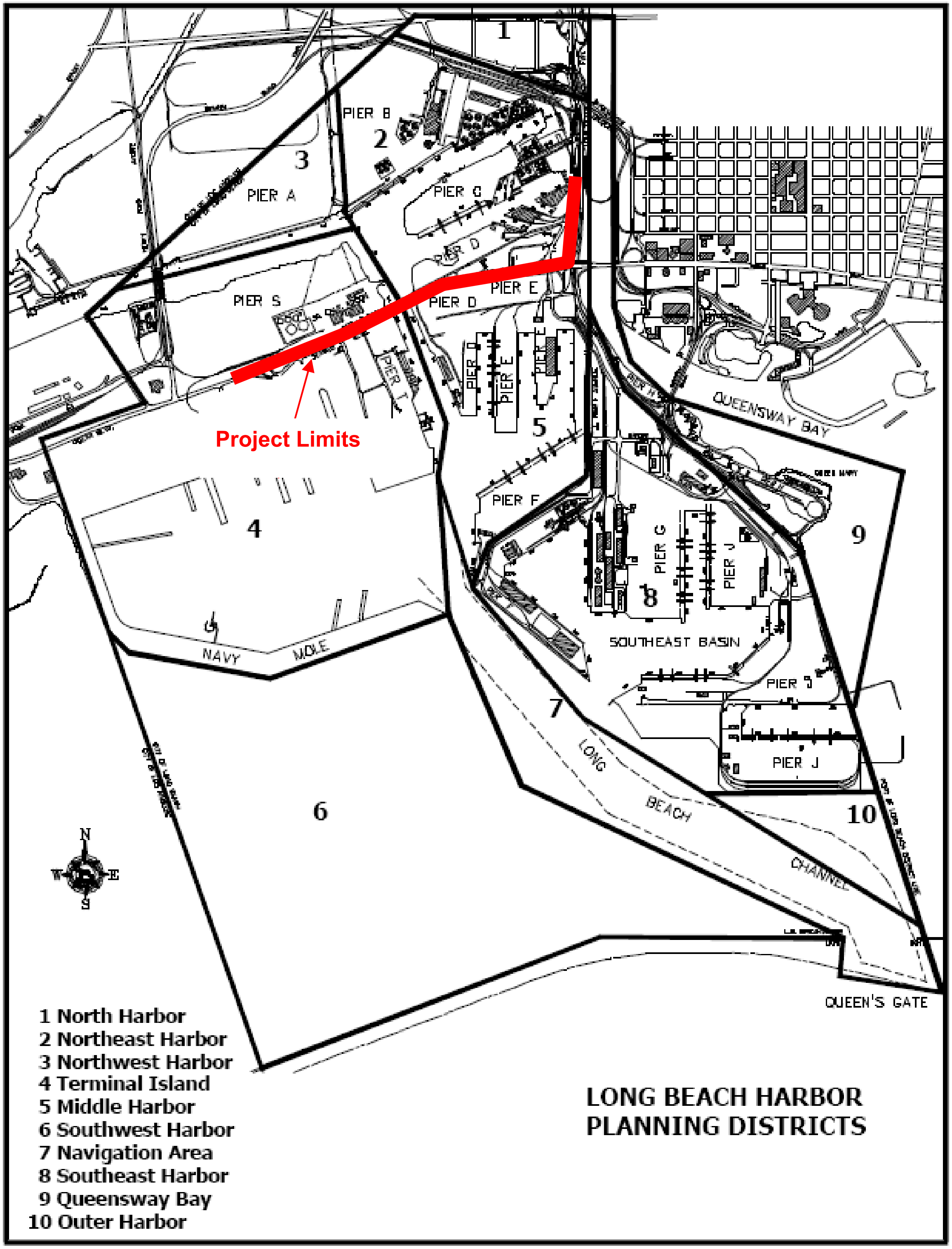

Exhibit 2.1.1-3
Port of Long Beach Harbor Planning Districts

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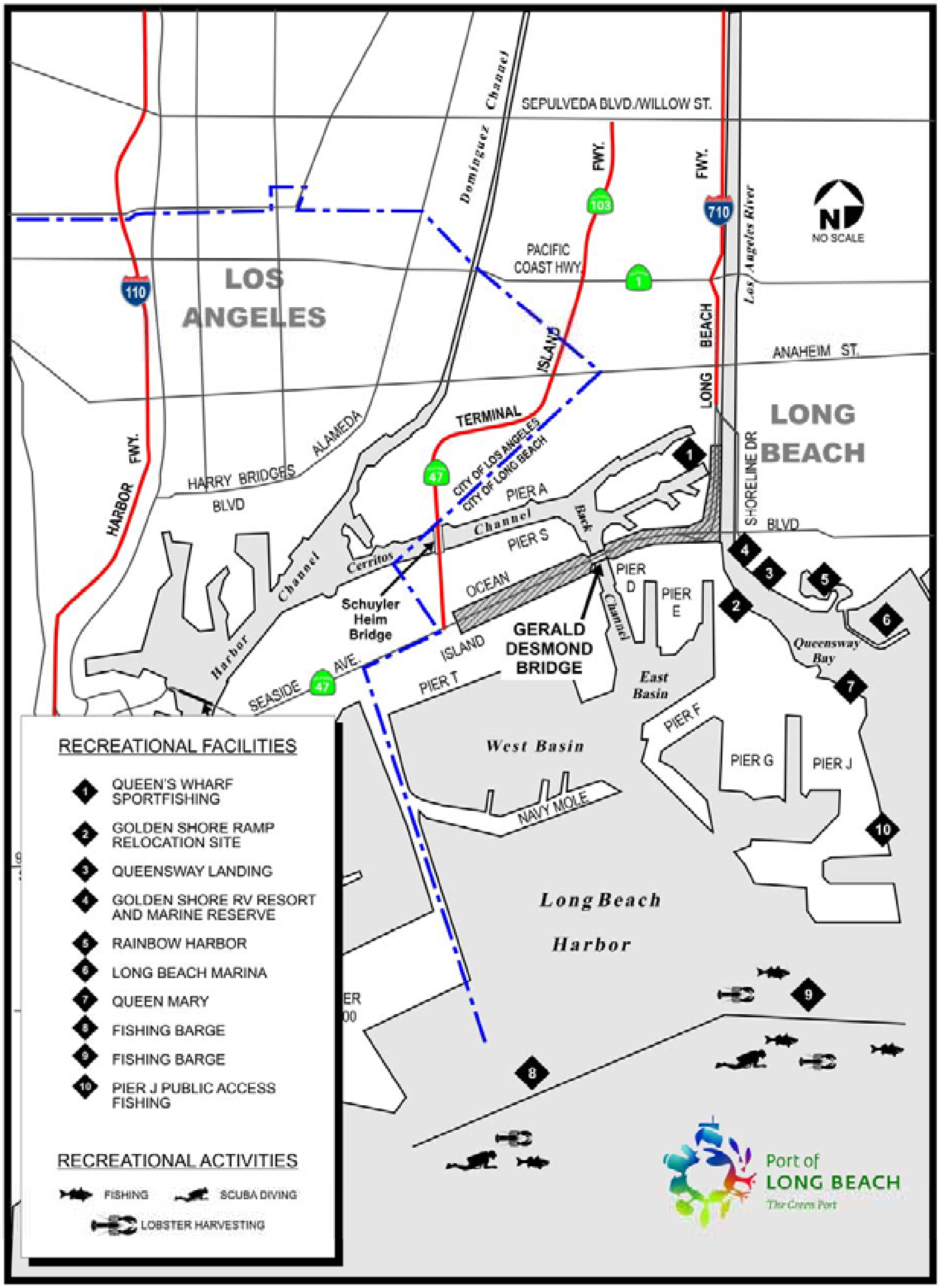

Exhibit 2.1.1-4
Recreational Areas and Facilities
in the Vicinity of the Gerald Desmond Bridge Replacement Project

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and the surrounding communities during the construction and demolition phases; therefore, no adverse effects to land use are expected. Applicable construction and demolition minimization measures are discussed in more detail in Sections 2.1.2 through 2.4.4.

Consistency with Plans and Policies: The North-side Alignment Alternative is consistent with local land use plans, policies, and guidelines. Construction activities associated with this alternative would not materially conflict with any plans, policies, or guidelines.

Coastal Zone: Construction of the North-side Alignment Alternative would not prevent public or commercial access to Terminal Island. Traffic would be maintained on the existing bridge during construction and then would be transferred to the new bridge during demolition of the Gerald Desmond Bridge. Demolition of the existing bridge would occur after opening of the new bridge, allowing Ocean Boulevard to remain open to through traffic at all times. Therefore, no limitation on access to recreational resources within the harbor area would result; however, some travelers would experience periodic traffic slowdowns on major roadways within the project area due to construction material hauling and heavy equipment transportation. Potential traffic impacts and avoidance and minimization measures are discussed in Sections 2.1.5 (Traffic and Circulation) and 2.2.4 (Public Health and Safety).

Recreational users and businesses would be notified in advance of construction and demolition activities over the Back Channel. Delays or restrictions occurring during construction and demolition would be temporary and would not adversely affect recreational traffic or access within the Back Channel or Port. Demolition and construction effects of this alternative would have no effect on coastal zone public access or resources.

Additionally, demolition of the Gerald Desmond Bridge would eliminate the existing pedestrian sidewalk, and the proposed bridge would not be designed to accommodate pedestrians. Removal of pedestrian access at this location would have minimal effects on access to Terminal Island. Removal of pedestrian access is discussed in detail in Section 2.1.5 (Traffic and Circulation).

South-side Alignment Alternative

The South-side Alignment is located on the south-side of the Gerald Desmond Bridge. The footprint of the proposed bridge and roadways would be approximately 117 acres (47 ha).

Although this alternative would have different effects than the North-side Alignment Alternative on the operations of individual facilities within the Port, the construction and demolition effects on land use within the project would be very similar. The South-side Alignment Alternative would not adversely affect land use planning compatibility/ consistency or recreation/coastal zone access or resources. See Section 2.1.3.2 (Relocations) for analysis of construction and demolition effects on existing facilities and operations.

Rehabilitation Alternative

The Rehabilitation Alternative would be constructed as discussed in Chapter 1. All construction land use effects would occur within and adjacent to the existing footprint of the Gerald Desmond Bridge. Construction activities would result in temporary direct and indirect land use effects adjacent to the existing columns, pile and bent caps, and abutments. Areas within the construction footprint and access to these areas may be required exclusively for construction and would result in a restricted, reduced, or modified land use during retrofit activities. In addition, facilities adjacent to the construction footprint could experience site-specific disruptions to land use, primarily related to construction traffic and site access modifications/disruptions. The construction effects on land use would be short term and/or intermittent. Most of the retrofit activities would occur during daytime hours; however, extensive work during bridge deck replacement activities would occur from 7:00 p.m. to 7:00 a.m. Construction land use effects would not be considered adverse.

No park or recreation facilities would be used for construction staging or material lay-down. The scope of the Rehabilitation Alternative, in regard to ground disturbance and construction equipment, would be considered minimal when compared to the scope of the bridge replacement alternatives. Potential effects of this alternative on parks and/or recreational enjoyment would also be considered minimal. Thus, construction effects on recreational land use would not be considered adverse.

The Rehabilitation Alternative would seismically upgrade an existing transportation facility. This alternative would not affect coastal zone access or resources or result in new or incompatible land uses. Construction activities for this alternative would be conducted in accordance with typical measures to minimize effects during the construction period; therefore, no adverse effects on land use would occur.

Operational Impacts

North-side Alignment Alternative

Compatibility with Planned Land Use and Recreation: Operation of the North-side Alignment Alternative would result in the conversion of approximately 0.7-acre (0.3-ha) of privately held Port-related industrial land to public/transportation use. Privately owned facilities affected include Pacific Pipelines, LLC; LBGS; SCE; Connolly Pacific; and Pacific Energy Resources. Potential effects on these properties could include loss of land due to acquisition, modified access due to bridge footings and easements, and relocation/ replacement of utilities and/or facilities. The current estimate for effects on private facilities is $2.0 million (see Section 2.1.3.2 [Relocations] for further discussion).

Anticipated ROW requirements for this alternative would not have a substantial effect on facility operations and would not result in permanent land use conflicts. The proposed bridge would be consistent with designated land use within the Port. It would be an industrial-type transportation use located in an area where all surrounding land uses are designated Port-related Industrial. The operation of the bridge would be consistent with the six long-range planning goals and objectives for future port development and expansion, as stated in the PMP and as listed in the Application Summary Report in Chapter 8 of this document. The implementing objective is to promote efficient vehicular and vessel circulation and access to Terminal Island and within the Port. The new bridge would not adversely affect future land use planning or require Plan amendments for proposed minor changes in existing land use. During operation, areas within the former footprint of the Gerald Desmond Bridge and, where appropriate, beneath the new bridge, would be available for Port-related industrial uses. The North-side Alignment Alternative utilizes more support columns instead of fill, potentially resulting in a net increase of 4 acres (1.6 ha) of area that would be available for future Port-related industrial use. Most of this increase is associated with removal of fill during demolition of existing abutments and approach roadways. The new bridge would also result in a long-term, safe connection between Long Beach and Terminal Island even after an extreme seismic event; therefore, no adverse effects associated with the operation of the North-side Alignment Alternative are anticipated.

This alternative would not require acquisition of any nearby park or recreation land use areas. Consequently, no direct effects to the surrounding parks and recreational facilities are expected. The project would not induce more population to reside in the Harbor District area; thus, it would not result in an increased use of existing recreational facilities within the area. The proposed project would not attract more tourists to visit the harbor than planned for by the City of Long Beach and the Port. Operation of the proposed project would have no effect on parks or recreational land uses.

This alternative would not increase population and employment in the project area. Therefore, it would not contribute to increased demand for new or expanded parks, recreational areas, or wildlife/waterfowl refuges; however, any potential increase in jobs would be temporary (related to construction) and come from throughout the region. Associated increases in permanent local residents would be considered minimal and would not likely result in new and expanded park/recreation services or facilities. Additionally, the North-side Alignment Alternative is intended to accommodate the anticipated growth in regional commuter and Port-related truck traffic. Local agencies are assumed to have already considered potential regional and Port-related growth in their capital facilities planning (see Section 2.1.2 [Growth]). No adverse effects related to the negligible indirect operational land use effects of this alternative are anticipated.

Consistency with Plans and Policies: The North-side Alignment Alternative is consistent with land use plans and policies applicable to the study area. Although the project is not specifically identified in many of the plans or policies, all of them identify general transportation and circulation issues in the area, particularly with respect to port-related transportation. This alternative would result in improved regional and local access to and from the port, as well as regional traffic in general, and it is consistent with local plans and policies (see Section 2.1.2 [Growth]). This alternative would not directly conflict with applicable plans and policies; therefore, it would not result in an adverse effect. The Long Beach General Plan states that the responsibilities for planning within legal boundaries of the harbor lie with the Board of Harbor Commissioners. Uses of land and water within the Port have been outlined in the PMP (POLB, 1999).

Operation of the North-side Alignment Alternative would not have an adverse effect on coastal zone management, the Long Beach General Plan, or its specific plan for the port as discussed within the PMP. Operation of the proposed project is consistent with these plans and would not adversely affect current or future planning.

Coastal Zone: Operation of the North-side Alignment Alternative would not affect public access within the coastal zone. The Port areas within the coastal zone are utilized by heavy industry, and many of the areas are restricted to public access. Additionally, this alternative would improve safety for current and future vessels within the Back Channel. Operation of the North-side Alignment Alternative would improve access to existing industrial facilities located within the coastal zone. The alternative would not attract more tourists to visit the harbor than planned for by the City of Long Beach and the Port. Operation of the proposed project would have no effect on public coastal zone access or resources.

The North-side Alignment Alternative is consistent with the California Coastal Act, which states that all port-related developments shall be located, designed, and constructed so as to minimize substantial adverse environmental impacts; minimize potential traffic conflicts between vessels; give highest priority to the use of existing land space within harbors for port purposes including, but not limited to, navigational facilities, shipping industries, and necessary support and access facilities; provide for other beneficial uses consistent with the public trust including, but not limited to, recreation and wildlife habitat uses, to the extent feasible; and encourage rail service to port areas and multi-company use of facilities.

<u>South-side Alignment Alternative</u>

Operation of the South-side Alignment Alternative would require reconfiguration of operations at both the California United Terminals (Piers D/E) and TTI (Pier T) facilities. Estimates to reconfigure these terminals to accommodate the South-side Alignment Alternative are approximately $10 million at each terminal. With demolition of the existing bridge, the South-side Alignment Alternative would not result in a loss of leasable Port acreage in the Middle Harbor area; however, it would permanently reduce the area available for container terminal operations within the TTI terminal and leasable Port acreage by approximately 2.4 acres (1-ha). The estimated present value of lost Port lease revenue would be $7.0 million over a typical 20-year lease (see Section 2.1.3.2 [Relocations] for further discussion).

Anticipated ROW requirements for this alternative would not have a substantial effect on facility operations and would not result in permanent land use conflicts. The proposed bridge would be consistent with designated land use within the Port. It would be an industrial-type transportation use located in an area where all surrounding land uses are designated Port-related Industrial. The operation of the bridge would be consistent with the six long-range planning goals and objectives for future port development and expansion, as stated in the PMP and as listed in the Application Summary Report in Chapter 8 of this document. The implementing objective is to promote efficient vehicular and vessel circulation and access to Terminal Island and within the Port. Although the South-side Alignment Alternative would permanently affect 2.4 acres (1-ha) of existing container terminal, the loss is along the edge of the terminal and would not affect long-range Port development plans. The new bridge would not adversely affect future land use planning or require Plan amendments for proposed minor changes in existing land use.

During operation, areas within the former footprint of the Gerald Desmond Bridge and, where appropriate, beneath the new bridge, would be available for Port-related industrial uses. The South-side Alignment also utilizes more support columns instead of fill, and it would also potentially result in a net increase of 4 acres (1.6 ha) of area that would be available for future Port-related industrial use. Most of this increase is associated with removal of fill during demolition of existing abutments and approach roadways. The new bridge would also result in a long-term, safe connection between Long Beach and Terminal Island even after an extreme seismic event.

Operational effects of the South-side Alignment Alternative on recreation/coastal zone access or resources would be the same as discussed under the North-side Alignment Alternative. The South-side Alignment Alternative would not result in adverse effects on land use planning compatibility/ consistency or recreation/coastal zone access or resources.

<u>Rehabilitation Alternative</u>

Operation of the Rehabilitation Alternative would not result in any changes from the existing land use within the project area. Operation of this alternative would have no effect on existing or future land use planning, compatibility, or consistency on recreation or coastal zone access or resources.

2.1.1.4 Avoidance, Minimization and/or Mitigation Measures

No measures are required.

2.1.2 Growth Inducement

This section discusses the project's "land side" and maritime growth inducement potential, prepared by the POLB, related to the cargo capacity of the Ports and growth outside the ports in the adjacent communities.

2.1.2.1 Regulatory Setting

The CEQ regulations, which implement NEPA, require evaluation of the potential environmental consequences of all proposed federal activities and programs. The regulations also include a requirement to examine indirect consequences that may occur in areas beyond the immediate influence of a proposed action and at some time in the future. The CEQ regulations, 40 CFR 1508.8, refer to these consequences as secondary impacts. Secondary impacts may include changes in land use, economic vitality, and population density, which are all elements of growth.

CEQA also requires the analysis of a project's potential to induce growth. CEQA guidelines, Section 15126.2(d), require that environmental documents "…discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment…"

City of Long Beach General Plan

In the project study area, land uses and future planned growth are designated by the City of Long Beach General Plan. The Long Beach Harbor area falls within General Plan Land Use District Number 12. This district includes existing freeways, the POLB, and the Long Beach Airport. The General Plan indicates that the water and land use designations within the harbor area are separately formulated and adopted by due process known as the Specific Plan of the Long Beach Harbor [also known as the PMP, as amended]. The General Plan indicates that the responsibilities for planning within legal boundaries of the harbor lie with the Board of Harbor Commissioners.

Port Master Plan

The PMP has nine designated land uses and four designated water uses consisting of:

- Primary Port facilities
- Hazardous cargo facilities
- Port-related industries and facilities
- Ancillary Port facilities
- Commercial recreational facilities
- Federal use
- Oil and gas production
- Utilities
- Non-Port-related areas
- Anchorage area
- Maneuvering areas
- Navigable corridors
- Recreational/sportfishing

The PMP Land Use Element has six goals for developing policies involving future POLB development and expansion. The goals are also shaped by the influences of the California Coastal Act, legislative grants of the Tide and Submerged Lands, City of Long Beach Charter, Municipal Code, and the City of Long Beach General Plan (POLB, 1999). The land use goals noted in this element include:

Goal 1: Consolidate similar and compatible land and water areas.

Goal 2: Encourage maximum use of facilities.

Goal 3: Improve internal circulation involving roadways and rail.

Goal 4: Provide for the safe cargo handling and movement of vessels within the Port.

Goal 5: Develop land for primary Port facilities and Port-related uses.

Goal 6: Protect, maintain, and enhance the overall quality of the coastal development.

The Land Use Element also provides a summary of long-range plans for cargo facility and infrastructure requirements to the year 2020. The long-range plans are informational discussions that would not be considered by the California Coastal Commission (CCC) as a submission for certification (POLB, 1999).

2.1.2.2 Affected Environment

The proposed project would provide a replacement surface transportation connection between Terminal Island, SR 710, and downtown Long Beach. Long Beach lies to the north and east of the existing Gerald Desmond Bridge, while the communities of San Pedro and Wilmington (both part of the City of Los Angeles) lie to the northwest and southwest, respectively.

The project site is located within the Port in an area zoned Port-related Industrial (IP). POLB owns most of this land; however, there are several relatively small privately owned and operated landholdings located in the Inner Harbor area and northernmost sections of the Port. Refer to Section 2.1.1.2 (Land Use, Affected Environment) for information about the three Planning Districts in the Long Beach Harbor that encompass the project site.

2.1.2.3 Environmental Consequences

Traffic Growth Inducement Methodology and Assumptions

The additional vehicle trips generated by planned transportation and land development projects (i.e., cumulative traffic growth) within the Ports and surrounding communities are included in the traffic forecasting model used for this study. Refer to Section 2.1.5 (Traffic and Circulation) for details on the development of the traffic forecasting model used for this study.

The traffic model used to develop the travel forecasts for development and growth in the region through the year 2030 is based upon the travel demand forecasting model developed for the Ports of Long Beach and Los Angeles Transportation Study (Ports Transportation Study). That model, completed in 2000, is based upon the SCAG Regional Travel Demand Forecasting Model. Elements of the SCAG heavy-duty truck model were used, as well as input data from the City of Long Beach model and the City of Los Angeles Transportation Improvement Mitigation Program models for Wilmington and San Pedro.

The year 2030 regional trip tables were developed using the SCAG 2030 regional trip tables. These regional trip tables were also augmented with focus area trips from non-port and port zones based on other major developments in the focus study area, as well as port trips based primarily on the Ports Transportation Study. The focus area and regional person trips were then converted into vehicle trips based on SCAG's trip distribution model, mode-split factors, and average auto-occupancy tables. The model was validated to 2005 base year conditions and used to project both year 2015 and year 2030 travel demand.

Land-side Direct Growth Inducement Potential: The North-side Alignment Alternative and the South-side Alignment Alternative (Bridge Replacement Alternatives) would not result in changes to zoning or land use designations that would have the potential to directly influence growth in the area. It is likely that adjacent areas would be utilized by the Port for marine terminals and infrastructure. These potential uses would compensate for the areas occupied by the new bridge and would represent additional land-side growth pressure. In effect, the Bridge Replacement Alternatives would not result in a greater amount of land available for redevelopment within the Port than that which exists today. Future Port development projects would be evaluated per the Port's Environmental Protocol and approved as required by the PMP, as amended.

The congestion relief benefits of the Bridge Replacement Alternatives would not likely be a direct cause of new vehicle trips (i.e., traffic growth) in the region because the bridge in and of itself is not the destination of vehicle trips. Rather, the congestion relief benefits of the Bridge Replacement Alternatives are expected to redirect traffic to the bridge to avoid other more-congested roadways. This redistribution could have the effect of freeing up capacity on other roadways within the vicinity of the Port. This redistribution of traffic is expected to increase traffic on the bridge. As discussed in Section 2.1.5 (Traffic and Circulation), the improvements provided by the proposed Bridge Replacement Alternatives would result in an estimated 9 percent more traffic (135,930 vpd) on the new bridge in year 2030 than would be on the bridge under the No Action/Rehabilitation Alternatives (124,670 vpd). The additional traffic, approximately 11,260 vpd, would likely be the result of motorists changing their paths rather than the result of additional trips associated with additional land development directly induced by the Bridge Replacement Alternatives; therefore, the Bridge Replacement Alternatives would not be a direct cause of traffic growth.

Land-side Indirect Growth Inducement Potential: The proposed bridge replacement project likely would indirectly induce growth. When considered in the context of future cumulative development that is likely to occur within the Ports and surrounding communities, the traffic congestion relief benefits associated with the Bridge Replacement Alternatives would have the potential to indirectly influence growth as a result of more-efficient or improved access to and from areas within the Port and surrounding communities. Indirectly induced growth associated with future land development could result from the traffic congestion relief benefits provided by the new bridge and the lessening of congestion on other roadways within the vicinity of the Port as more vehicles utilize the bridge as a preferred route. Thus, the proposed new bridge would reduce future traffic congestion that might otherwise serve to limit future development or cargo movement potential. This type of growth is highly speculative; therefore, it is extremely difficult to quantify in an urban environment that is already developed. In terms of land-site acreage, there are limited opportunities for additional development beyond what is already included in the land use forecasts used in the traffic forecasting process. The Ports themselves are assumed to reach build-out before year 2030. Any indirectly induced growth that involved a new project would be subject to the regulatory process at the time that it occurs.

It is possible that the improved access to and from areas within the Port could also contribute to more intense use of existing cargo terminals. The key question is whether the new bridge would have the potential to cause a greater amount of cargo to be brought in the Port than would otherwise occur with the existing bridge left in place. The amount of cargo brought into the Port directly influences the volume of truck and train trips needed to carry away the cargo to its ultimate destination. The maximum amount of cargo that can be accommodated by the Ports is directly related to the capacity of the marine terminals. The capacity of the Ports container terminals is generally considered to be a function of the following:

- The size and configuration of the wharfs and backland storage yards
- Labor practices
- The type and quantity of yard equipment
- The type of containers (imports/exports/ empties and intermodal/local)
- The size distribution of the ships calling at the terminals

The maximum Ports container cargo capacity is estimated to be 42 million TEUs, which will be reached between years 2020 and 2025 based on projected market demand. The estimated capacity of the Ports would not be directly affected by the Bridge Replacement Alternatives. The market demand for goods would be neither directly nor indirectly affected by bridge replacement.

Because the truck traffic associated with the maximum capacity cargo volumes (42 million TEUs) has been provided to SCAG and is incorporated in SCAG's RTP, the regional transportation system already takes into account the estimated capacity of the Ports.

The new bridge would result in travel time savings (2.2 minutes per truck in both directions [Port of Long Beach Traffic Model]) for trucks moving the cargo. This reduction on one small segment of the global distribution network is not likely to cause a shipper to shift cargo to POLB or POLA from other ports. The 2.2-minute savings is a negligible part of the total cargo transit time from manufacturer to the ultimate destination, which is measured in days (typically ranging from 9 to 15 days) (*Pacific Shipper Magazine,* 2006).

The *Port and Model Elasticity Study* (Leachman & Associates, 2005), which was prepared for SCAG, and supplemental analyses conducted by SCAG indicate that a container fee of under $200 per forty-foot equivalent unit (FEU), combined with transportation congestion relief projects, would not alter shipper supply chain logistics. Another study, *Cargo on the Move through California* (Energy and Environmental Research Associates, 2006) prepared for the Natural Resources Defense Council (NRDC) concluded that a $30 container fee for capital improvements would not result in the diversion of cargo. The estimated value of time for goods movement estimated by SCAG in their supplemental diversion study analyses indicates that the time savings for the proposed replacement bridge could equate to approximately $2.66 per trip. Given the thresholds of elasticity estimated in the aforementioned studies, it is reasonable to assume that supply cost savings of $2.66 would not result in the shifting of cargo from other ports.

The Port has concluded that the reduction in traffic congestion and the improved efficiency and enhanced capacity resulting from the Bridge Replacement Alternatives and the relatively small savings in overall cargo transit time attributable to the new bridge would not provide a meaningful incentive for shippers to divert their cargo from other ports to the POLB/POLA; however, it is not possible to predict whether the improved and enhanced access to and from areas of the Port would have other indirect effects on the intensity of cargo movement through existing Port terminals. Some of the factors that suggest there is unlikely to be an increase in cargo movement as a result of the new bridge and roadway improvements include (1) the capacity of the Ports' container terminals generally is limited by factors other than the surrounding roadway system, such as berth capacity, backland capacity, crane capacity, and terminal gate capacity; (2) the market demand for goods traveling through the Ports would be neither directly nor indirectly affected by bridge replacement; and (3) the potential travel time savings is not sufficient to induce the shifting of cargo from other ports. Nonetheless, to be conservative, this DEIR/EA assumes there is a potential for indirect growth inducement associated with the Bridge Replacement Alternatives and that the Bridge Replacement Alternatives could result in some level of growth-related adverse effects on the environment. Quantifying any such effects would be highly speculative and is made more difficult by the fact that the project is occurring in an urban environment and port complex that are already highly developed with very limited opportunities for additional development. For this reason, while the potential for growth inducement in cargo movement is identified as a possible impact of the roadway improvements associated with the bridge replacement project, the effects are too speculative to reliably evaluate and essentially remain unknown.

It is also important to note that future development growth within the Port and surrounding communities is planned for in the PMP and the City of Long Beach General Plan. In addition, the additional vehicle trips generated by planned transportation and land development projects (i.e., cumulative traffic growth) within the Port and surrounding communities are included in the traffic forecasting model used for this study.

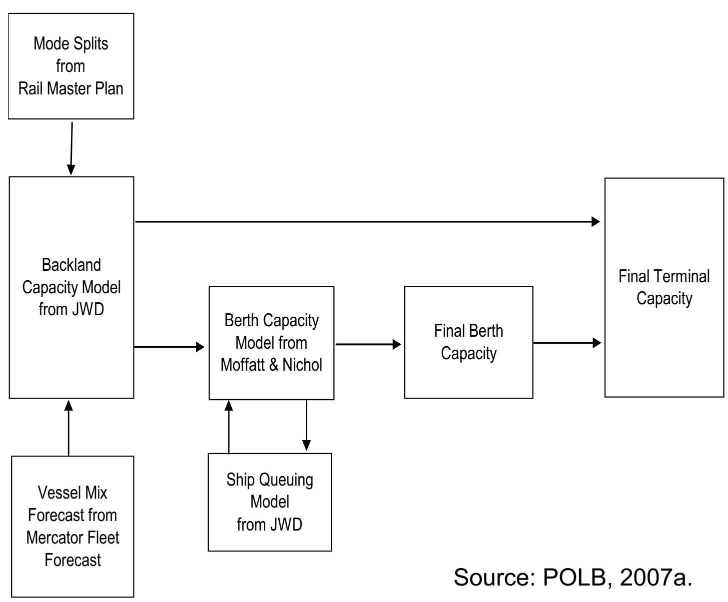
Maritime Growth Inducement Potential

Container Terminal Capacity

The key question in assessing the potential for the Bridge Replacement Alternatives to induce port growth is whether the additional 44 ft (13.4 m) of clearance for ships passing under the bridge will lead to more cargo being handled by the terminals upstream of the bridge. In other words, if the current bridge height had served as a constraint on cargo throughput at those upstream terminals, then the removal of that constraint would be “growth inducing.”

The Port’s process for determining the capacity of any Port container terminal begins by estimating the terminal’s backland throughput capacity. Given this estimate, a collection of vessels that can accommodate that throughput is determined from a container fleet forecast. The physical constraints of the terminal (e.g., wharf length, channel width, or air draft) will be accommodated by the selected vessels. The selected vessels are assigned an arrival schedule that is assessed for acceptable LOS at the berth, measured by the expected probability of queuing. Port terminal capacities reflect existing, known development and expansion plans.

Exhibit 2.1.2-1 summarizes the process for calculating container terminal capacity.



Source: POLB, 2007a.

Exhibit 2.1.2-1
Marine Terminal Capacity Flow Chart

Backland Capacity

JWD Group (an engineering consulting group that specializes in marine planning capabilities) developed a spreadsheet model used by ports nationwide to calculate maximum container-yard capacity for a given existing or planned terminal.

Key model variables include the size of the storage area, how the containers are stored (i.e., chassis versus grounded) and how long the containers remain in storage. Container storage and dwell times[4], in turn, are largely a function of where the container is destined and whether it is loaded with cargo. Tables 2.1.2-1 and 2.1.2-2 provide a list of assumptions about the types of containers handled and various backland operations that feed into the model.

The model uses these inputs along with the size of the container yard and expected split of cargo among the various container types (Table 2.1.2-1) to estimate the overall capacity of the yard.

Table 2.1.2-1
Detailed Container-Type Assumptions for Calculating Backland Capacity

Container Type	Mean Dwell Time (days)	% Wheeled	Mean Stack Height
Import local load	4.0	10	3.5
Import on-dock intermodal load	2.0	10	3.5
Import off-dock intermodal load	1.5	10	3.5
Export local load	6.0	5	3.5
Export on-dock intermodal load	6.0	0	3.5
Export off-dock intermodal load	6.0	10	3.5
Import empty	NA	NA	5.5
Export empty	7.0	5	5.5

Source: POLB, 2007e.

Berth Capacity

The number and size of vessels expected to call at the terminal are taken from the San Pedro Bay distribution of vessels forecast for 2020. This forecast is taken from the 2005 fleet forecast prepared by Mercator Transport Group (MTG). This fleet forecast is designed to accommodate San Pedro Bay's expected 2020 container cargo (identified as the "Base-Case Scenario" in the MTG study). The projected fleet will be a representative subset of the San Pedro Bay fleet capable of handling the container yard capacity throughput.

An initial projected fleet is developed by selecting a diverse collection of ships from the 2020 Mercator distribution that can handle terminal throughput approximately equal to the estimated container yard capacity. (In certain cases, the collection of services for a given terminal may have an expected annual capacity greater than the capacity of the terminal's container yard.) This fleet is input to the Moffatt & Nichol (M&N) berth capacity model to determine if the initial fleet can be accommodated at the wharf. The model considers the overall length of each ship, the number of containers discharged and loaded, and various assumptions about berth operations to estimate how long each vessel will remain at berth and how much berth space it will use.

Table 2.1.2-2
Utilization Rate and Static Density Assumptions for Calculating Backland Capacity

Utilization rate for stocked storage area	1/ (peak/mean)	85%
Maximum wheeled utilization	–	90%
Wheel shape efficiency factor	–	80%
Slot density for wheeled storage	TEU slots per acre	50
Slot density for top and side pick (T/SP)*	TEU slots per acre	100
Slot density for rubber tire gantry (RTG)*	TEU slots per acre	115

* Stacks of loaded containers to be handled by RTGs; Stacks of empty containers to be handled by T/SP.

Source: POLB, 2007.

The vessel distribution produced from this process is then evaluated to determine the probability of vessel queuing using JWD's terminal resources model. If the vessel distribution *exceeds a queuing probability of 5 percent,* then the distribution will be modified by adjusting the mix of vessels to find a combination of weekly services that can accommodate the container yard capacity throughput while avoiding a queuing expectation of 5 percent or greater. These modified vessel schedules may no longer be representative of the overall distribution of vessels forecast for San Pedro Bay; however, the POLB fleet should remain as close to representative of the San Pedro Bay total as possible.

4 Dwell Time: The number of days that a ton of cargo remains in port.

The need for calculating queuing probability stems from the fact that a terminal wharf cannot be occupied 100 percent of the time (i.e., its theoretical capacity). To the extent that ship arrival times will vary, a certain amount of useable wharf will need to remain unoccupied for a period of time to avoid unacceptable ship queuing. JWD's terminal resources model calculates this queuing probability using vessel call schedules developed from the M&N model and empirical data on the frequency and length of time that container vessels calling San Pedro Bay arrive late due to weather and other factors.

Overall Capacity

Comparing the berth capacity to the container yard capacity reveals where terminal capacity constraints arise, the greater constraint will dictate the overall constraint of the terminal. A berth-constrained terminal has a container yard capacity greater than the berth capacity (i.e., the berth cannot accommodate the vessel activity required to deliver the entire throughput that the container yard could handle). A container yard-constrained terminal has a berth capacity greater than the capacity of the storage yard (i.e., the terminal's berths will be underutilized because the container yard cannot handle all of the containers that could be moved over the wharf).

Maritime Growth Inducement Potential: The existing Gerald Desmond Bridge is approximately 156 ft (47.5 m) above the Back Channel at MHWL. Given the size and type of existing and planned marine terminals located north of the Gerald Desmond Bridge, only the existing Pier A and the planned Pier S container terminals are potentially affected by the Bridge Replacement Alternatives. This is because the only other container terminal north of the Gerald Desmond Bridge is Pier C, which is a small facility leased by Matson Navigation Company primarily for its Hawaii trade, which does not warrant the use of larger container vessels. The other terminals north of the bridge are bulk or automobile terminals serviced by different types of vessels for which the height of the current Gerald Desmond Bridge is not expected to be a limitation in the foreseeable future.

The Port's pilots can navigate under the bridge with a minimum 3-ft (1-m) overhead clearance for their vessels. Accordingly, this guideline limits ships to a height, or air draft, of approximately 153 ft (46.6 m) (POLB, 2005a). Air draft is defined as the height of a vessel from the keel to the antenna, minus its draft in the water. The actual draft of a container vessel varies depending on the cargo it carries. Generally this variation ranges from the design draft, or the draft associated with what the vessel is expected to carry, to the scantling draft, or the draft at maximum possible load.

The projected capacities of Piers A and S are approximately 2.1 and 1.4 million TEUs, respectively. These capacities were calculated using a computer modeling system developed for the Port in 2005 by JWD Group and M&N. Key model factors include the amount of container yard acreage, length of the wharf, and size of the ships expected to call at the terminal. A projection of the San Pedro Bay container fleet was prepared in 2005 for the Ports by MTG. Table 2.1.2-3 shows the distribution of all vessels by TEU capacity expected to call at the two ports by year 2020.

Table 2.1.2-3
San Pedro Bay 2020 Vessel Forecast

Vessel Size Categories (TEUs)	Number of Weekly Services
1000-1099	1
2000-2999	9
3000-3999	10
4000-4999	23
5000-5999	16
6000-6999	15
7000-7999	12
8000-8999	11
11000-11999	11
Total	108

Both Piers A and S would be capable of handling any forecasted vessel above if there were no navigational constraints; however, the expectation is that ships in the largest size category would not likely call at Pier S given that in year 2020 Pier S would be one of the smallest container terminals in San Pedro Bay. Excluding Pier C, the San Pedro Bay Ports will have 13 container terminals, but they project only 11 weekly services of the largest vessels (see Table 2.1.2-3). Because not every terminal will have a weekly service of the largest vessels, it is highly unlikely that these vessels will call at a smaller terminal such as Pier S.

Given the current plans for Pier A, which for the purpose of this analysis was assumed to include the 30 acres (12 ha) of the old Wilmington Rail yard to the east that currently are not part of Pier A, the facilities are constrained by the size of the container storage yard (i.e., the berth can accommodate more cargo than the container storage yard can handle). Table 2.1.2-4 shows a projected fleet for Terminal A that provides cargo flows equal to container yard capacities. The projected fleet is consistent with the overall San Pedro Bay fleet distribution, as well as the assumption that Pier A would be able to receive the largest vessels.

Table 2.1.2-4
Pier A Vessel Forecast at Capacity – No Navigational Constraints

Vessel Size Categories (TEUs)	Pier A	
	Number of Weekly Services	Annual TEUs
1000-1099	–	–
2000-2999	–	–
3000-3999	–	–
4000-4999	1	173,160
5000-5999	–	–
6000-6999	1	509,860
7000-7999	1	596,440
8000-8999	–	–
11000-11999	1	822,510
Total	4	2,101,970

Without the proposed bridge replacement project, it is assumed that the weekly service by vessels in the 11,000 to 11,999 TEU size category would not service Pier A due to air draft constraints; however, it should be noted that the Gerald Desmond Bridge is not the only navigational constraint for Piers A and S. As identified in the Port's Pier S Marine Terminal and Back Channel Navigational Safety Improvements Project, navigational safety concerns would require the Port to widen the navigable width of the channel to approximately 315 ft (96 m) at a minimum and maximum water depth of 52 ft (15.8 m) and 54 ft (16.5 m), respectively, at mean lower low water (MLLW). Even with the proposed bridge replacement, the largest ship that would be able to navigate the channel safely would be between 8,000 and 8,999 TEUs. Larger vessels would require a wider channel and deeper water, which are not considered feasible or cost effective for the foreseeable future; however, this growth inducement analysis considered larger ships in case the channel constraints are removed in the future.

Table 2.1.2-5 shows that a distribution of ships from the current San Pedro Bay fleet can provide terminal throughput within the capacity of Pier A and is not substantially constrained by the existing bridge height. According to the Port's model, which calculates each vessel's time at berth and factors in periodic late ship arrivals, even with the two additional weekly services, there would be no ship queuing problem. Based on this modeling, it does not appear that the Bridge Replacement Alternatives will meaningfully enhance terminal capacity at Pier A even though they facilitate larger ships calling at the terminal. In other words, even though the height constraint on larger ships getting into the Back Channel would be removed with the Bridge Replacement Alternatives, this does not appear to translate into substantially more cargo being handled through Pier A. Thus, raising the height of the bridge does not appear to serve to generate meaningfully more container throughput than would occur without the project. Based upon the modeling shown in Tables 2.1.2-4 and 2.1.2-5, it is possible that there would be some modest increase in throughput. This potential increase in throughput would likely have environmental effects typically associated with cargo transport. The effects would typically include additional truck, train, ship, and cargo

Table 2.1.2-5
Pier A Vessel Forecast at Capacity – Air Draft Constraints

Vessel Size Categories (TEUs)	Number of Weekly Services	Annual TEUs
1000-1099	–	–
2000-2999	–	–
3000-3999	1	211,640
4000-4999	2	346,320
5000-5999	1	384,800
6000-6999	1	509,860
7000-7999	1	596,440
8000-8999	–	–
11000-11999	–	–
Total	6	2,049,060

handling equipment operational emissions and cumulative contribution to greenhouse gases (GHGs) and additional effects on the Port, City, and State roadways to accommodate potential additional truck trips to move the additional throughput into the State and national distribution networks. Because predicting the level of any such increase in throughput is speculative, further analysis of the environmental impacts associated with any possible increase cannot be performed. This is consistent with the recommendation of CEQA Guidelines 15145 and NEPA.

No Action/Rehabilitation Alternatives

Under the No Action/Rehabilitation Alternatives, the Gerald Desmond Bridge would continue to operate in its existing configuration. There would be no changes in land use or zoning, no changes to the existing surface transportation system or terminal cargo capacity in the vicinity of the existing bridge, no congestion relief associated with additional traffic capacity on the bridge, and no travel time savings achieved. As such, there would be no potential for the No Action or Rehabilitation Alternatives to directly or indirectly induce growth in the project area.

2.1.2.4 Avoidance, Minimization and/or Mitigation Measures

No measures are required.

2.1.3 Community Impacts

This section addresses potential effects on community character and cohesion (Section 2.1.3.1), relocations (Section 2.1.3.2), and low-income and minority populations (Section 2.1.3.3) associated with the construction and operation of the proposed build alternatives. Because there are no specific guidelines under NEPA or CEQA for determining potential areas of influence of community impacts, the Caltrans Environmental Handbook, Volume 4 (1997) – Community Impact Assessment was consulted. The handbook states that the boundary of potentially affected social and economic environments should be drawn to include surrounding buildings, transportation facilities, land, and neighborhood and community features. On this basis, the project study area was delineated to include the Port and those portions of the adjacent communities potentially affected within the cities of Long Beach and Los Angeles. The project study area includes all census tracts within 0.75-mi (2.4 km) of the project corridor (0.75-mi [2.4 km] on both sides of the project corridor, as shown in Exhibit 2.1.3-1).

2.1.3.1 Community Character and Cohesion

2.1.3.1.1 Regulatory Setting

NEPA established that the federal government use all practicable means to ensure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings [42 U.S.C. 4331(b)(2)]. FHWA, in its implementation of NEPA [23 U.S.C. 109(h)], directs that final decisions regarding projects are made in the best overall public interest. This requires taking into account adverse environmental impacts, such as destruction or disruption of human-made resources, community cohesion, and the availability of public facilities and services.

Under CEQA, an economic or social change by itself is not to be considered a significant effect on the environment; however, if a social or economic change is related to a physical change, then social or economic change may be considered in determining whether the physical change is significant. Because this project would result in physical change to the environment, it is appropriate to consider changes to community character and cohesion in assessing the significance of the project's effects.

2.1.3.1.2 Affected Environment

Study Area

The EIR/EA was reviewed to identify potentially adverse effects of the project on the adjacent communities within the project area. Based on consideration of the potential project effects as discussed within this EIR/EA, traffic effects were determined to have the largest potential direct effects area, extending into downtown Long Beach. The 0.75-mi (2.4-km) study area is centered on the project corridor within the project limits and encompasses the entire traffic study area (see Section 2.1.5, Exhibit 2.1.5-1). The 0.75-mi (2.4-km) study area includes the proposed project area, its immediate surrounding areas, and an additional area to account for potential project effects on community character and cohesion.

The study area consists of 11 census tracts (see Exhibit 2.1.3-1). Due to the irregular shape of the census tracts, some tracts extend outside of the 0.75-mi (2.4-km) project study area. Census data were not adjusted to account for this; therefore, census data presented for the study area actually account for an area slightly larger than the project study area. It should also be noted that Tracts 5756 and 2961 are located within the Ports of Long Beach and Los Angeles.

In addition to the planning areas of the Ports of Long Beach and Los Angeles, the study area census tracts include portions of the community of Wilmington and the City of Long Beach. Socioeconomic and demographic data for the study area census tracts discussed below were obtained from the 2000 census data. The City of Long Beach and the County of Los Angeles are also discussed for comparison to provide local and regional socioeconomic and demographic context for the study area.

Community Facilities and Services

The Cities of Long Beach and Los Angeles supply water and sewer services to the project site and the entire study area. Electricity and natural gas within the study area are provided by SCE and Long Beach Energy, respectively. Solid waste collection within the Port is handled by private contractors. Trash and other nontoxic solid waste are disposed of at various landfills in Los Angeles County. No shortages of these facility capacities in the Port or the larger study area currently exist or are anticipated.

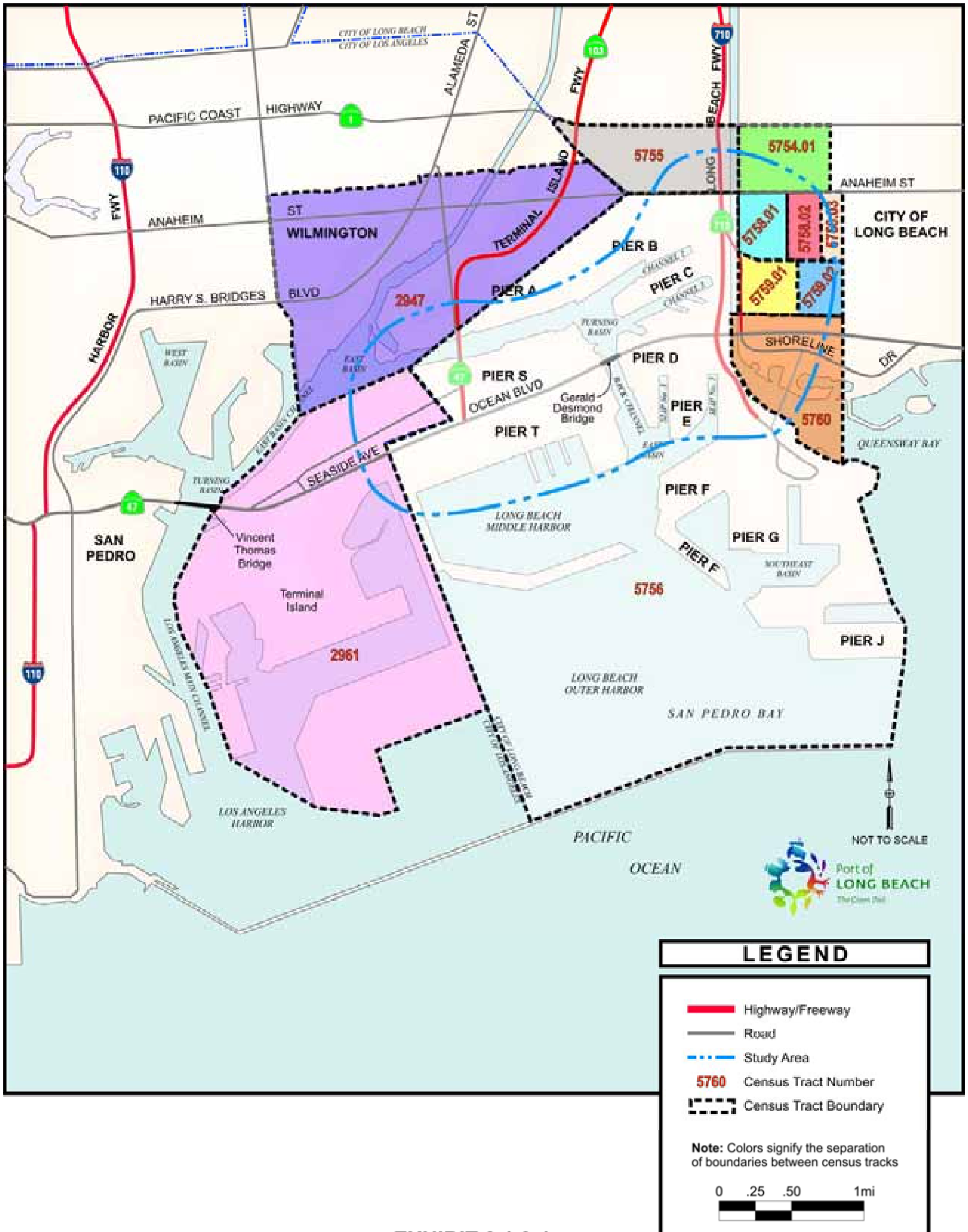


EXHIBIT 2.1.3-1
Census 2000 Tracts

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Other community resources located within the study area include schools and recreational facilities. The nearest schools to the project are located within the City of Long Beach and are located approximately 0.3-mi (0.5-km) from the eastern edge of the proposed project: Edison Elementary is a public school at 625 Maine Avenue, and Cesar Chavez Elementary School is a public school located at 730 West 3rd Street.

Recreational Amenities

San Pedro Bay supports recreational uses such as marinas, sportfishing facilities, and other public access areas (POLB, 1999). Specific recreational amenities within the area include the Long Beach Marina, Queen Mary, Queensway Bay, Golden Shore RV Resort, public fishing access on the eastern side of Pier J, and Long Beach Sportfishing on Berth 55. None of these recreational facilities and attractions is located within the immediate project vicinity (see Section 2.1.1 [Land Use] for further discussion)

Study Area Socioeconomic and Demographic Characteristics

Population socioeconomic data from the U.S. Census Bureau (U.S. Census, 2000) were analyzed at the census tract level. A census tract is a statistical subdivision of a county delineated by a local committee of census data users for the purpose of presenting data. Census tract boundaries normally follow visible features, but they may follow governmental unit boundaries and other nonvisible features in some instances. During their development, census tracts are designed to be relatively homogeneous units with respect to population characteristics, economic status, and living conditions. Each census tract contains an average of 4,000 inhabitants (U.S. Census, 2000), and it may be split by any subcounty geographic entity. As previously discussed, the study area consists of 11 census tracts. All but 2 of the 11 census tracts, Tracts 2947 and 2961, are located within the City of Long Beach (see Exhibit 2.1.3-1).

Study Area Population Demographics

Population reported for the study area census tracts are provided in Table 2.1.3-1, and study area population age and racial composition are provided in Tables 2.1.3-2 and 2.1.3-3. The reported population of the 11 census tracts is approximately 31,000 people. The percentage of working age (19 to 64) adults within the study census tracts range from a low of 50.4 (Tract 5758.01) to 90.6 (Tract 5760). Overall, 58.4 percent of the study area population is working age adults. This compares to 58.6 percent and 59.3 percent for the City of Long Beach and the County of Los Angeles, respectively.

With the exception of Census Tract 5760, persons classified as Hispanic or Latino constitute most of the population in the study area census tracts. The percentage of Hispanic or Latino populations ranges from 28.8 percent (Tract 5760) to 86.7 percent (Tract 5758.01). Overall, 64 percent of the study area census tract population is Latino or Hispanic. This compares to 35.8 percent and 44.6 percent for the City of Long Beach and the County of Los Angeles, respectively; however, all census tracts have majority minority populations. Minority percentages of the study area census tracts range from 60.4 percent (Tract 5760) to 95.4 percent (Tract 574.01). Overall, 85.6 percent% of the study area census tract population is minority (not white). This compares to 66.9 percent and 68.6 percent for the City of Long Beach and the County of Los Angeles, respectively. Except for Tracts 2961, 5759.02, and 5760, the percentage of white persons is much lower in the study area census tracts than the City of Long Beach and the County of Los Angeles. Based on the information

Table 2.1.3-1
Historical Population Data within the Project Study Area

Communities	1990	2000	2006 Estimates	Percent Change 1990-2000	Percent Change 2000-2006
Study Area[1]	---[2]	30,978	N/A*	0.2	N/A
City of Long Beach	429,433	461,522	466,520	7.5	1.1
County of Los Angeles	8,863,164	9,519,338	8,878,554	7.4	-6.7

[1]Project study area includes all census tracts within 0.75-mi (2.4 km) of the project area.

[2]Census tract boundaries in 1990 Census are different from census tract boundaries for 2000 Census.

*N/A: data not available for census tracts.

Sources: U.S. Census, 2000; and U.S. Census, 1990.

provided in Table 2.1.3-3, the study area is considered a predominantly minority community when compared to the City of Long Beach and County of Los Angeles

Study Area Socioeconomic Demographics

Socioeconomic demographic data for the study area census tracts are provided in Tables 2.1.3-4 and 2.1.3-5. The information is summarized below.

According to the 2000 census data, 9,973 households and 5,740 families are within the study area census tracts. Average household and family size within the study area range from 1.67 (Tract 2961) to 5.09 (Tract 5755) and 2.14 (Tract 5760) to 4.51 (Tract 5758.01), respectively. This compares to 2.77 and 3.55 for the City of Long Beach and 2.98 and 3.61 for the County of Los Angeles. Median family and household incomes within the study area census tracts range from $0 (Tract 5756; no families) to $69,375 (Tract 2961) and $13,750 (Tract 5755) to $152,338 (Tract 5756), respectively. This compares to $40,002 and $37,270 for the City of Long Beach and $46,492 and $42,189 for the County of Los Angeles. Even when leaving out the study area census tracts that contain the Ports (2961 and 5756), the median family and household incomes reported for the study area are much lower than those reported for the City of Long Beach and the County of Los Angeles.

The study area census tracts contain 9,693 housing units. No housing or residential communities are located within the project footprint or larger Port area (Tract 5756). Residential neighborhoods are located within the bordering census tracts in the City of Long Beach. According to U.S. Census 2000 data, residential communities are found east of the Los Angeles River (8,626 units) and also north of Anaheim Street (100 units). Housing units within the study area vary from high-density apartments to single-family homes built on individual lots. Approximately 84 percent of the housing units within the study area census tracts are classified as renter occupied. This compares to 59 percent of renter-occupied housing units in the City of Long Beach and 52 percent of renter-occupied housing units in the County of Los Angeles.

According to the City of Long Beach Housing Authority and Los Angeles County Community Development Commission, six low-income affordable housing developments that provide affordable housing for seniors, disabled, and people with HIV/AIDS are located within the study area census tracts.

Employment data for the study area census tracts show that there are 11,306 individuals in the civilian labor force (i.e., does not include military). Unemployment within the study area census tracts range from zero percent (Tracts 5755 and 5756) to 27.8 percent (Tract 5754.01). Overall unemployment within study area census tracts is 16.9 percent. This compares to 9.4 percent and 8.2 percent for the City of Long Beach and County of Los Angeles, respectively.

Individual earnings in 1999 that are below the poverty level within study area census tracts range from 21.9 percent (Tract 5760) to 53.4 percent (Tract 5754.01). With the exception of Tract 5760, all study area tracts have greater percentages of individuals earning below the poverty level than both the City of Long Beach (22.8 percent) and County of Los Angeles (17.9 percent).

The U.S. Census Bureau uses a set of income thresholds that vary by family size and composition to determine poverty status. If a family's total income is less than the poverty threshold income, then that family is considered impoverished. The poverty thresholds do not vary geographically, and they are updated annually to reflect inflation using the Consumer Price Index (CPI). The official poverty definition considers monetary income before taxes and does not include capital gains and non-cash benefits (e.g., public housing, Medicaid, and food stamps). Poverty is not defined for people in military barracks, institutional group quarters, or for unrelated individuals under age 15 (e.g., foster children) (Dalaker and Proctor, 1999).

Except for tracts 2961, 5756, and 5760 (no families or no families below the poverty level), percentages of families with incomes below the poverty level ranged from 32.4 percent (Tract 5759.02) to 77.3 percent (Tract 5755). Overall, 40.1 percent of the families within study area census tracts have incomes that fall below the poverty level, and is much higher than the City of Long Beach (19.3 percent) and County of Los Angeles (14.4 percent). Based on the higher percentages of individuals and families living below the poverty level when compared to the City of Long Beach and County of Los Angeles, all study area tracts, except for 2961 (located in the Port of Los Angeles), 5756 (located in the Port of Long Beach), and 5760, are considered low-income populations.

Table 2.1.3-2
Study Area Age Composition

Demographic	Study Area Census Tracts																						Comparison Areas			
	2947		2961		5754.01		5755		5756		5758.01		5758.02		5758.03		5759.01		5759.02		5760		City of Long Beach		County of Los Angeles	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Total Population	3,270	100.0	1,434	100.0	5,476	100.0	252	100.0	46	100.0	2,721	100.0	5,433	100.0	2,968	100.0	3,825	100.0	5,108	100.0	445	100.0	461,522	100.0	9,519,338	100.0
Population 19 or younger	1,242	38.0	81	5.6	2,527	46.1	71	28.2	16	34.8	1,298	47.7	2,345	43.2	833	28.1	1,452	38.0	1,239	24.3	31	7.0	149,119	32.3	2,946,796	31.0
Population 19 to 64	1,881	57.5	1,296	90.4	2,835	51.8	176	69.8	28	60.9	1,372	50.4	2,949	54.3	1,567	52.8	2,259	59.1	3,353	65.6	403	90.6	270,501	58.6	5,645,869	59.3
Population 65+	147	4.5	57	4.0	114	2.1	5	2.0	2	4.3	51	1.9	139	2.6	568	19.1	114	3.0	516	10.1	11	2.5	41,902	9.1	926,673	9.7

Source: U.S. Census, 2000.

Table 2.1.3-3
Study Area Racial Composition

Demographic	Study Area Census Tracts																						Comparison Areas			
	2947		2961		5754.01		5755		5756		5758.01		5758.02		5758.03		5759.01		5759.02		5760		City of Long Beach		County of Los Angeles	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Total Population	3,270	100.0	1,434	100.0	5,476	100.0	252	100.0%	46	100.0	2,721	100.0	5,433	100.0	2,968	100.0	3,825	100.0	5,108	100.0	445	100.0	461,522	100.0	9,519,338	100.0
White	224	6.9	459	32.0	251	4.6	55	21.8	7	15.2	176	6.5	466	8.6	617	20.8	565	14.8	1,554	30.4	176	39.6	152,899	33.1	2,959,614	31.1
Black or African American	205	6.3	337	23.5	485	8.9	19	7.5	11	23.9	114	4.2	518	9.5	478	16.1	815	21.3	965	18.9	81	18.2	66,836	14.5	901,472	9.5
American Indian or Native American	6	0.2	12	0.8	19	0.3	3	1.2	1	2.2	7	0.3	10	0.2	25	0.8	25	0.7	41	0.8	2	0.4	1,772	0.4	25,609	0.3
Asian	36	1.1	40	2.8	272	5.0	7	2.8	1	2.2	31	1.1	238	4.4	314	10.6	267	7.0	318	6.2	35	7.9	54,937	11.9	1,124,569	11.8
Native Hawaiian and other Pacific Islander	27	0.8	12	0.8	52	0.9	2	0.8	4	8.7	3	0.1	12	0.2	18	0.6	31	0.8	47	0.9	5	1.1	5,392	1.2	23,265	0.2
Other (not Hispanic or Latino)	0	0.0	0	0.0	5	0.1	4	1.6	0	0.0	1	0.0	7	0.1	5	0.2	5	0.1	14	0.3	2	0.4	1,013	0.2	19,935	0.2
Two or more races	38	1.2	30	2.1	83	1.5	2	0.8	1	2.2	31	1.1	67	1.2	67	2.3	88	2.3	185	3.6	16	3.6	13,581	2.9	222,661	2.3
Hispanic or Latino	2,734	83.6	544	37.9	4,309	78.7	160	63.5	21	45.7	2,358	86.7	4,115	75.7	1,444	48.7	2,029	53.0	1,984	38.8	128	28.8	165,092	35.8	4,242,213	44.6

Source: U.S. Census, 2000.

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Table 2.1.3-4
Study Area Socioeconomic and Housing Characteristics

Demographic	Study Area Census Tracts																						Comparison Areas			
	2947		2961		5754.01		5755		5756		5758.01		5758.02		5758.03		5759.01		5759.02		5760		City of Long Beach		County of Los Angeles	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Total Population over 16 Years Old	2,222	100.0	1,281	100.0	3,312	100.0	175	100.0	2	100.0	1,607	100.0	3,431	100.0	2,305	100.0	2,681	100.0	4,802	100.0	533	100.0	339,395	100.0	7,122,525	100.0
In Labor Force over 16 Years Old	1,150	51.8	71	5.5	1,777	53.7	105	60.0	2	100.0	763	47.5	1,960	57.1	1,087	47.2	1,699	63.4	2,458	60.2	273	51.2	209,485	61.7	4,312,264	60.5
Per Capita Income	9,622		7,639		6,128		6,992		171,900		7,285		7,100		9,656		15,207		15,323		16,407		19,040		20,683	
Total Poverty-Based Population	3,242	100.0	155	100.0	5,305	100.0	208	100.0	2	100.0	2,737	100.0	5,410	100.0	2,918	100.0	3,817	100.0	5,108	100.0	370	100.0	453,065	100.0	9,349,771	100.0
Individuals below Poverty Level	1,324	40.8	48	31.0%	2,674	50.4	111	53.4	0	0	1,190	43.5	2,723	50.3	1,289	44.2	1,448	37.9	1,704	33.4	81	21.9	103,434	22.8	1,674,599	17.9
Total Families	629	100.0	42	100.0	1,052	100.0	22	100.0	0	100.0	540	100.0	1,165	100.0	487	100.0	841	100.0	945	100.0	17	100.0	100,866	100.0	2,154,311	100.0
Average Family Size	4.2		2.95		4.42		4.06		3.20		4.51		4.23		3.66		3.78		3.18		2.14		3.55		3.61	
Median Family Income	23,179		69,375		19,199		12,115		0		22,667		19,265		20,613		25,262		23,935		12,361		40,002		46,452	
Families below Poverty Level	250	39.7	0	0	498	47.3	17	77.3	0	0	250	46.3	513	44.0	185	38.0	284	33.8	306	32.4	0	0	19,512	19.3	311,226	14.4
Total Households	946	100.0	104	100.0	1,191	100.0	38	100.0	2	100.0	725	100.0	1,419	100.0	1,094	100.0	1,374	100.0	2,614	100.0	286	100.0	163,279	100.0	3,136,279	100.0
Average Household Size	3.39		1.67		4.25		5.09		2.00		4.17		3.65		2.41		2.76		1.95		1.70		2.77		2.98	
Median Household Income	21,914		31,500		19,789		13,750		152,338		23,750		19,349		17,109		25,898		23,170		28,750		37,270		42,189	
Total Housing Units	941	100	93	100	1,189	100	32	100	1	100	655	100	1,479	100	1,077	100	1,375	100	2,618	100	233	100	163,107	100	3,133,774	100
Owner Occupied	139	14.8	93	100.0	70	5.9	0	0.0	0	0.0	80	12.2	132	8.9	156	14.5	465	33.8	418	16.0	25	10.7	66,971	41.1	1,499,694	47.9
Renter Occupied	802	85.2	0	0.0	1,119	94.1	32	100.0	1	100.0	575	87.8	1,347	91.1	921	85.5	910	66.2	2,200	84.0	208	89.3	96,136	58.9	1,634,080	52.1

Source: U.S. Census, 2000.

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Table 2.1.3-5
Study Area Employment Status, Work Location, and Means of Transportation to Work

Demographic	Study Area Census Tracts																						Comparison Areas			
	2947		2961		5754.01		5755		5756		5758.01		5758.02		5758.03		5759.01		5759.02		5760		City of Long Beach		County of Los Angeles	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Employment Status																										
Total Population over 16 in Labor Force	1,150	100.0	71	100.0	1,777	100.0	105	100.0	2	100.0	763	100.0	1,960	100.0	1,087	100.0	1,699	100.0	2,458	100.0	273	100.0	209,485	100.0	4,312,264	100.0
Employed	1,001	87	56	78.9	1,283	72.2	105	100	2	100	649	85.1	1,556	79.4	885	78.7	1,442	84.9	2,183	90.2	266	97.4	189,487	90.6	3,953,415	91.8
Unemployed	149	13	15	21.1	494	27.8	0	0	0	0	114	14.9	404	20.6	232	21.3	257	15.1	236	9.8	7	2.6	19,680	9.4	354,347	8.2
Work Location																										
Work in Residence	458	46.3	0	0.0	434	35.4	91	90.1	2	100.0	121	19.3	543	37.3	272	34.4	506	36.7	805	36.5	106	39.8	61,685	33.4	1,382,500	36.5
Work outside of Residence	531	53.7	48	100.0	792	64.6	10	9.9	0	0.0	506	80.7	914	62.7	518	65.6	871	63.3	1,401	63.5	160	60.2	122,794	66.6	2,402,195	63.5
Transportation to Work																										
Car, Truck, or Van	767	77.6	48	100.0	799	65.2	16	15.8	2	100.0	505	80.5	981	67.3	532	67.3	1,065	77.3	1,565	70.9	224	84.2	159,133	86.3	3,296,964	87.5
Public Transportation	110	11.1	0	0.0	276	22.5	10	9.9	0	0.0	62	9.9	318	21.8	202	25.6	198	14.4	307	13.9	11	4.1	12,260	6.6	254,091	6.7
Walk, Bike, Motorcycle, or Other	108	10.9	0	0.0	124	10.1	75	74.3	0	0.0	53	8.5	139	9.5	48	6.1	81	5.9	305	13.8	31	11.7	7,798	4.2	81,906	2.2
Work at Home	4	0.4	0	0.0	27	2.2	0	0.0	0	0.0	7	1.1	19	1.3	8	1.0	33	2.4	29	1.3	0	0.0	5,288	2.9	134,643	3.6

Source: U.S. Census, 2000.

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2.1.3.1.3 Environmental Consequences

Evaluation Criteria

NEPA requires consideration of social and economic impacts of projects in the preparation of environmental documents. NEPA states that consideration is to be given to qualitative factors and unquantifiable environmental amenities and values, along with economic and technical considerations, in decision making that may affect the following:

- Human-made and natural resources and/or aesthetic values
- Community cohesion and the availability of public facilities and services
- Adverse employment effects and tax and property value losses
- Disruption of desirable community and regional growth

No Action Alternative

Continued operation of the Gerald Desmond Bridge would have no effect on community character. It would not divide or weaken the cohesion of any established communities or affect any community or recreation facilities or services or access to facilities or services.

Construction and Demolition Impacts

<u>North-side Alignment Alternative</u>

Community Facilities and Services. Approximately 150 construction workers would be required to build the North-side Alignment Alternative. It is likely, as is the case with most construction projects in southern California, that the construction workforce would consist of workers from existing regional labor pools. Due to the temporary nature of construction industry jobs, the relatively large regional construction industry, and the fact that construction workers do not typically relocate to near the jobsite, it is unlikely that new construction jobs would lead to increases in local or regional population; however, it should be noted that even if the workforce resulted in a permanent relocation of the workforce to the City of Long Beach, the increase associated with 150 construction workers and their families would not likely result in a measurable increase in demand on local facilities and services or cause a substantial increase in the demand for existing electrical sources or require the development of new sources.

Construction of the North-side Alignment Alternative would not substantially increase demand for public utilities in the Port or region (see Section 2.1.4 [Utilities and Service Systems]). Based on the temporary nature of construction industry jobs, construction of the North-side Alignment Alternative is not anticipated to have a substantial effect on local school enrollments, hospital admissions, or other demand-sensitive facilities or services. Demand-sensitive public services and facilities would not be substantially affected by the small workforce anticipated for construction of the North-side Alignment Alternative.

Demolition of the existing bridge would not occur until after the opening of the new bridge, allowing Ocean Boulevard to remain open to through traffic at all times; however, there would be some temporary closures of lanes and adjacent roads, as well as access changes or restrictions. To minimize delays and inconvenience, a Transportation Management Plan (TMP) identifying alternative routes would be developed. As part of the TMP, portable changeable message signs and advanced warning roadway signs would be used to direct traffic to these alternative routes. Emergency access would be maintained during construction. All affected emergency routes would be identified in the TMP and coordinated with all agencies prior to construction (see Section 2.1.5 [Traffic and Circulation]). Construction of this alternative would not adversely affect existing emergency facilities or services (see Section 2.2.4 [Public Health and Safety]).

The North-side Alignment Alternative would not result in any loss of public parking. The proposed demolition of the Gerald Desmond Bridge would eliminate the existing pedestrian sidewalk. Removal of the sidewalk would not adversely affect pedestrian access to community facilities or services because there are none within the Port areas. Removal of the pedestrian access is discussed in detail in Section 2.1.5 (Traffic and Circulation).

Recreational Amenities. There would be no limitation on access to recreational resources within the harbor during construction of the North-side Alignment Alternative; however, there may be some traffic slowdowns near the project area as a result of heavy equipment movement and material hauling. Recreational boating businesses that use the Back Channel would be notified of any restrictions to the Back Channel well in advance of construction and demolition activities

The North-side Alignment Alternative would not result in an increased use of existing recreational facilities in the area. The North-side Alignment Alternative would not adversely affect recreational opportunities within the project study area (see Section 2.1.1 [Land Use]).

Population. Construction of the North-side Alignment Alternative is located within an area zoned for industrial use, would not result in the creation or elimination of permanent jobs, and would not result in any land use changes that would affect local or regional growth projections.

Housing. Construction of the North-side Alignment Alternative would not result in the removal of any residences or construction of additional residences. The project involves the replacement of an existing bridge in an industrial area, and it would not divide or weaken the cohesion of any established communities. There are no residential neighborhoods within the immediate project vicinity. Residential neighborhoods closest to the project site are found beyond the industrial use area, outside the Port to the north and east. The nearest residential development is at least 0.3-mi (0.5-km) east of the project site on the east side of the Los Angeles River near the Cesar Chavez Elementary School. No impacts to housing would result from construction or demolition activities associated with this alternative.

<u>South-side Alignment Alternative</u>

The South-side Alignment Alternative would essentially be a mirror image of the North-side Alignment Alternative. The potential construction and demolition effects of this alternative on community facilities and services, recreational amenities, population, and housing would be the same as those described under the North-side Alignment Alternative.

<u>Rehabilitation Alternative</u>

Community Facilities and Services. Similar to the North- and South-side Alignment Alternatives, construction workers for the Rehabilitation Alternative would likely be drawn from existing regional labor pools,and would not measurably increase demand on local facilities and services. Construction of this alternative would not cause a substantial increase in the demand on existing electrical sources or require the development of new sources. The proposed bridge rehabilitation would not substantially increase demand on public utilities in the Port or region (see Section 2.1.4 [Utilities and Service Systems]).

The small increase in the number of workers in the Port during construction of this alternative is not anticipated to affect local school enrollments, hospitals admissions, or other demand-sensitive facilities or services. Workers would likely be selected from existing local labor pools. Demand-sensitive public services and facilities would not be affected by this alternative.

During construction of the Rehabilitation Alternative, lane closures for roadway and bridge deck replacement would occur from 7:00 p.m. to 7:00 a.m. Two lanes of traffic would be open in each direction at all times on the bridge. Construction of this alternative would likely not require access changes or restrictions; however, to minimize delays and inconvenience, a TMP would be prepared to identify alternative routes as applicable. As part of the TMP, portable changeable message signs and advanced warning roadway signs would be used to direct traffic if additional lane closures or detour routes would be required. Emergency access would be maintained across the bridge at all times during construction; however, planning for alternative emergency routes would be included in the TMP and coordinated with all agencies prior to construction (see Section 2.1.5 [Traffic and Circulation]). Construction of the Rehabilitation Alternative would not adversely affect existing emergency facilities and services (see Section 2.2.4 [Public Health and Safety]).

Construction of the Rehabilitation Alternative would occur within the existing footprint of the Gerald Desmond Bridge and would not result in any loss of public parking.

Recreational Amenities. There are no recreational amenities within the footprint of the Gerald Desmond Bridge. No recreational amenities would be affected by construction activities associated with this alternative.

Population. Construction of the Rehabilitation Alternative would occur within an area zoned for industrial use and would not result in any land use changes that affect local or regional growth projections.

Housing. Construction of the Rehabilitation Alternative would occur within the footprint of the existing Gerald Desmond Bridge. There is no housing within the existing footprint, and construction of this alternative would have no effect on housing.

Operational Impacts

<u>North-side Alignment Alternative</u>

Operation of the North-side Alignment Alternative would not adversely affect community character or cohesion. This alternative involves the replacement of an existing bridge in an industrial area, and it would not divide or weaken the cohesion of any established communities or affect any community recreation facilities or services, or access to those facilities or services. There are no residential neighborhoods within the immediate project vicinity. Residential neighborhoods closest to the project site are found beyond the industrial use area, outside the Port to the north and east. The nearest residential development or school is located at least 0.3-mi (0.5-km) from the project site. No effect on population or housing would result from operation of this alternative.

South-side Alignment Alternative

The South-side Alignment Alternative would essentially be a mirror image of the North-side Alignment Alternative. The potential operational effects of this alternative on community facilities and service, recreational amenities, population, and housing would be the same as those described under the North-side Alignment Alternative.

Rehabilitation Alternative

Once construction is complete, the Rehabilitation Alternative would operate the same as the No Action Alternative. Operation of the rehabilitated Gerald Desmond Bridge would have no effect on community character or cohesion. It would not divide or weaken the cohesion of any established communities or affect any community or recreation facilities or services or access to community or recreation facilities or services.

2.1.3.1.4 Avoidance, Minimization and/or Mitigation Measures

No measures are required.

2.1.3.2 Relocations

2.1.3.2.1 Regulatory Setting

The Caltrans Relocation Assistance Program (RAP) is based on the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (as amended) and 49 CFR Part 24.

The purpose of the Uniform Relocation Act is to "ensure that persons displaced as a direct result of federal or federally assisted projects are treated fairly, consistently, and equitably" so as not to suffer disproportionately from projects designed for the benefit of the public as a whole [49 CFR 24.1(b)]. Unlike for residential displacees, the Uniform Relocation Act does not require that nonresidential displacees (i.e., businesses, farms, nonprofit organizations) be made whole; thus, they receive fewer benefits (Caltrans, 2001). To qualify for benefits, one must legally occupy the property as an owner or lessee/tenant when negotiations commence or when possession of the property is taken. Benefits are limited to moving and related expenses. The acquisition of replacement business property is not included in the provisions and is the responsibility of the displacee; however, the displacee may qualify for re-establishment payment to cover some of the costs involved in re-establishing their business.

All relocation services and benefits are administered without regard to race, color, national origin, or sex in compliance with Title VI of the Civil Rights Act (42 U.S.C. 2000d, *et seq.*). See Appendix B for a copy of the Caltrans Title VI Policy Statement.

2.1.3.2.2 Affected Environment

The project site is completely surrounded by industrial uses associated with the Port. The Port is located in the southwestern portion of Long Beach, and it is adjacent to the downtown area. The project area is zoned for Port-related industrial. Only heavy industrial operations and associated facilities are located within the project area. Exhibits 2.1.3-2 and 2.1.3-3 provide an aerial view of the project area and identify the companies operating within the construction footprint of the proposed project. No residential neighborhoods or farms are located within the census tract (Census Tract 5756, see Exhibit 2.1.3-1) in which the project site is located.

The Port and industrial development that make up most of the study area are characterized by large areas of cargo container and bulk handling infrastructure. Some of the larger structures adjacent to the project limits are the Tidelands Oil Production Company warehouse (1370 W. Broadway) and the LBGS power plant building north of Ocean Boulevard along the west approach to the Gerald Desmond Bridge. Two large areas at the western end of the project area are vacant or partially vacant, and they are undergoing/completed redevelopment: Pier S north of Ocean Boulevard is a former oil production property, which the Port is proposing to redevelop as a marine cargo terminal, and Pier T was the former Naval Complex, which is now occupied by TTI (Hanjin Shipping Company; see Exhibits 2.1.3-1 and 2.1.3-2).

2.1.3.2.3 Environmental Consequences

Evaluation Criteria

The proposed project may result in adverse effects if it would:

- Result in injurious displacement of people or businesses

No Action Alternative

The No Action Alternative would not result in acquisition of ROW and would not displace any people or businesses. The No Action Alternative would not require relocations.

North-side Alignment Alternative:

Most of the potentially affected businesses are located on lands owned and administered by the Port. The level of impact on the affected businesses could include rearrangement of onsite facilities within existing property boundaries, reconfiguration of access to properties, complete relocation of businesses to other areas within the Port, purchase of properties from private property owners, or termination of leases with affected Port tenants. Table 2.1.3-6 provides a list of businesses and associated features potentially affected by this alternative. Detailed descriptions of potential property effects follow the table.

Table 2.1.3-6
List of Facilities Potentially Affected by North-side Alignment Alternative

No.	Facility Name	Facility Description	Property Ownership	Potentially Affected Features
1	Tidelands Oil Production Co.	Oil production facilities, oil wells, pipelines	COLB Harbor Department	• Gravel lot • Active oil wells (adjacent to the oil storage tank farm) • Aboveground pipelines • “W-strip” Oil Field near Ocean Boulevard and SR 47 • Three active oil wells adjacent to LBGS (between the building and the existing bridge)
2	Pacific Pipeline System, LLC	Oil storage tank farm	Pacific Pipeline System, LLC	• Access road
3	LBGS (NRG Energy)	Power station	Long Beach Generation, LLC	• Access road • Pipelines (pipes are adjacent to fence)
4	SCE	Substation, power lines, and towers	SCE	• High-voltage transmission towers and lines
5	Fireboat Station #20	Fireboat station	COLB Harbor Department	• Air space over garage for fire truck • Air space over main building (1980 Pier D Street) • AC lot
6	Connolly Pacific	Storage yard	L.G. Everist, Inc.	• Gravel parking lot • Gravel lot (material storage) • Driveway and access road • Main office building (1925 Pier D Street) and office parking
7	California United Terminals	Storage yard	COLB Harbor Department	• PCC lot adjacent to terminal gate at northern end of terminal
8	Port Maintenance Yard	Maintenance yard	COLB Harbor Department	• AC lot (material storage) • Buildings (1401 W. Broadway) • 1 active oil well

Table 2.1.3-6
List of Facilities Potentially Affected by North-side Alignment Alternative

No.	Facility Name	Facility Description	Property Ownership	Potentially Affected Features
9	Tidelands Oil Production Co. (Topko Yard)	Warehouse area	COLB Harbor Department	• AC lot (material storage) • Main building (1370 W. Broadway) • Ancillary buildings
10	COLB Harbor Department	Vacant office building	COLB Harbor Department	• AC parking lot
11	THUMS Long Beach Company	Gas processing facility and custody transfer station	COLB Harbor Department	• Aboveground pipelines (adjacent to Pico Avenue) • Access
12	Loren Scale Company, Inc.	Truck scales	COLB Harbor Department	• Main building (249 Pico Avenue) • Truck scale • AC parking lot
13	Quick Stop Commercial Oil and Lube Service	Oil and lube service	COLB Harbor Department	• Main service building (180 Pico Avenue) • AC access road
14	Pacific Energy	Offshore oil processing station	COLB Harbor Department	• Concrete wall and fencing • Gravel lot • Oil storage tank (170 Pico Avenue)
15	Port Petroleum, Inc.	Gas station	COLB Harbor Department	• AC access road • Fuel pumps • Truck scale
16	International Seafarers Center Memorial Maritime Clinic Vacant Lot	Support services, clinic, and office building	COLB Harbor Department	• No impact to International Seafarers Center permanent structure (trailer/sheds and construction impacts) • Memorial Maritime Clinic rear parking lot – Caltrans Maintenance Easement • Vacant lot • AC lot
17	Pacific Energy Resources	Production facility	LACFCD	• Gravel access road • Oil wells • Pipelines
18	TTI	Storage and Office Facilities	U.S. Navy Lease to Port and COLB Harbor Department	• Modified access
19	Weyerhaeuser Company	Lumber yard and storage facility	COLB Harbor Department	• New bridge footings and air space over lumber yard • Storage area during construction and demolition

AC: Asphalt concrete

COLB: City of Long Beach

LACFCD: Los Angeles County Flood Control District

PCC: Portland cement concrete

Source: POLB, 2005d.

The North-side Alignment Alternative would potentially affect 19 properties within the project area (Exhibit 2.1.3-2). Five of these 19 properties are privately owned or owned by other public agencies. Private property owners would be compensated in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act. Property owners would be compensated at fair market value for their property, determined on the basis of the highest and best use. All effects of the proposed project on Port tenants would be resolved based on the terms and conditions of each tenant's agreement with the Port or negotiated with the Port. Discussion and negotiation between the affected businesses and the Port would take place well before the scheduled construction of the bridge to avoid any adverse economic impacts. This typically occurs during the final design phase when more detailed engineering is available.

Estimates of business displacements and acquisition requirements are based on review of preliminary engineering design plans, aerial photographs, and field reviews. Note that the potential ROW impacts described in Table 2.1.3-6 are based on the available preliminary engineering plans. The number of affected properties could change during final design as more detailed engineering is completed. The anticipated acquisition and, as necessary, site access and facility reconfiguration and relocation of potentially affected businesses would not displace a substantial number of businesses, but they may necessitate identification of replacement facilities or land elsewhere within the Port, as applicable.

Where building demolition is required, buildings would be surveyed for asbestos and LBP. Any ACMs would be removed and disposed of in accordance with state and federal guidelines prior to demolition. LBP debris would be disposed of in accordance with regulatory requirements prior to demolition (see Section 2.2.3 [Hazardous Materials/Wastes]).

In areas where the Port would be acquiring private property, the Port hopes to obtain the voluntary sale of these properties by entering into purchase-sales transaction and acquiring the properties for fair market value (an "Early Acquisition Program"). If voluntary sale is not feasible and the Port determines to proceed with condemnation, then the Port would pay fair market value to acquire the properties commensurate with statutory and constitutional requirements. Furthermore, California law requires the Port to provide relocation benefits to the affected private property owners (or their tenants, if appropriate) either as part of an Early Acquisition Program, in the case of voluntary acquisitions, or as required by state law and regulations, in the case of involuntary acquisitions. Under California law and regulations, displaced businesses are entitled to reimbursement of certain actual, reasonable moving expenses pursuant to 25 CCR § 6090.

<u>Potentially Affected Properties: North-side Alignment Alternative</u>

Site No. 1: Tidelands Oil Production Co. facilities would be affected by the proposed bridge footings in areas between the bridge and LBGS and within the "W-Strip" at the location of the new loop ramps. Temporary construction impacts could include modified access to these areas to accommodate construction activities and equipment. Abandoned oil wells within the affected areas would require testing and reabandonment. Several active oil wells and aboveground pipelines would require relocation. Subsequent to construction, limited vertical clearance associated with proposed overhead structures and access for oil extraction and transport within and adjacent to the new loop ramps may restrict future operations in affected areas. Tidelands Oil Production Co. is located on land administered by the Port.

Site No. 2: No ROW would be required from the Pacific Pipeline System, LLC, tank farm; however, a temporary construction easement would be required along the southeast corner of the property. During construction, modified access from the tank farm to/from Pier T Avenue would be required. Access to this facility would be maintained during construction of the proposed project. Subsequent to construction, an easement for bridge maintenance would be required. Pacific Pipeline System, LLC, is located on privately owned land. The Port would enter negotiations with Pacific Pipeline System to address potential effects on access, as well as terms and conditions of the required construction and maintenance easements.

Site No. 3: A sliver of the property, currently occupied by LBGS pipeline facilities, located north of the existing bridge, would be permanently occupied by the proposed bridge footings, and pipeline facilities/utilities would require relocation. Access would be modified the same as discussed for Site No. 2. A construction easement would be required to accommodate construction activities and equipment. The proposed project would also affect LBGS air space, where the elevated bridge

LIST OF FACILITIES POTENTIALLY IMPACTED BY NORTH-SIDE ALIGNMENT ALTERNATIVE			
No.	FACILITY NAME	No.	FACILITY NAME
1	Tidelands Oil Production Co.	11	Thums Long Beach Company
2	Pacific Pipeline System, LLC	12	Loren Scale Company, Inc.
3	Long Beach Generating Station (NRG Energy)	13	Quick Stop Commercial Oil and Lube Service
4	SCE	14	Pacific Energy, LLC.
5	Fireboat Station #20	15	Port Petroleum, Inc.
6	Connolly Pacific	16	International Seafarers Center Memorial Maritime Clinic Vacant Building (Formerly MSRC)
7	California United Terminals		
8	Port of Long Beach Maintenance Yard	17	Pacific Energy Resources
9	Tidelands Oil Production Co. (Topko Yard)	18	Total Terminal International, LLC. (T.T.I.)
10	COLB Harbor Department	19	Weyerhaeuser Company

Note: The colors signify the limits of the potentially impacted properties.

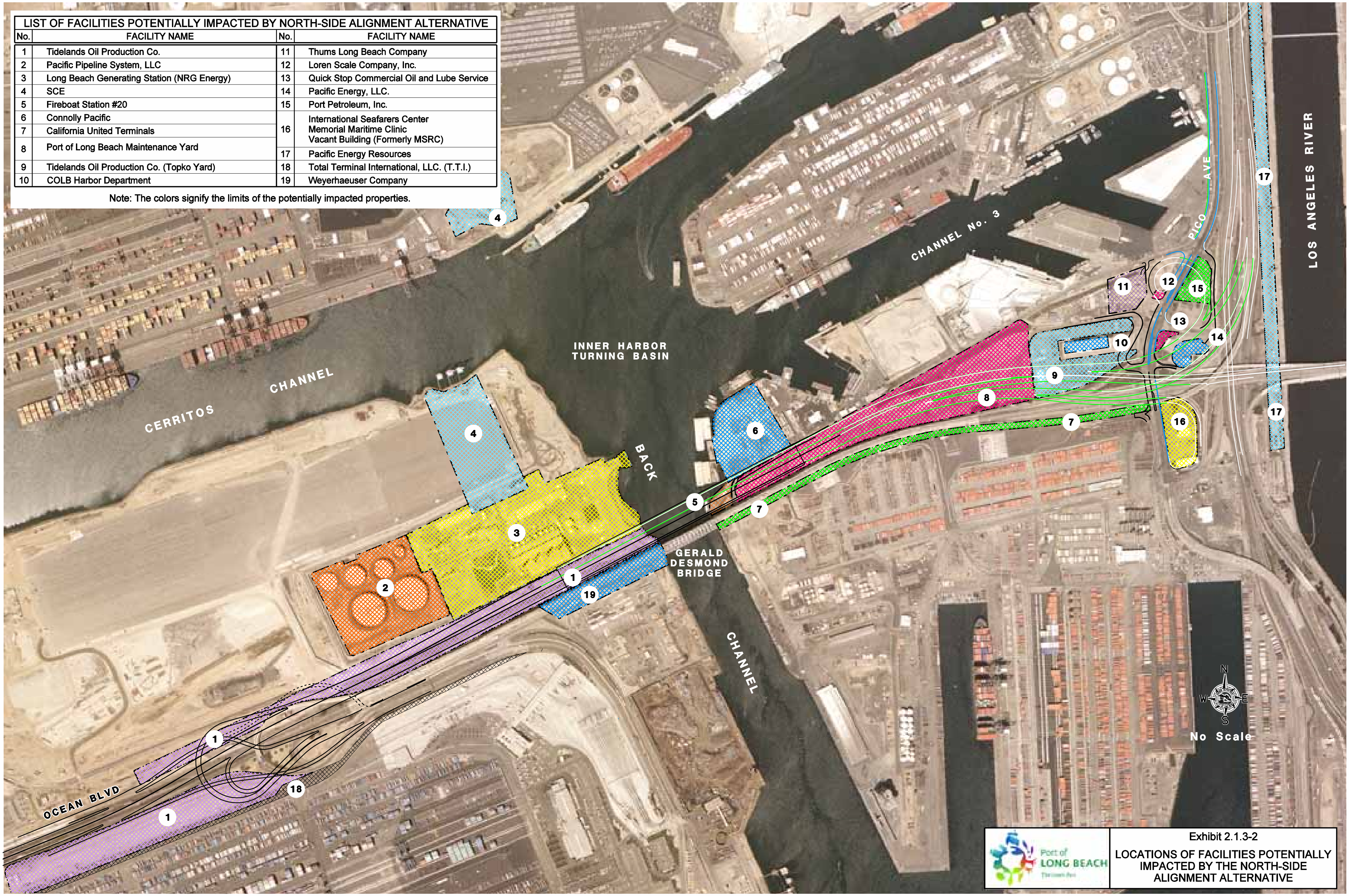

Exhibit 2.1.3-2

LOCATIONS OF FACILITIES POTENTIALLY IMPACTED BY THE NORTH-SIDE ALIGNMENT ALTERNATIVE

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would encroach on the property, requiring an aerial easement. Additionally, an easement would be required for maintenance of the proposed transportation facility. Approximately 1.33 acres (0.54-ha) within the property would be required for the easements. LBGS is located on privately owned land. The Port would enter negotiations with LBGS to address potential effects of pipeline/utility relocation, as well as terms and conditions of the required aerial, construction, footing, and maintenance easements.

Site No. 4: SCE high-voltage transmission lines cross the Cerritos Channel from LBGS. The line elevation currently limits the air draft of vessels transiting to Piers A and S, and it is a potential hazard to navigation. The proposed project includes relocation of the SCE lines for the bridge replacement alternatives. The recommended relocation option would require building new, taller towers adjacent to the existing towers. The new towers would be constructed to increase the transmission line elevation to at least the vertical clearance of the proposed bridge. The existing towers would be left in place (see Section 2.1.8 [Cultural Resources]). Relocation would be completed in accordance with the applicable laws and regulations governing power transmission lines over navigable waters (see Section 2.1.4 [Utilities and Service Systems] and Appendix I for further discussion). SCE towers are privately owned. Site No. 5: The air space above the City of Long Beach Fireboat Station No. 20 would be temporarily affected during construction of the proposed project. The fire truck garage, which is the main building at 1980 Pier D Street, would be protected in place during construction. All essential operations for Fireboat Station No. 20 would be relocated to temporary facilities located approximately 100 ft (30.5 m) south of the Gerald Desmond Bridge during construction. After completion of the proposed project, Fireboat Station No. 20 would be relocated back to its existing location. The temporary relocation would have no effect on its services or response times. Fire Boat Station No. 20 is located on land administered by the Port. Relocation of this facility would be the responsibility of the local lead agency as a separate project development process.

Site No. 6: A temporary construction easement would be required within the Connolly Pacific facility to accommodate construction access. Construction would also temporarily affect the gravel parking lot, gravel lot, driveway, access road, and main office building and parking lot at 1925 Pier D Street. Construction access and proposed bridge footing locations would require demolition/relocation of an office building within the property. The proposed project would require an aerial easement over the Connolly Pacific yard space, along the north side of Ocean Boulevard at 1401 Pier D Street, and maintenance and footing easements. Approximately 0.47-acre (0.19-ha) within the yard would be required for the easements. The Connolly Pacific facility is located on privately owned land. The Port would enter negotiations with L.G. Everest Inc., (property owner) to address the potential effects of the proposed project on the property and facilities.

Site No. 7: The PCC lot adjacent to the terminal gate, located at the northern end of California United Terminal, would be permanently affected by the ramp structures for the hook off-ramp to Pico Avenue. During construction, modified access may be required to accommodate construction activities at this location. Additionally, a temporary construction easement for the area directly south of Ocean Boulevard along the northern boundary of this property would be required to accommodate demolition of the Gerald Desmond Bridge. A bridge maintenance easement would also be required. California United Terminal is located on land administered by the Port.

Site No. 8: The new bridge would occupy a portion of the Port Maintenance Yard, located along the north side of Ocean Boulevard and east of the existing bridge. This would require relocation of the maintenance yard, demolition of existing structures and ancillary buildings, and relocation/abandonment of an active oil well. The Port Maintenance Yard would be demolished as part of the proposed project, and operations would temporarily be moved to an interim site and separately permitted by the Port. Ultimately, the maintenance yard would be co-located with the Administration Building Complex, as identified in the FEIR for the Administration Building and Maintenance Facility Project. Two candidate locations for the temporary relocation of the Maintenance Building are as follows:

- At the proposed location for the new Port Administration Building (669 Harbor Plaza Drive).
- Former Long Beach Ironworks site south of Anaheim Street, west of 9th Street.

The relocation and replacement of this facility would be the responsibility of the Port as a separate project development process being covered under the EIR for the Administration Building and Maintenance Facility Project. The Port Maintenance Yard is located on land administered by the Port.

Site No. 9: The new bridge would occupy a portion of the Tidelands Oil Production Co. Topko Yard and would require the demolition or relocation of the main office and ancillary buildings. During construction, storage areas and operations may be limited or restricted to accommodate construction activities and equipment. The easternmost portions of the site would be permanently affected by the realignment of West Broadway. The Tidelands Oil Production Co. Topko Yard is located on land administered by the Port.

Site No. 10: COLB Harbor Department Property AC lot would be affected by the realignment of West Broadway and would be occupied by portions of the approach structure footings. The vacant building on the property may be demolished to accommodate construction activities and equipment.

Site No. 11: The THUMS Long Beach Company's gas processing facility and custody transfer station would be avoided by the proposed bridge and ramp construction; however, some aboveground pipelines adjacent to Pico Avenue that connect to this facility would be affected by the bridge footings for the new Pico Avenue on-ramp and would require relocation. Additionally, access to the facility would be permanently relocated from Pico Avenue to Pier D Street. THUMS Long Beach Company is located on land administered by the Port.

Site No. 12: The Loren Scale Company, Inc., building at 249 Pico Avenue, the truck scales, and AC parking lot would be permanently affected by the proposed WB Ocean Boulevard on-ramp from Pico Avenue. Demolition/relocation of this facility would be required. Loren Scale Company, Inc., is located on land administered by the Port.

Site No. 13: The Quick Stop Commercial Oil and Lube Service station would experience temporary construction-related and permanent effects due to its proximity to the proposed bridge footings. The main service building, located at 180 Pico Avenue, may require relocation prior to construction of the SB SR 710 connector to WB Ocean Boulevard and the hook on-ramp from Pico Avenue. Quick Stop Commercial Oil and Lube Service is located on land administered by the Port.

Site No. 14: The Pacific Energy, LLC, offshore oil processing station would be affected by the proposed bridge construction. Effects would include falsework for bridge supports and an aerial easement for the proposed overhead structures above the valve assemblies. Some of the pipelines would be affected by the proposed bridge footings and would require relocation. The concrete wall and fencing surrounding the oil storage tank, portions of the gravel lot, and a building would also be affected. The oil storage tank might require relocation. Pacific Energy is located on land administered by the Port.

Site No. 15: Port Petroleum, Inc., located at 260 N. Pico Avenue, consists of a gas station with seven fuel pumps and a truck scale (Interstate Scales) located in the rear (northeast) portion of the lot. All facilities would be permanently affected by the realigned Pico Avenue on-ramp to Ocean Boulevard and would require demolition/ relocation. Port Petroleum, Inc. is located on land administered by the Port.

Site No. 16: The International Seafarers Center, Memorial Maritime Clinic, and a vacant building (formerly the Marine Spill Response Corporation [MSRC] office building), currently located inside the hook off-ramp to Pico Avenue from EB Ocean Boulevard, would experience temporary construction-related and permanent effects due to their proximity to the off-ramp. Construction-related effects would require the partial and/or full relocation/demolition of several existing trailers/ sheds located on the north portion of the lot. The vacant building located at 190 S. Pico Avenue and the metal storage containers to the rear portion of the lot (west side of the SR 710 ramp) are anticipated to be directly affected by the hook off-ramp. The Memorial Maritime Clinic rear parking lot would be closer to the west side of the hook ramp. There would be no effect on the permanent structures of the International Seafarers Center main building at 120 S. Pico Avenue. A Caltrans maintenance easement would be required in a portion of the rear parking area for the Memorial Maritime Clinic building at 150 S. Pico Avenue. The International Seafarers Center, Memorial Maritime Clinic, and vacant building are located on lands administered by the Port.

Site No. 17: Pacific Energy Resources' facilities may be affected by proposed improvements to the NB Harbor Scenic Drive and SR 710. Potential effects on this parcel could include modifications to the access/service roads during construction; however, access to the site would be maintained during construction. Additionally, some relocation of existing facilities may be required. Pacific Energy Resources is on land owned by LACFCD.

Site No. 18: The TTI terminal would be temporarily affected by a proposed construction easement along the northern boundary of the site in the area containing the entry gate. This may require minor modification of access within the site during construction, but it would not require relocation of the gate. TTI is located on land administered by the Port.

Site No. 19: Weyerhaeuser Company, located south of the existing bridge adjacent to the Back Channel, would be affected by proposed bridge footings and aerial easement requirements. Temporary construction and permanent maintenance easements within the yard would be required during demolition of the Gerald Desmond Bridge and subsequent to construction of the new bridge. Weyerhaeuser Company is located on land administered by the Port.

South-side Alignment Alternative

Most of the businesses potentially affected by the South-side Alignment Alternative are also located on lands administered by the Port. The level of impact on the affected businesses include rearrangement of onsite facilities within existing property boundaries, reconfiguration of access to properties, complete relocation of businesses to other areas within the Port, purchase of properties from private property owners, or termination of leases with affected Port tenants. Table 2.1.3-7 provides a list of businesses and associated features potentially affected by this alternative.

The South-side Alignment Alternative would potentially affect 16 properties within the project area (Exhibit 2.1.3-3). Similar to the North-side Alignment Alternative, potential effects on Port tenants and private property owners were considered. Potential ROW effects are described in Table 2.1.3-7, and detailed descriptions follow the table. Anticipated acquisition and, as necessary, site access and facility reconfiguration and relocation of potentially affected businesses would not displace a substantial number of businesses, but it may necessitate identification of replacement facilities or land elsewhere within the Port as applicable. Where building demolition is required, buildings would be surveyed for asbestos and LBP. Any ACMs would be removed and disposed of in accordance with state and federal guidelines prior to demolition. LBP debris would be disposed of in accordance with regulatory requirements prior to demolition (see Section 2.2.3 [Hazardous Materials/Wastes]).

Table 2.1.3-7
List of Facilities Potentially Affected by South-side Alignment Alternative

No.	Facility Name	Facility Description	Property Ownership	Potentially Impacted Features
1	Tidelands Oil Production Co.	Oil production facilities, oil wells, pipelines	COLB Harbor Department	• Gravel lot • Active and abandoned oil wells • Aboveground pipelines • “W-strip” Oil Field near Ocean Boulevard and SR 47
4	SCE	Substation, power cables, and towers	SCE	• High-voltage transmission towers and lines
5	Fireboat Station #20	Fireboat station	COLB Harbor Department	• Air space over garage for fire truck • Air space over main building (1980 Pier D Street) • AC lot
7	California United Terminals	Storage yard	COLB Harbor Department	• Entrance and exit gates • Radiation detection area • Storage areas • Buildings
8	Port Maintenance Yard	Maintenance yard	COLB Harbor Department	• Property access

Table 2.1.3-7
List of Facilities Potentially Affected by South-side Alignment Alternative

No.	Facility Name	Facility Description	Property Ownership	Potentially Impacted Features
9	Tidelands Oil Production Co. (Topko Yard)	Warehouse area	COLB Harbor Department	• AC lot (material storage) • Storage sheds
10	COLB Harbor Department	Vacant office building	COLB Harbor Department	• AC parking lot • Site access
11	THUMS Long Beach Company	Gas processing facility and custody transfer station	COLB Harbor Department	• Aboveground pipelines (adjacent to Pico Avenue) • Dirt lot • Access
12	Loren Scale Company, Inc.	Truck scales	COLB Harbor Department	• Main building (249 Pico Avenue) • Truck scale • AC parking lot
13	Quick Stop Commercial Oil and Lube Service	Oil and lube service	COLB Harbor Department	• Main service building (180 Pico Avenue) • AC access road
14	Pacific Energy	Offshore oil processing station	COLB Harbor Department	• Concrete wall and fencing • Gravel lot • Oil storage tank (170 Pico Avenue)
15	Port Petroleum, Inc.	Gas station	COLB Harbor Department	• AC access road • Fuel pumps • Truck scale
16	International Seafarers Center Memorial Maritime Clinic Vacant Lot	Support services, clinic, and office building	COLB Harbor Department	• No impact to International Seafarers Center permanent structure (trailer/sheds and construction impacts) • Memorial Maritime Clinic rear parking lot – Caltrans Maintenance Easement • Vacant lot • AC lot
17	Pacific Energy Resources	Production facility	LACFCD	• Gravel access road • Oil wells • Pipelines
18	TTI	Storage and Office Facilities	U.S. Navy Lease to Port and City of Long Beach Harbor Department	• Property access • Gates • Storage area • Weight readers • Administrative building
19	Weyerhaeuser Company	Lumber yard and storage facility	COLB Harbor Department	• Storage area

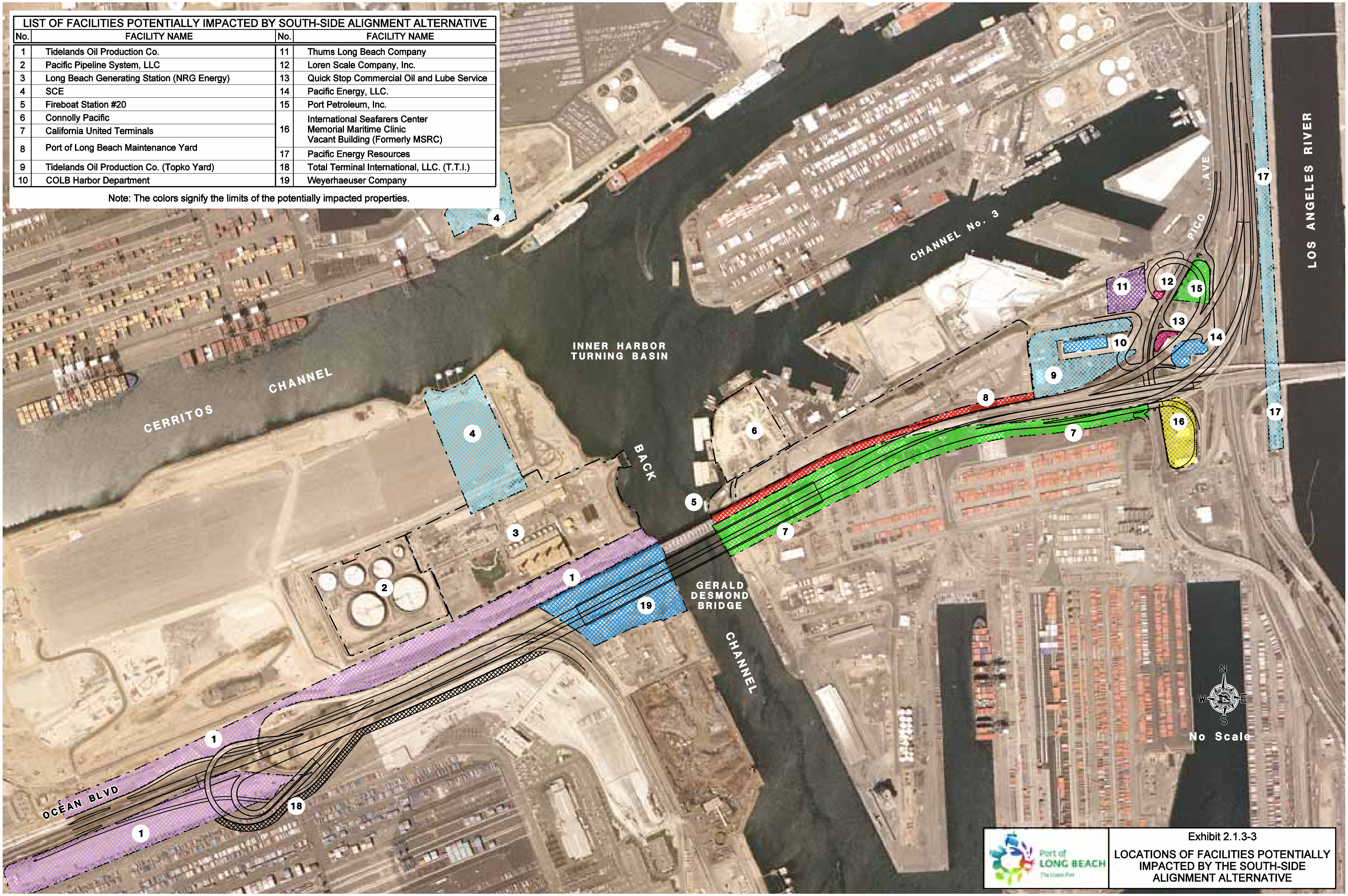
AC: Asphalt concrete

COLB: City of Long Beach

LACFCD: Los Angeles County Flood Control District

PCC: Portland cement concrete

Source: POLB, 2005d.



LIST OF FACILITIES POTENTIALLY IMPACTED BY SOUTH-SIDE ALIGNMENT ALTERNATIVE

No.	FACILITY NAME	No.	FACILITY NAME
1	Tidelands Oil Production Co.	11	Thums Long Beach Company
2	Pacific Pipeline System, LLC	12	Loren Scale Company, Inc.
3	Long Beach Generating Station (NRG Energy)	13	Quick Stop Commercial Oil and Lube Service
4	SCE	14	Pacific Energy, LLC.
5	Fireboat Station #20	15	Port Petroleum, Inc.
6	Connolly Pacific	16	International Seafarers Center Memorial Maritime Clinic Vacant Building (Formerly MSRC)
7	California United Terminals		
8	Port of Long Beach Maintenance Yard	17	Pacific Energy Resources
9	Tidelands Oil Production Co. (Topko Yard)	18	Total Terminal International, LLC. (T.T.I.)
10	COLB Harbor Department	19	Weyerhaeuser Company

Note: The colors signify the limits of the potentially impacted properties.

Exhibit 2.1.3-3

LOCATIONS OF FACILITIES POTENTIALLY IMPACTED BY THE SOUTH-SIDE ALIGNMENT ALTERNATIVE

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Potentially Affected Properties: South-side Alignment Alternative

Construction of the South-side Alignment would have no effect on sites 2, 3, or 6, which are affected by the North-side Alignment Alternative. Similar construction/demolition effects, as described under the North-side Alignment Alternative, are anticipated for construction of the South-side Alignment Alternative at the western end of site 1 and for sites 4, 5, 10, 11, 12, 13, 14 15, 16, and 17. This alternative would also potentially result in construction/demolition effects on the properties discussed below.

Site No. 1: A construction easement within Tidelands Oil Production Co. for the area between the Gerald Desmond Bridge and LBGS would be required during bridge demolition. Effects on the "W-strip" at the western end of the project would be the same as discussed under the North-side Alignment Alternative. Tidelands Oil Production Co. is located on land administered by the Port.

Site No. 7: For the California United Terminal (Piers D and E), the South-side Alignment Alternative would likely result in restricted use and modified access during construction and reconfiguration of operations subsequent to construction. Effects on operations would require relocation of the Pier E gate and reconfiguration of the following elements: entrance and exit roadways, inbound OCR, receiving gate lanes with pedestals, scales cameras and queuing area, trouble resolution building with parking area, outbound primary RPM and OCR, outbound secondary RPM, exit gate lanes with pedestals and cameras, and associated underground electrical, communication, and pavement markings/barriers. It is estimated that the reconfiguration on Piers D and E would cost approximately $10.0 million. The California United Terminal is located on land administered by the Port.

Site No. 8: A construction easement within the Port Maintenance Yard along the alignment of the Gerald Desmond Bridge may be required during bridge demolition. Access to the yard from West Broadway and along an unnamed road to the south of the property would likely be closed/ modified during bridge demolition. At this time, building demolition within the Port Maintenance Yard is not anticipated. The Port Maintenance Yard is located on land administered by the Port.

Site No. 9: A construction easement would be required along the southern property boundary of the Tidelands Oil Production Co. adjacent to the Gerald Desmond Bridge within the Topko Yard to accommodate construction and demolition activities. These activities would likely require the relocation/demolition of several small storage buildings within this area. Footing, aerial, and maintenance easements would also be required within the same areas. The easternmost portions of the site would be permanently affected by the realignment of West Broadway. The Tidelands Oil Production Co. Topko Yard is located on land administered by the Port.

Site No. 18: For TTI (Pier T), the South-side Alignment Alternative would likely result in restricted use and modified access during construction and reconfiguration of operations subsequent to construction. Effects on operations would require reconfiguration of Pier T resulting in the permanent loss of 2.4 acres (1-ha) within the TTI terminal storage facility currently used for Reefer storage. Additionally, reconfiguration on Pier T would require reconfiguration of the following elements: relocation of a portion of the main gate canopy, driver's service building and trouble parking, steel high-mast light poles, chassis storage, and associated utilities, barriers, and pavement markings. It is estimated that the reconfiguration on Pier T would cost approximately $10.0 million. The South-side Alignment Alternative would also permanently reduce leasable Port acreage by approximately 2.4 acres (1-ha). The estimated present value of lost Port lease revenue would be $7.0 million over a typical 20-year lease. TTI is located on land administered by the Port.

Site No. 19: Weyerhaeuser Company storage space would be affected by the South-side Alignment Alternative due to restricted access resulting from the proposed alignment and footings and required aerial, construction, and maintenance easements. Operations at this facility would also be temporarily affected by construction and demolition access and easement requirements. If reconfiguration of Weyerhaeuser Company operations during construction or for long-term operation is not feasible, then total relocation of Weyerhaeuser Company operations would be required. The Weyerhaeuser Company is located on land administered by the Port.

Rehabilitation Alternative

This alternative would require improvements to the existing bridge and roadway structures only. Construction easements would be required on all properties adjacent to the existing bridge to provide access to column and footing locations. Additionally, this alternative would utilize similar areas for construction storage and staging areas identified for the North- and South-side Alignment

Alternatives. This alternative would not have any substantial effects on Port tenants or privately owned businesses. This alternative would not result in any permanent changes to facilities or facility operations within the project area.

2.1.3.2.4 Avoidance, Minimization and/or Mitigation Measures

No measures are required.

2.1.3.3 Environmental Justice

Over the last two decades, public awareness and concern has increased due to evidence that low-income and minority communities often suffer disproportionately from exposure to unhealthy environmental conditions. Key concerns for the environmental justice movement include exposure to lead, hazardous materials in the workplace, noise and air pollution, and location of industry and infrastructure within in these communities. In response, Executive Order (EO) 12898 was issued to raise awareness and bring environmental justice issues into public policy.

2.1.3.3.1 Regulatory Setting

Federal

All projects involving a federal action (funding, permit, or land) must comply with EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* signed by President Clinton on February 11, 1994. This Executive Order directs federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law.

EO 12898 does not mandate special mitigation measures for environmental justice impacts; however, the Presidential Memorandum accompanying the Executive Order does direct federal agencies to include measures to mitigate disproportionately high and adverse environmental effects of proposed federal actions on minority and/or low-income populations. Federal agencies are also required to give affected communities opportunities to provide input into the NEPA process, including identification of mitigation measures.

EO 12898 focused attention on Title VI of the Civil Rights Act of 1964, which is a policy of the United States that prevents discrimination on the grounds of race, color, or national origin in connection with programs and activities receiving federal financial assistance, by providing that "each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

All considerations under Title VI of the Civil Rights Act of 1964 and related statutes have also been included in this project. The Caltrans commitment to upholding the mandates of Title VI is evidenced by its Title VI Policy Statement, signed by the Director, which can be found in Appendix B of this document.

<u>Department of Transportation Order 5610.2</u>

In accordance with EO 12898, in April 1997 the U.S Department of Transportation (DOT) issued DOT Order 5610.2 to Address Environmental Justice in Minority Populations and Low-Income Populations. The order generally describes the process for incorporating environmental justice principles into all DOT programs, policies, and activities, and it instructs each DOT agency to develop specific procedures to incorporate the goals of the DOT and Executive Orders with the programs, policies, and activities that they administer or implement.

<u>FHWA Order 6640.23</u>

As directed in DOT Order 5610.2, in December 1998 FHWA issued Order 6640.23 "FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." This Order establishes policies and procedures for FHWA to use in complying with EO 12898.

FHWA's environmental justice policy is dedicated to three fundamental principles (FHWA, 2000):

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations
- To ensure full and fair participation by all potentially affected communities in the transportation decision-making process
- To prevent denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations

<u>Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users</u>

Enacted in 2005, SAFETEA-LU placed additional emphasis on environmental stewardship as a part of metropolitan and statewide transportation planning. This strengthens the linkages between planning and environmental protection and creates opportunities to examine the potential for environmental justice issues early on and throughout the project development process.

Federal-Aid Highway Act of 1970

This law established that agencies must assure that the adverse economic, social, and environmental effects of a federally supported highway project have been fully considered during project development, and final decisions on the project are made in the best overall public interest, taking into consideration the need for fast, safe, and efficient transportation; public services; and the costs of eliminating or minimizing such adverse effects.

Executive Order 13166 – Improving Access to Services for Persons with Limited English Proficiency

EO 13166, signed by President Clinton in August 2000, requires federal agencies to "develop a system by which limited-English proficiency persons can meaningfully access…[federal] services [including participation in the project planning process] without unduly burdening the fundamental mission of the agency." Federal agency response to this order has included the provision for oral language assistance, translating vital documents in languages other than English, and training staff to serve non-English speakers. As it applies to the proposed project, the Executive Order requires that written materials and oral presentations prepared for public dissemination be made available to limited-English speakers and readers.

State and Local

Environmental justice, as it pertains to EO 12898 and the Gerald Desmond Bridge Replacement Project, is a federal requirement as implemented by Caltrans and FHWA as the lead federal agency for the project; however the State of California also recognizes the concepts of environmental justice through the California Government Code Section 65040.12, which defines environmental justice slightly differently as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws and policies." While there is no requirement under CEQA to address environmental justice, a few pieces of state legislation have been signed into law since 1999 that address the topic. Legislative and executive actions relating to environmental justice in California have largely been procedural, including, but not limited to, formation of environmental justice advisory committees and assigning coordinating roles and responsibilities to the Governor's Office of Planning and Research and the California Environmental Protection Agency (Cal-EPA). Although there is no specific state law requiring the Port to assess environmental justice issues, Port projects may trigger the jurisdiction of two state agencies, California State Lands Commission (CSLC) and California Air Resources Board (CARB), which have adopted environmental justice review requirements consistent with the California Government Code Section.

The CSLC adopted an Environmental Justice Policy on October 1, 2002. In its policy, the CSLC pledges to continue and enhance its processes, decisions, and programs with environmental justice as an essential consideration. The policy also cites the definition of environmental justice in state law and points out that this definition is consistent with the Public Trust Doctrine principle that the management of trust lands is for the benefit of all of the people. To date, the CSLC has not issued any guidance to implement the policy, although environmental justice is discussed in CSLC environmental documents.

CARB was one of the first state entities to adopt an environmental justice policy (CARB, 2007e). CARB has taken various steps to implement the policy, such as publishing a public participation handbook for agencies in English and Spanish, developing an air quality handbook on land use, and convening a multi-stakeholder environmental justice group to serve as a forum to discuss its environmental justice program.

In 1997, the SCAQMD adopted a set of guiding principles of environmental justice to ensure environmental equity. The principles address, for example, the right of residents to live and work in an environment of clean air free of airborne health threats; the obligation of government to protect the public health; the right of public and private sectors to be informed about scientific findings concerning hazardous and toxic emission levels; and other principles.

The City of Long Beach has not adopted policies related to environmental justice.

2.1.3.3.2 Affected Environment

After consideration of potential effects associated with construction and operation of the proposed project, as discussed in Chapter 2 of this document, the study area for considering environmental justice is the same as previously described in Section 2.1.3.1 (see Exhibit 2.1.3-1).

The study area (i.e., affected community) is centered on the project corridor and extends along Ocean Boulevard from near the SR 47 interchange to Pine Street in the City of Long Beach, and also north along SR 710 (see Section 2.1.5). Race and income data from the 2000 U.S. Census for the affected community were previously discussed in Section 2.1.3.1. Pertinent information regarding environmental justice populations are summarized below.

The project site is located within the Port of Long Beach and is surrounded by industrial land uses associated with the Ports. No residential neighborhoods or communities are present within the census tract in which the project site is located (Census Tract 5756).

The communities outside of the Port area include the City of Long Beach and a portion of the community of Wilmington (located within the City of Los Angeles). All other areas within the study area are within the Ports of Long Beach and Los Angeles. The racial and ethnic composition of the affected community is shown in Table 2.1.3-3. The population of the study area census tracts is characterized as a predominantly Hispanic and Latino community, comprising 64 percent of the total population within the affected community. The overall makeup of the affected community is 85.6 percent minority. This compares with 66.9 percent and 68.9 percent for the City of Long Beach and County of Los Angeles, respectively.

Income and poverty data are shown in Table 2.1.3-4. When comparing the median incomes, the affected community has lower median family and household incomes and higher percentages of families and individuals below the poverty level than the City of Long Beach and County of Los Angeles. Considering the 2000 U.S. Census data for race and economic characteristics of the study area, it appears that the minority and low-income populations are in readily identifiable groups rather than dispersed pockets within the study area. Low-income and minority populations within the study area census tracts are considered relatively homogenous, and the affected community as a whole is considered both a low-income and minority population for the purpose of this environmental justice discussion.

The proposed project is a transportation project near the Ports of Long Beach and Los Angeles, which would reduce congestion and enhance goods movement within the region. Thus, the reference community, which consists of the population that will benefit from the proposed project, is the southern California region. The reference community will be used as a comparison population in determining if potential project effects are disproportionately high and adverse on the affected community when considering both the project effects and benefits.

2.1.3.3.3 Environmental Consequences

Evaluation Criteria

EO 12898 requires federal agencies to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations. Caltrans, through the FHWA NEPA delegation process, is the lead federal agency for the project. This environmental justice analysis has been prepared in accordance with the applicable guidance for addressing environmental justice. Consistent with FHWA policy and guidance, the environmental justice analysis will be based on the following:

- Potential adverse effects of the proposed project associated with construction and operation of the proposed project; and
- Disproportionately high and adverse effects on minority and low-income populations

The definition of “low-income,” “minority,” “disproportionately high and adverse effect,”, “low income population,” and “minority population” for this environmental justice assessment are per FHWA Policy 6640.23 (FHWA, 1998) and are as follows:

- “Low-income” means a household income at or below the Department of Human Health Services poverty guidelines;
- “Minority” means a person who is:
  - Black (having origins in any of the black racial groups of Africa);
  - Hispanic (of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);
  - Asian American (having origins in any of the original people of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); or
  - American Indian or Alaskan Native (having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition).

- "Disproportionately high and adverse effect on minority and low-income populations" means an adverse effect that:
  - Is predominantly borne by a minority population and/or low-income population; or
  - Will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the non-minority population and/or non-low-income population.
- "Low-income population" means any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons who would be similarly affected by a proposed FHWA program, policy or activity.
- "Minority population" means any readily identifiable group of minority persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons who would be similarly affected by a proposed FHWA program, policy or activity.

Methodology

The potential adverse effects associated with the North- and South-side Alignment Alternatives (Bridge Replacement Alternatives) and the Rehabilitation Alternative associated with construction and operation of the proposed project are discussed in Chapter 2. As applicable and where feasible, Chapter 2 also includes avoidance, minimization, and/or mitigation measures to avoid and/or minimize potential adverse project effects on resources affected by the construction and operation of the proposed project.

For the proposed project, no distinct pockets or areas of low-income or minority populations were identified. The entire affected community is considered a low-income and minority population for the purpose of the environmental justice assessment; therefore, to the extent that adverse effects would be localized, resulting from either the construction or operation of the proposed project, they would be borne predominantly by a minority and low-income population. Based upon results of the impact analyses, and as described below, such localized effects would be temporary and confined to short-term construction activities. Where the project effects have been reduced to a level that is less than adverse, there is, by definition, no potential for the effect to be considered disproportionately high and adverse, whether it be on minority or low-income populations or the general population. Thus, only potentially unavoidable adverse effects (i.e., those that remain potentially adverse after implementation of avoidance/minimization and or mitigation measures) would have the potential to be considered to have a disproportionately high and adverse effect on minority or low-income populations. This environmental justice analysis considers all potentially unavoidable adverse effects on the affected population, and the potential to result in disproportionately high and adverse effects on minority and low-income populations when considered together with the benefits of the proposed project.

This section also summarizes the planned public outreach, focusing on efforts to provide information and meaningful opportunities for participation for potentially affected minority and low-income populations. Chapter 4 discusses the project coordination with the interested parties to date.

No Action Alternative

The Gerald Desmond Bridge was constructed in 1966. The Gerald Desmond Bridge was also constructed prior to the issuance of EO 12898; therefore, its requirements were not considered within the scope of an environmental justice evaluation. However, with the No Action Alternative, the transportation facility would continue to result in traffic congestion, as well as potential for increased emergency response times. Surface runoff from the transportation facilities would continue to enter Long Beach Harbor without treatment, potentially contributing to water quality impairment. Lack of shoulders and capacity on the bridge would continue to have increased potential for accidents resulting in releases of hazardous substances into the environment; therefore, potential effects associated with the No Action Alternative could affect all communities within the study area.

Summary of Unavoidable Adverse Effects: Bridge Replacement Alternatives

<u>Traffic and Circulation</u>

The unavoidable adverse effects on traffic and circulation and minimization/mitigation measures are summarized below (see Section 2.1.5 for further discussion). Additionally, the proposed mitigation measures would be considered and implemented as part of the TMP required for the project. Prior to construction, the TMP would be submitted to the Port and Caltrans for approval. The TMP, at a minimum, would include detour routes, flagmen, traffic controls, signing, and traffic lane closure scheduling to minimize impacts. Unavoidable adverse traffic and circulation effects summarized below are located within the Port planning area on roadways that are primarily used to provide local and regional access to facilities and roadways within the Ports (intersection of Pico Avenue, Pier B Street, and 9th Street; intersection of Pico Avenue and Pier D Street; WB Ocean Boulevard between the Horseshoe Ramps and the Terminal Island Freeway interchange; and the north and south intersections of the Ocean Boulevard ramps and the Terminal Island Freeway). Adverse traffic and circulation effects at these locations would be highly localized; therefore, they would have little effect on the adjacent community. As previously discussed in Section 2.1.3.1, most of the residences are located north of Anaheim Street and east of the Los Angeles River. Persons within the affected community would be able to continue to access the City of Long Beach or the regional transportation system (i.e., SR 710 and SR 47) via Ocean Boulevard or Pacific Coast Highway.

- A temporary adverse traffic effect attributable to the Bridge Replacement Alternatives would occur at the Pico Avenue and Pier B Street/9th Street intersection during construction Stages 3 and 4.

TC-1 Prior to the start of construction Stages 3 and 4, the following improvements will be made to the intersection of Pico Avenue, Pier B Street, and 9th Street to mitigate the project's temporary adverse effect during construction at that intersection during Stages 3 and 4: remove NB-SB split-signal phasing; restripe NB through lane to a NB left-turn lane; widen SB approach and provide two (2) left-turn lanes and one (1) through lane; and continue two (2) on-ramp lanes to NB SR 710.

- A temporary adverse traffic effect attributable to the Bridge Replacement Alternatives would occur at the Pico Avenue and Pier D Street intersection during construction Stages 2, 3, and 4.

TC-2 Prior to the start of construction Stage 2, a traffic signal will be installed at the intersection of Pico Avenue and Pier D Street to mitigate the project's temporary adverse effect during construction at that intersection during Stages 2, 3, and 4. The traffic signal will be permanent and will not be removed after completion of construction of a Bridge Replacement Alternative.

TC-3 During the design phase of the project, and after approval of the TMP, the Port shall identify those intersections requiring temporary signalization and shall implement the signalization.

- A short-term temporary adverse traffic condition effect attributable to the Bridge Replacement Alternatives would occur on WB Ocean Boulevard between the Horseshoe Ramps and the Terminal Island Freeway interchange.

  No feasible measures to minimize traffic effects at WB Ocean Boulevard between the Horseshoe Ramps and the Terminal Island Freeway interchange have been identified; however, construction of the SR 47 Flyover as part of the SR 47 project would eliminate the temporary adverse traffic conditions effect.

- A temporary adverse traffic effect has been identified that would result from construction of the proposed Bridge Replacement Alternatives at the Ocean Boulevard and Terminal Island Freeway interchange.

  The two intersections of the Ocean Boulevard ramps (north and south) and the Terminal Island Freeway would have temporary unavoidable adverse effects for 3 years, which is the approximate combined duration of construction Stages 2, 3, and 4 of either of the proposed Bridge Replacement Alternatives.

<u>Air Quality</u>

The unavoidable adverse air quality effects and associated minimization/mitigation measures are summarized below (see Section 2.2.5 [Air Quality] for further discussion). Construction emissions of nitrogen oxides (NO_X) would exceed SCAQMD peak daily regional construction emission thresholds, based on worst-case construction activity scenarios during the 9th month of construction years 1 and 2 and the 3rd month of construction year 3 (see Section 2.2.5 [Air Quality]). The associated construction activities potentially occurring during these construction years (i.e., Phases 1, 2, and 3) are discussed in Section 1.6.1.3. This adverse effect is due to exceedance of the SCAQMD regional peak daily construction emission threshold and is associated with regional air quality. The exceedance would contribute to regional air quality degradation and is independent of sensitive receptors or uses.

Localized NO_X effects due to construction activities would also result in offsite ambient NO_X

concentrations that would exceed SCAQMD thresholds of significance during construction years 2 and 3 at a distance of up to 1,640 ft (500 m) from the construction area. This is based on the SCAQMD localized significance threshold look-up tables for Source Receptor Area Number 4. As discussed in Section 2.2.5, even with incorporation of the mitigation measures summarized below, the exceedance would occur during construction years 2 and 3. Areas with potential receptors within 1,640 ft (500 m) include areas within Census Tracts 5760 and 5759.01, primarily south of west 6th Street and west of Maine Avenue. Sensitive community receptors within these tracts include Cesar Chavez Park and Elementary School, the Golden Shore Marine Reserve, Edison Elementary School, and a few residences.

Emissions of NO_X are mainly associated with exhaust emissions from heavy-duty construction equipment that operate simultaneously onsite. Temporary adverse ambient offsite exceedances would be intermittent over the 12-month period, occur only during the most intense construction activities, and be highly dependent upon construction vehicle mix, location of activities, and prevailing climactic conditions.

Exceedance of the SCAQMD daily operational threshold would occur during the opening year (2015) and would be below the threshold in the horizon year (2030). This is attributed to increased average daily traffic (ADT) within the project corridor for which there is no feasible mitigation. This adverse effect is also due to exceedance of a regulatory threshold associated with regional air quality in the SCAQMD. The exceedance during operation would contribute to regional air quality degradation, and is independent of sensitive receptors or uses.

- Construction emissions associated with the North- and South-Side Alignment Alternatives would exceed SCAQMD NO_X regional and localized thresholds.

AQ-C1 Construction processes shall adhere to all applicable SCAQMD rules and regulations concerning the operation of construction equipment and dust control.

AQ-C2 Construction equipment shall be properly tuned and maintained in accordance with manufacturer's specifications.

AQ-C3 During construction, trucks and vehicles in loading and unloading queues must be kept with their engines off when not in use to reduce vehicle emissions. Construction emissions shall be phased and scheduled to avoid emissions peaks, where feasible, and discontinued during second-stage smog alerts.

AQ-C4 To the extent feasible, use electricity from power poles rather than temporary diesel or gasoline power generators.

AQ-C5 As part of the Port's commitment to promote the Green Port Policy and implement the Clean Air Action Plan (CAAP), proposed project construction would employ all applicable control measures included in the CAAP and relevant clean air technologies. Project heavy-duty construction equipment would use alternative clean fuels, such as ultra-low sulfur or emulsified diesel fuel, or compressed natural gas, with oxidation catalysts

AQ-C6 Construction activities that affect traffic flow on the arterial roadways shall be scheduled to off-peak hours to the extent possible. Additionally, construction trucks shall be directed away from congested streets or sensitive receptor areas.

AQ-C7 During the construction period, provide temporary traffic controls, such as flagger person, and improved signal flow for synchronization to maintain smooth traffic flow shall be provided.

AQ-C8 Trucks used for construction prior to 2015 shall use engines with the lowest certified NO_X emission levels, but not greater than the 2007 NO_X emission standards.

AQ-C9 Where feasible, use construction equipment that shall meet the EPA Tier 4 non-road engine standards. The equipment with Tier 4 engine standards become available starting in year 2012.

AQ-C10 Where feasible, heavy-duty diesel-fueled construction equipment shall use diesel oxidation catalyst and selective catalytic reduction system for heavy-duty diesel-fuel construction equipment. This measure would reduce the NO_X and diesel particulate matter (DPM) emissions by 40 percent and 25 percent, respectively.

- Operational emissions associated with the North- and South-Side Alignment Alternatives would exceed SCAQMD NO_X daily operational thresholds.

There is no feasible mitigation. This exceedance is attributed to increased ADT within the project corridor. In the design horizon (2030), operational emissions are expected to be below the SCAQMD operational threshold. The future emissions reduction is due to future year modeling that incorporates a newer vehicle fleet composition and compliance with adopted regulations in the Air Quality Management Plan (AQMP) that are aimed at controlling emissions from mobile sources. Compliance measures include use of alternative or reformulated fuels, retrofit control on engines, and installing or encouraging the use of new engines and cleaner in-use heavy-duty vehicles.

Summary of Unavoidable Adverse Effects: Bridge Rehabilitation Alternative

There are no unavoidable adverse effects associated with the Bridge Rehabilitation Alternative; however, similar to the No Action Alternative, operations under this alternative would result in increased traffic congestion and potentially increased emergency response times due to congestion during major incidents on the roadway or at facilities on Terminal Island. Lack of shoulders and needed capacity on the bridge would continue to have increased potential for accidents, potentially resulting in releases of hazardous substances into the environment. These potential effects would continue to degrade the environment within the affected community.

It should be noted that the design life of the rehabilitation alternative is 30 years versus 100 years for the Bridge Replacement Alternatives. The existing transportation connection between Terminal Island, SR 710, and the City of Long Beach is locally and regionally important. It is reasonable to assume that an alternative similar to one of the Bridge Replacement Alternatives would still be necessary at the end of the design life of the Bridge Rehabilitation Alternative. It is also reasonable to believe that there is a potential for similar adverse effects for a future bridge replacement alternative.

Project Benefits: Bridge Replacement Alternatives

Implementation of either the North- or South-side Alignment Alternatives would have offsetting benefits that would accrue to the adjacent community and the region. The proposed project would result in a seismically superior bridge that could be returned to service shortly after a major seismic event. As discussed in Section 2.1.5 (Traffic and Circulation), the Bridge Replacement Alternatives are expected to result in some local redistribution of traffic as Port and regional traffic modify their travel paths to take advantage of the congestion-relief benefits of the Bridge Replacement Alternatives. This redistribution would most likely occur from parallel roadways north of the Ports, such as Anaheim Street, Pacific Coast Highway, and Willow Street. Some trips that would otherwise seek local street routes may use the new bridge, thereby acting to improve local circulation in the area. In addition, all transportation users would be afforded a safer and more reliable bridge. Other potential benefits would include reduced regional congestion and improved air quality; surface water runoff treatment prior to being released into the Long Beach Harbor; and shoulders and additional capacity to enhance safety and minimize emergency response times and enhanced safety for workers and ships.

Project Benefits: Bridge Rehabilitation Alternative

Implementation of the Bridge Rehabilitation Alternative would provide a seismically safe bridge that would minimize the potential for loss of life during a major seismic event; however, it would likely be condemned and require replacement.

Potential Disproportionately High and Adverse Effects

When considering the potential for unavoidable adverse effects to also constitute disproportionately high and adverse effects on minority and low-income populations, two factors must be considered: (1) whether the effects of the project are predominantly borne by a minority population; or (2) whether the effects of the project are appreciably more severe or greater in magnitude on minority and low-income populations compared to the effect on non-minority and low-income populations.

The first consideration above would be the most appropriate for application to the proposed project, because the potential project effects are not substantially different in severity or magnitude than other past or present transportation projects within the region, and because they would be distributed relatively uniformly across the adjacent community, including areas of minority and low-income residents, as well as nearby residents of non-minority and/or low-income status.

The adverse effects that would occur, and which are largely confined to portions of the construction period, could be considered, at first observation, to be predominantly borne by nearby minority and/or low-income residents, because of their higher proportion of the nearby resident population; however, when considering these effects, potential offsetting benefits of the proposed project must also be considered. A brief summary of the comparison of both sets of factors is as follows:

Traffic and Circulation

- Locations of potentially unavoidable adverse traffic effects previously discussed are all located within industrial areas and the port planning area. These locations are primarily used by Port and regional traffic to access the Ports and regional transportation facilities. All motorists using these intersections would be affected during the construction period. Adverse effects on traffic and circulation would therefore not be disproportionately high and adverse on minority or low-income populations. Moreover, subsequent to construction, the affected community would benefit from the potential reduced congestion associated with redistribution of traffic from arterials within the community to the new bridge.

Air Quality:

- The unavoidable adverse air quality effects associated with exceedances of SCAQMD daily construction and operational thresholds, in addition to being a temporary condition, would occur at a regional scale; therefore, they are not associated with the presence of sensitive receptors or uses. The effects of the exceedances are regional in nature and all residents of the South Coast Air Basin (SCAB) would experience similar effects; therefore, the exceedances would not be considered a disproportionately high and adverse effect on low-income or minority populations within the affected community.
- Temporary adverse ambient offsite exceedances could occur up to 1,640 ft (500 m) from the project site during the most intense construction activities; however, these exceedances would be intermittent. Project-related NO_X concentrations resulting from construction would be similar to those expected with any similar large-scale construction project in the SCAB. In addition, minority and non-minority and low-income and non-low-income residents living adjacent would be equally affected. A full range of mitigation measures is being implemented to reduce the emissions as much as practicable, consistent with SCAQMD requirements; therefore, the offsite NO_X exceedances would not be considered to constitute a disproportionately high and adverse effect on minority and low-income populations.

Consistent with the intent of EO 12898 to maximize opportunity for meaningful participation by the affected community during the environmental process, public outreach, public notice, project information, and meetings would be conducted and accommodations made to involve low-income and minority populations, including language translation to persons for which English may be a second language.

Based on the above discussion and analysis, the proposed project alternatives would not cause disproportionately high and adverse effects on minority or low-income populations within the meaning and intent of EO 12898.

Community Outreach and Public Involvement

To date, community outreach and public involvement has included scoping meetings with public agencies and the general public, distribution of notices, presentations, public hearings, and public review and comment on the 2004 Draft EIR/EA described in Chapter 4 (Comments and Coordination). Project coordination to date has also resulted in an extensive distribution list of interested parties, contained in Chapter 6, who will receive copies of the hearing notices and a copy of this revised Draft EIR/EA.

Efforts to provide meaningful opportunities for public participation in the project planning and development process will be ongoing until either the project is approved and constructed or abandoned. Two public hearings are anticipated to occur during the public comment period for this revised Draft EIR/EA. Additional efforts may also include, but are not limited to, community meetings, informational mailings, project Web site information, and news releases to the local media. The overall goal of all project-related community outreach and public involvement activities is to maximize opportunities for meaningful participation by all interested persons within and outside of the affected community by minimizing/eliminating barriers to participation due to economic status, cultural affiliation, or language.

2.1.3.3.4 Avoidance, Minimization and/or Mitigation Measures

All measures summarized above and as discussed in Sections 2.1.5 (Traffic and Circulation) and Section 2.2.5 (Air Quality) would be implemented.

2.1.4 Utilities and Service Systems

This section addresses the potential impacts to public utilities and service systems within the project area as a result of project implementation. Public utilities include electricity, natural gas, water and sewer facilities, storm drains, telephone, oil pipelines and wells, and solid waste disposal. For each of the utilities and service systems discussed, existing infrastructure, levels of service, and capacity are described.

2.1.4.1 Affected Environment

Electricity

SCE currently supplies electricity to the Gerald Desmond Bridge. The need for electrical power is solely associated with lighting on the bridge. In addition to supplying electricity to the bridge, SCE owns several overhead transmission and distribution lines in the project area, including the lines that cross the Cerritos Channel from the LBGS (220-kV, 66-kV, and 12.5-kV). NRG Energy, Inc., owns the LBGS.

Natural Gas

Long Beach Gas and Oil, a division of the City of Long Beach, supplies natural gas in the project area. Several gas distribution pipelines are within the project limits ranging from 3 to 20 in. (76 to 508 millimeters [mm]) in diameter.

Water

The City of Long Beach provides the water supply in the project area. Several water lines run under the bridge and through the project area that measure from 4 to 35.5 in. (101 to 901 mm) in diameter.

Sewer

The City of Long Beach provides sewers and sewer services for the project area. Several existing sewer pipes run under the bridge and within the project limits. These sewer pipes range in diameter from 8 to 24 in. (203 to 609 mm).

Stormwater

Drainage of stormwater is currently accommodated through eight drainage networks that pass through the project area and discharge into various channels.

Telephone

Verizon owns and operates the telephone facilities located within the project area. These facilities run both above and below the ground.

Oil Lines and Wells

Terminal Island has been used as an oil field since the 1930s. Due to its history, numerous active and abandoned oil lines and wells are within the project area. Approximately 125 large and small oil pipelines traverse the project site. Owners and/or operators of these lines include Tidelands, Pacific Energy Resources, British Petroleum (BP) Pipelines North America (formerly Arco), AERA Energy, LLC, THUMS, Chemoil, Oil Operators, Cardinal/Equilon, and Conoco Philips.

Solid Waste

Regional planning for solid waste facilities in the project area is under the jurisdiction of Los Angeles County, which is the local enforcement agency under integrated waste management laws. The County and cities are encouraging source reduction and recycling objectives that meet or exceed the requirements of State Assembly Bill (AB) 939. AB 939 mandates a 50 percent reduction in waste volumes from 1990 levels by the year 2010. In addition, hazardous waste can be land filled or recycled at several facilities throughout the state. Any hazardous waste generated within the study area is managed in accordance with federal and state requirements. The closest municipal solid waste landfill to the project is Chandler’s Landfill, located at 26311 Palos Verdes Drive East, Rolling Hills Estates, California.

2.1.4.2 Environmental Consequences

Evaluation Criteria

The utility issues of concern in this evaluation are disruption of utility supply during construction, increased demand for utility capacity, and comparable increases in capacity from implementing the proposed project. In analyzing the project impacts, the proposed project may result in substantial impacts if it would:

- Require or result in construction of new storm drainage facilities or expansion of existing facilities, the construction of which could cause substantial environmental effects
- Be served by a landfill with insufficient permitted capacity to accommodate the solid waste disposal needs of the project (primarily for demolition of the existing bridge)
- Fail to comply with federal, state, and local statutes and regulations related to solid waste
- Result in determination by the energy providers, which serve or may serve the

project, that there is inadequate capacity to serve the projected demand of the project in addition to the existing commitments of the provider

No Action Alternative

Under the No Action Alternative, there would be no impacts to the existing utilities and service systems because of the existing bridge operation.

Construction Impacts

North-side Alignment Alternative

Impacts associated with construction activities are temporary, lasting only as long as the construction phase. Project construction would include two major activities, including construction of the new bridge and demolition of the existing bridge once the new bridge is completed and placed in service. Possible impacts to the existing utilities systems would result from required utilities system relocation, increase in utility demand, and increase in solid waste volume. Each of these impacts is discussed below:

Utilities Relocation

Electricity. The Gerald Desmond Bridge Replacement project would replace the existing bridge with a 200-ft (61-m) vertical clearance (above MHWL) bridge. This requires the need to address the existing transmission lines that currently cross the Cerritos Channel, located approximately 300-ft (91.4-m) north of the bridge, with an approximate vertical clearance of 153-ft (46.6-m) above the MHWL. The transmission lines would be the only vertical navigation constraint if the new, higher bridge is constructed. For this reason, the proposed project also includes relocating the SCE high-voltage transmission towers and the lines that cross the Cerritos Channel between Piers S and A (see Section 1.6.1.4 [Proposed Demolition and Phasing]).

NRG Energy, Inc., submitted their application for a Harbor Development Permit in November 2006 for the refurbishment of four of the seven gas turbine generators at the existing LBGS. LBGS was taken out of service in January 2005 for lack of a power sales contract. It was later determined that there was a need for a peaking plant to support the extra energy needed during the summer months. In compliance with California Public Utilities Commission (CPUC) General Order 131-D, an analysis was undertaken to explore the different relocation options for the SCE transmission lines that cross the Cerritos Channel between Piers A and S. Option 3 from the Draft Transmission Towers and Lines Relocation Options at the Port of Long Beach (see Appendix I), as discussed below, is the recommended relocation option and will be developed for additional study and coordination with SCE.

Option 3 would construct new towers adjacent to the existing towers on Piers S and A to accommodate a 200-ft (61-m) clearance over the Back Channel. Subsequent to construction of the new towers, all SCE lines (12.5-, 66-, and 220-kV lines) would be relocated to the new towers. The existing towers would be left in place (see Exhibit 2.1.4-1).

Relocating the lines to the new towers at a higher elevation would enable taller ships to traverse the Cerritos Channel. Reducing navigational hazards along the Cerritos Channel would prevent service interruption to ships utilizing the Back Channel. Building the new towers adjacent to the existing towers would not require additional coordination with the SHPO. The SHPO has concurred that by leaving the existing towers in place, the project would not have an adverse effect on the eligible National Register of Historic Places (NRHP) resource (the former Edison Power Plant No. 3 and transmission towers were determined eligible for the NRHP, see Section 2.1.8 [Cultural Resources] for more information); therefore, it would not affect the project schedule.

Construction of the new towers on Piers A and S would require coordination with the tenants at these respective piers. Depending if there are parallel construction activities by these tenants, this may affect the schedule for construction of the new towers.

CPUC General Order 131-D

Since the project potentially involves relocating high voltage transmission lines that are greater than 50-kV, it would be subject to CPUC General Order No. 131-D. This Rule and subsequent sections (Section X [EMF] and XI [Notice]) are applied to the planning and construction of electric generation, transmission/power/distribution line facilities, and substations located in California.

Final determination of the design scenario for relocation of the power lines will require further coordination with SCE and Port tenants of Piers A and S regarding timing for the new tower construction. Through the respective coordination, the relocation of power lines would not result in an adverse effect on the Port Area, its tenants, or the community of Long Beach.

Effects on Port Facilities: NRG Energy, Inc., would be impacted by the bridge construction at the southeast corner of their facility. The crane tower used for construction of the bridge column would require the removal or relocation of NRG utilities at the southeast corner of the NRG facility. Relocation of the affected utilities is not expected to have a substantial effect on the operation of the NRG facility.

Effects on Natural Gas. Several gas lines would be impacted by the footings of the proposed structures. The largest impact would be to a 16-in. (41-cm) high-pressure gas main. Impacted gas lines and mains would need to be relocated.

Effects on Water and Sewer. Several water and sewer pipelines would be affected by the proposed new bridge construction and would need to be relocated before commencement of construction and demolition activities.

Effects on Storm Drain. Several footings of the proposed structures would impact sections of the 42-in (106-cm) supply pipe and 42-in (106-cm) pressure discharge pipe of the Ocean Boulevard Pump Station. In addition, many smaller collection pipes and catch basins would also be impacted. All impacted structures would need to be replaced or modified to accommodate the proposed project. No additional facilities would need to be constructed.

Effects on Telephone. Telephone facilities would be affected by the proposed project and would require relocation.

Effects on Oil Lines and Wells. Active and abandoned oil lines within the construction footprint would be affected by the proposed project. Active lines would be avoided where possible. Abandoned lines would be removed as required. However, during the final design phase of the project, the owners of the pipelines would perform detailed studies and recommend provisions for the relocation or protection of these facilities from construction; studies and relocation/protection would be compensated by the Port.

Short-term service interruptions could occur during the relocation activities. The impact would be temporary, and with close coordination with the utilities service providers, interruption duration and severity would be minimized.

Active and abandoned oil wells within the construction footprint would also be affected by the proposed project (see Exhibits 2.1.4-2 and 2.1.4-3). There are approximately 147 abandoned wells located within the construction footprint that may be affected. The abandoned wells affected by the project would be tested and, as required, they would be re-abandoned to meet California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) requirements and performance standards as specified in *California Laws for Conservation of Petroleum and Gas*, January 2001. Prior to construction, an oil well abandonment plan, as applicable, would be coordinated with the DOGGR Construction Review Engineer.

Approximately 23 active or idle wells within the construction footprint may be affected by the proposed project. These wells could be abandoned and redrilled (replaced) in a new location, undergo a buy-out and be taken out of service, or temporarily shut down during construction and placed back in service following completion of construction within the well area. (personal communication, Sean Gamette, 2002); however, the City of Long Beach Department of Gas and Oil would make the final decision as to which oil wells are redrilled or bought out.

<u>Utilities Demand</u>

Construction activities would utilize machinery and tools that require the consumption of more electrical power than is currently used for the bridge. This increase in electrical usage would be temporary, and the contractor would be able to tap into the existing power grid of the Port. In addition, a recently installed 12,000-volt substation on the north side of the bridge would accommodate the temporary increase in electricity demand during construction activities (personal communication, Jim Matthei, 2002).

There are 245 operational power plants located in the counties of Los Angeles, Orange, Riverside, and San Bernardino that produce at least 100 kilowatt (kW) (0.1-megawatt [MW]) of electricity each (CEC, 1999b). These facilities have a total online generating capacity of 16,922 MW. Electric energy in the region is provided primarily through SCE and the Los Angeles Department of Water and Power (LADWP) distribution networks, along with three municipalities having their own power plants located in the region (Glendale, Burbank, and Pasadena), and with the Imperial Irrigation District and San Diego Gas & Electric providing service to the extreme southern areas of Riverside and Orange counties, respectively. Because of the restructuring of the electric energy industry throughout California, many of the facilities owned by investor-owned utilities have been divested.

Option 3

Exhibit 2.1.4-1
New Towers

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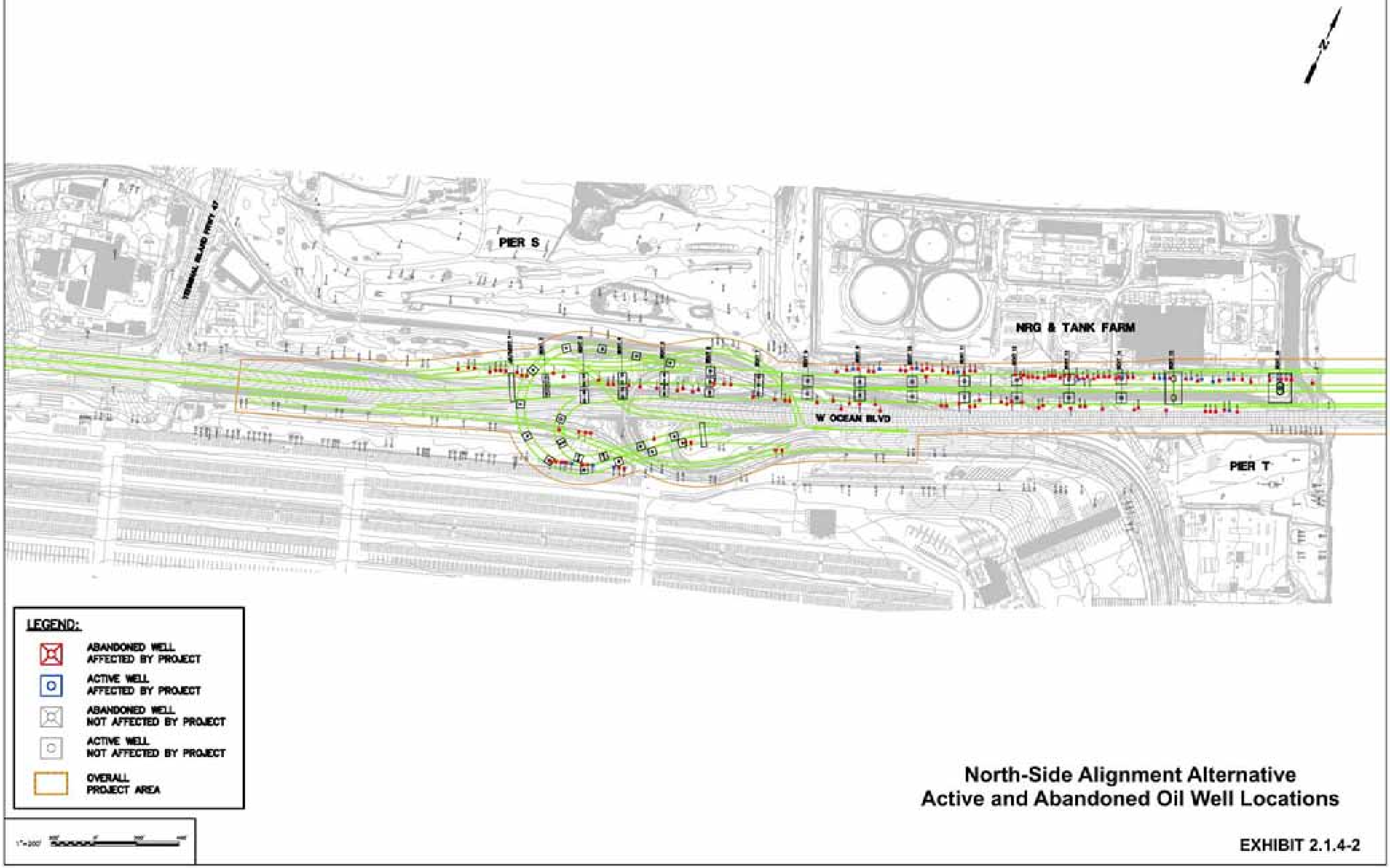

North-Side Alignment Alternative
Active and Abandoned Oil Well Locations

EXHIBIT 2.1.4-2

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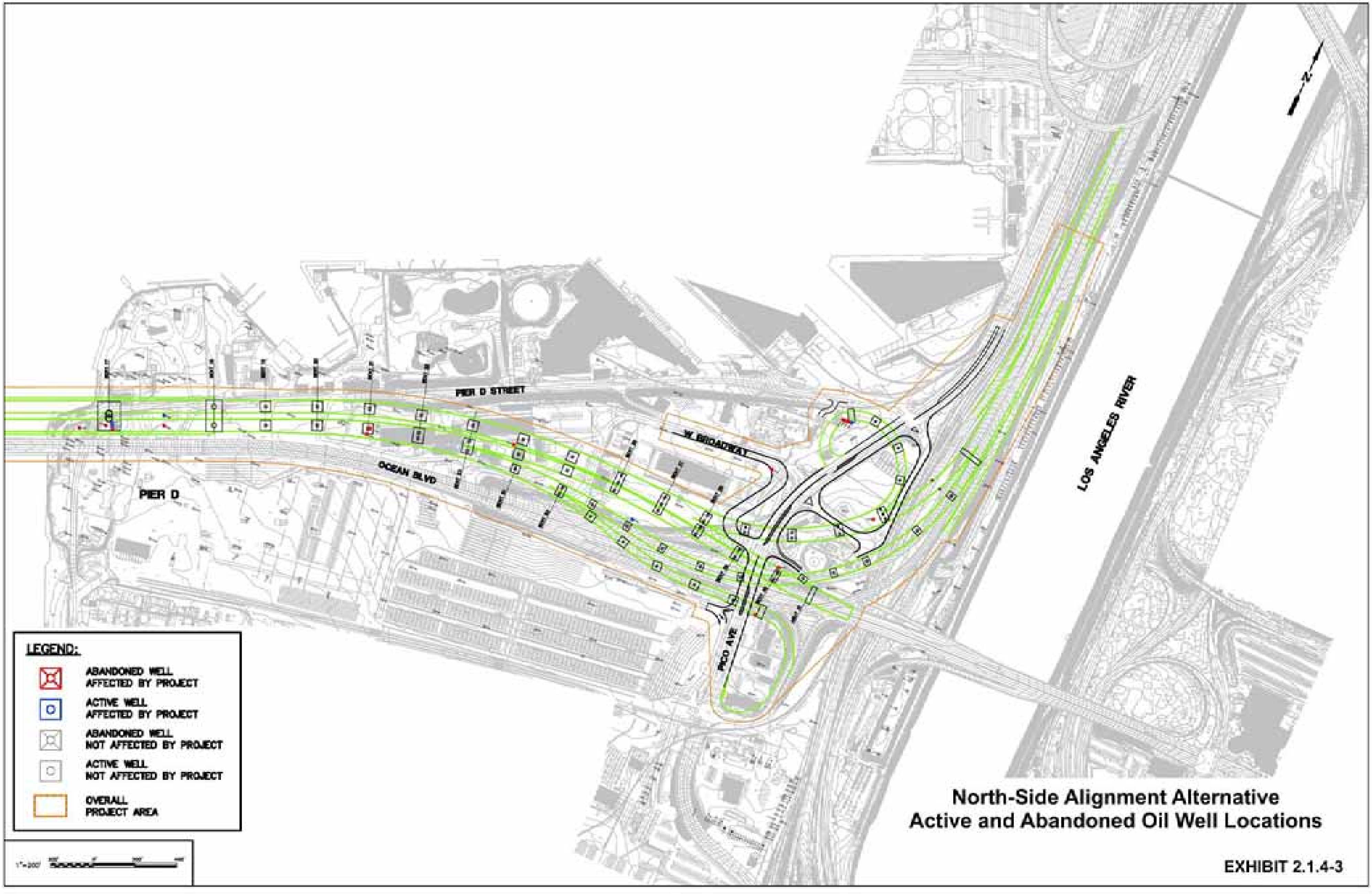

North-Side Alignment Alternative
Active and Abandoned Oil Well Locations

EXHIBIT 2.1.4-3

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Most of the electric energy used in southern California is imported to the region from coal-fired and hydroelectric generating facilities located elsewhere in California and out of state. Utilities in southern California participate in power-sharing arrangements with many other entities throughout the western United States.

Construction of the proposed project would not cause a substantial increase in the demand on existing electrical sources or require the development of new sources; therefore, the project would not result in a change to local or regional energy supplies, or change the efficiency of energy use.

Solid Waste Generation

Construction and demolition activities associated with the proposed project would generate a large amount of solid waste. Most of this waste would be a product of demolition. Construction and demolition materials would be recycled to the extent feasible in accordance with the City of Long Beach Construction and Demolition Program. Recycling programs would be used to reduce the amount of waste to be disposed of in the local landfill. The quantity of waste is unknown at this early stage of engineering, but it is not assumed to be substantial. Various recycling stations are located throughout Los Angeles County, and any waste produced by construction activities could be disposed of or recycled at these facilities or others throughout the state. Solid waste that remains after recycling would be disposed of at an appropriate municipal landfill within the region.

South-side Alignment Alternative

Impacts associated with construction activities for the South-side Alignment Alternative would be temporary, lasting only as long as the construction phase. Project construction would include two major activities, including construction of the new bridge and demolition of the existing bridge once the new bridge is completed and placed in service. Possible impacts to the existing utilities systems would result from utility relocations, increase in utility demand, and increase in solid waste volume. Each of these impacts is discussed below:

Utilities Relocation

Electricity. Impacts to the existing transmission lines that currently cross the Cerritos Channel, approximately 300-ft (91.4-m) north of the bridge, with an approximate vertical clearance of 153-ft (46.6-m) above the MHWL, are the same as the North-side Alignment Alternative. The scenarios and conclusions/recommendations are also the same for the South-side Alignment Alternative.

Several SCE overhead and underground lines within Pier T and Pier D would need to be relocated. Tidelands electrical infrastructure for existing facilities would also be affected by the proposed bridge within the South-side Alignment Alternative.

Effects on Natural Gas. Several gas lines would be impacted by the footings of proposed structures. The largest impact would be to a 16-in. (41-cm) high-pressure gas main located in Piers T and D. Several gas mains in Piers T and D with various pipe sizes would be impacted and would need to be relocated.

Effects on Water and Sewer. Several water and sewer pipelines would be affected by the proposed new bridge construction and would need to be relocated before commencement of construction and demolition activities. The largest impact would be to 24-in. (61-cm) and 20-in. (51-cm) water mains located in Piers T and D.

Effects on Storm Drain. Several footings of the proposed structures would impact the existing storm drain system. There is an existing 48-in. (122-cm) storm drain in Pier D that drains to a pump station that would need to be relocated. In addition, many smaller collection pipes and catch basins would also be impacted. All impacted structures would need to be replaced or modified to accommodate the proposed project. No additional facilities would need to be constructed.

Effects on Telephone. Aboveground and belowground telephone facilities would be affected by the proposed project and would require relocation.

Effects on Oil Lines and Wells. Active and abandoned oil lines within the construction footprint would be affected by the proposed project. Active lines would be avoided where possible. Abandoned lines would be removed as required. However, during the final design phase of the project, the owners of the pipelines would perform detailed studies and recommend provisions for relocation or protection of these facilities from construction; studies and relocation/protection would be compensated by the Port.

Short-term service interruptions could occur during the relocation activities. The impact would be temporary, and with close coordination with the utilities service providers, interruption duration and severity would be minimized.

Active and abandoned oil wells within the construction footprint would also be affected by the proposed project (see Exhibits 2.1.4-4 and 2.1.4-5). Approximately 138 abandoned wells located within the construction footprint may be affected. The abandoned wells affected by the project would be tested and, as required, they would be re-abandoned to meet DOGGR requirements and performance standards as specified in *California Laws for Conservation of Petroleum and Gas*, January 2001. Prior to construction, an oil well abandonment plan, as applicable, would be coordinated with the DOGGR Construction Review Engineer.

Approximately 30 active or idle wells within the construction footprint may be affected by the proposed project. These wells could be abandoned and redrilled (replaced) in a new location, undergo a buy-out and be taken out of service, or temporarily shut down during construction and placed back in service following completion of construction within the well area. (personal communication, Sean Gamette, 2002); however, the City of Long Beach Department of Gas and Oil would make the final decision as to which oil wells are redrilled or bought out.

Utilities Demand

The demand for electrical power for this alternative would be similar to the North-side Alignment Alternative.

Solid Waste Generation

Solid waste disposal and recycling for this alternative would be similar to the North-side Alignment Alternative.

<u>Rehabilitation Alternative</u>

Impacts associated with construction activities for the Rehabilitation Alternative would be temporary, lasting only as long as the construction phase. Project construction would include rehabilitation of the existing bridge deck, existing columns, and existing bridge footings. Possible impacts to the existing utilities systems would result from utility relocations in the surrounding area of the existing footings, increase in utility demand, and increase in solid waste volume. Each of these impacts is discussed below:

Utilities Relocation

Electricity. There would be no impacts to the existing SCE transmission lines that cross the Cerritos Channel. The vertical clearance of the existing bridge would remain the same.

Several overhead light poles on the bridge would need to be relocated for this alternative. Other impacts include SCE overhead electrical lines in Piers T and D and underground electrical lines in Pier D.

Effects on Natural Gas. The gas lines in the immediate vicinity of the existing bridge footings would be affected by this alternative.

Effects on Water and Sewer. Water pipelines in the immediate vicinity of the existing bridge footings would be affected by the proposed rehabilitation of the bridge footings and would need to be relocated before commencement of construction and demolition activities. This includes a 20-in. (51-cm) pipeline in Pier D and abandoned 24-in. (61-cm) and 10-in. (25-cm) waterlines in Pier D. There are no sewer line impacts with this alternative.

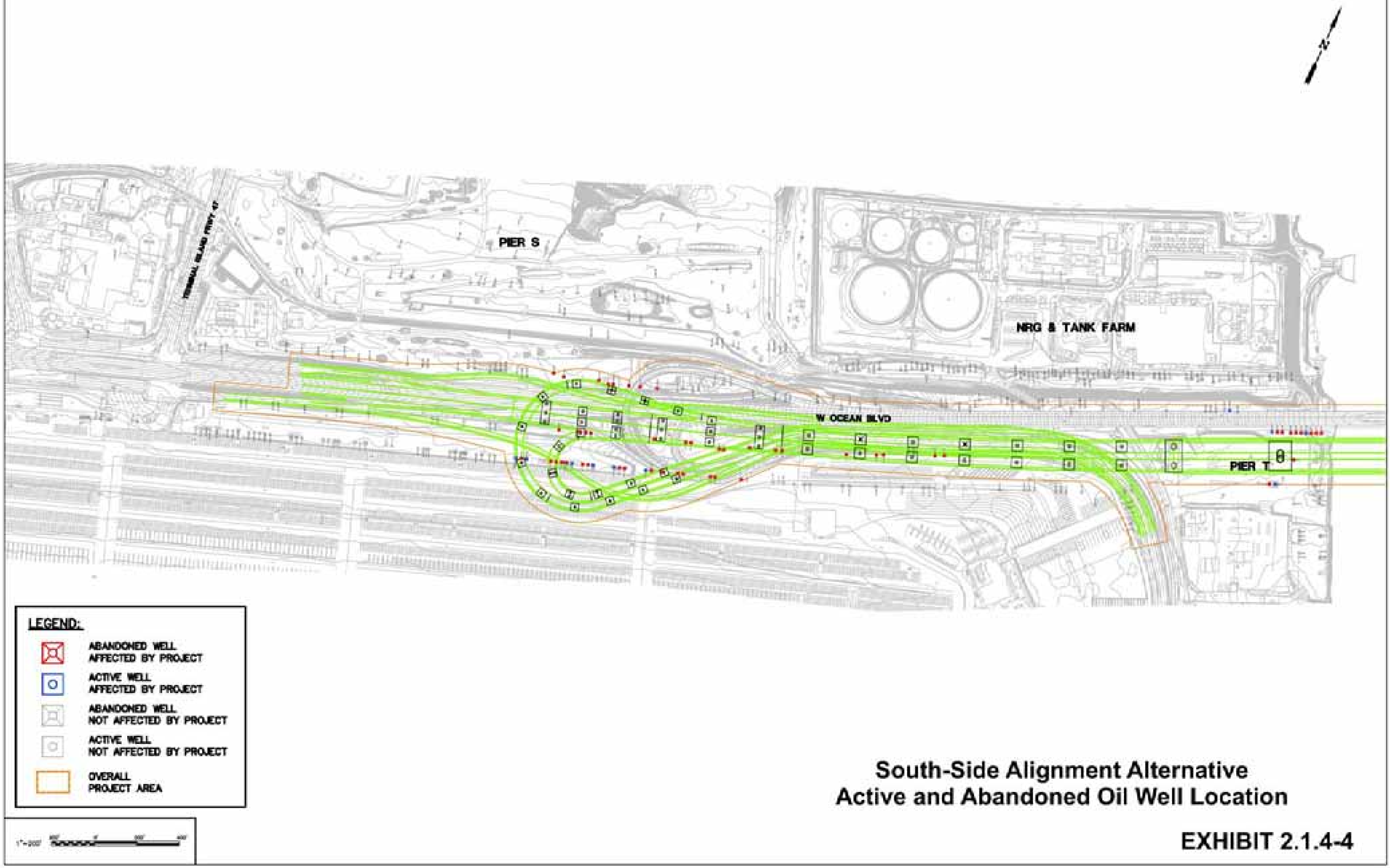
Effects on Storm Drain. An existing storm drain that crosses underneath the bridge adjacent to the footings would require relocation. The storm drain would be relocated to an adjacent area, away from the footing location.

Effects on Telephone. The existing underground telecommunication lines near the existing footings at Piers T and D would require relocation. The lines would be relocated to an adjacent area, away from the footing locations.

Effects on Oil Lines and Wells. Active and abandoned oil lines within the construction footprint would be affected by the proposed project. Active lines would be avoided where possible. Abandoned lines would be removed as required. However, during the final design phase of the project, the owners of the pipelines would perform detailed studies and recommend provisions for the relocation or protection of these facilities from construction; studies and relocation/protection would be compensated by the Port.

Short-term service interruptions could occur during the relocation activities. The impact would be temporary, and with close coordination with the utilities service providers, interruption duration and severity would be minimized.

Active and abandoned oil wells within the construction footprint would also be affected by the proposed project Approximately 52 abandoned wells located within the construction footprint may be affected. The abandoned wells affected by the project would be tested and, as required, they would be re-abandoned to meet DOGGR requirements and performance



South-Side Alignment Alternative
Active and Abandoned Oil Well Location

EXHIBIT 2.1.4-4

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South - Side Alignment Alternative
Active and Abandoned Oil Well Locations

EXHIBIT 2.1.4-5

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standards as specified in *California Laws for Conservation of Petroleum and Gas*, January 2001. Prior to construction, an oil well abandonment plan, as applicable, would be coordinated with the DOGGR Construction Review Engineer.

Approximately six active or idle wells may be affected by the proposed project. These wells could be abandoned and redrilled (replaced) in a new location, undergo a buy-out and be taken out of service, or temporarily shut down during construction and placed back in service following completion of construction within the well area. (personal communication, Sean Gamette, 2002); however, the City of Long Beach Department of Gas and Oil would make the final decision as to which oil wells are redrilled or bought out.

Utilities Demand

The demand for electrical power for constructing this alternative would be less than the North-side and South-side Alignment Alternatives.

Solid Waste Generation

Construction and demolition activities associated with the Rehabilitation Alternative would generate solid waste from the removal of the existing bridge deck. Recycling programs would be used to reduce the amount of waste to be disposed of in the local landfill. The quantity of waste is unknown at this early stage of engineering, but it is not assumed to be substantial. Solid waste that remains after recycling would be disposed of at an appropriate municipal landfill within the region.

Operational Impacts

North-side Alignment Alternative

Electrical usage during operation of the proposed project would be limited to the lighting of the roadway and aesthetic lighting of the bridge. Additional lighting would be required to illuminate the proposed six lanes with standard shoulders versus the existing five lanes and no shoulders; however, the additional electricity required to illuminate one additional lane and safety shoulders would not represent a substantial demand on local supplies when compared to the regional capacity provided by SCE (personal communication, Jim Matthei, 2002). The aesthetic lighting would not require a substantial amount of energy. The existing power grid has sufficient capacity to relieve any increase in electrical demand; therefore, the proposed project would not result in a change to local or regional energy supplies, and it would not change the efficiency of energy use.

The new bridge would include an additional through-lane on the EB and WB sides of the bridge. The increased surface area of the bridge would result in an increase in stormwater runoff being directed from the bridge to the existing storm drains. This increase may require construction of new storm drainage facilities or the expansion of existing facilities at the Port; however, since the project area generally consists of paved impervious surfaces, the net effect of the bridge project would not substantially change the volume of storm drain runoff in the vicinity.

South-Side Alignment Alternative

Operational impacts for the South-side Alignment Alternative would be similar to the North-side Alignment Alternative.

Rehabilitation Alternative

Operational impacts for the Rehabilitation Alternative would be less than the North-side and South-side Alignment Alternatives.

2.1.4.3 Avoidance, Minimization and/or Mitigation Measures

No measures are required.

2.1.5 Traffic and Circulation

This section addresses the potential impacts to traffic and circulation associated with construction and long-term operation of the proposed project. The traffic and circulation impact analysis is based on the results of a traffic study conducted for the project (Iteris, 2009). The study identified existing (year 2005) and future projected (years 2015 and 2030) traffic volumes and lane configurations to determine the traffic LOS for roadway elements within the study area. For this analysis, the "existing" traffic conditions are defined as the conditions that existed in year 2005 at the time that the CEQA NOP for this project was issued.

2.1.5.1 Regulatory Setting

Caltrans, as assigned by FHWA, directs that full consideration should be given to the safe accommodation of pedestrians and bicyclists during the development of federal-aid highway projects (see 23 CFR 652). It further directs that the special needs of the elderly and the disabled must be considered in all federal-aid projects that include pedestrian facilities. When current or anticipated pedestrian and/or bicycle traffic presents a potential conflict with motor vehicle traffic, every effort must be made to minimize the detrimental effects on all highway users who share the facility.

Caltrans is committed to carrying out the 1990 Americans with Disabilities Act (ADA) by building transportation facilities that provide equal access for all persons. The same degree of convenience, accessibility, and safety available to the general public will be provided to persons with disabilities.

2.1.5.2 Affected Environment

The existing lane configurations, traffic volumes, and LOS within the study area are presented in this subsection.

LOS denotes the possible range of traffic operating conditions that may occur on a roadway or at an intersection when it is subjected to various traffic volumes. LOS analysis is based on hourly traffic and typically examines the peak travel hours of the day. It is a measure of the "quality of flow" defined in six levels, A through F, by the *Highway Capacity Manual – 2000 Edition* (HCM) published by the Transportation Research Board (TRB). The six levels, A to F, relate to traffic congestion from best to worst, respectively. In general, LOS A represents free-flow conditions with no congestion. Conversely, LOS F represents severe congestion with stop-and-go conditions. Levels E and F typically are considered unsatisfactory operating conditions. For a multi-lane highway such as Ocean Boulevard in the vicinity of the Gerald Desmond Bridge, LOS is determined by the density of vehicles on the roadway. A very low density allows free-flow conditions, and a very high density provides stop-and-go conditions. Table 2.1.5-1 presents LOS information for multi-lane highways.

Table 2.1.5-1
Level of Service Criteria for Highway Segment

LOS	Maximum Density*	Description of Conditions
A	11	"Free-flow" conditions
B	18	Slight congestion
C	26	Moderate congestion
D	35	Significant congestion
E	43**	Extreme congestion
F	>43**	Gridlock/stop-and-go condition

* Density is measured in passenger cars per lane per mile.
** Assuming a free-flow speed of 50 miles per hour.
Source TRB, 2000.

The intersection capacity utilization (ICU) analysis methodology compares the level of traffic volume during the peak hours at an intersection to the amount of traffic that intersection is able to carry (capacity). Table 2.1.5-2 describes the LOS concept and the operating conditions expected with each LOS for signalized intersections.

Analysis of unsignalized intersections is conducted differently than signalized intersections due to different operating characteristics. For unsignalized intersections, LOS is based on average delay in seconds per vehicle. Table 2.1.5-3 describes the LOS concept for unsignalized intersections. Stop-controlled intersections were analyzed using the delay-based HCM method of determining LOS.

Traffic Study Area

The traffic study area is shown in Exhibit 2.1.5-1. The overall study area extends along Ocean Boulevard from Navy Way on the west to downtown Long Beach on the east. It includes the access between Ocean Boulevard, SR 710, and Pico Avenue. It extends north along Pico Avenue and SR 710 to 9th Street, and it includes the Terminal Island Freeway (SR 47) interchange with Ocean Boulevard, as well as the Terminal Island Freeway interchange with New Dock Street. The

GERALD DESMOND BRIDGE REPLACEMENT PROJECT
Traffic Study Area

EXHIBIT 2.1.5-1

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Table 2.1.5-2
Level of Service Criteria
for Signalized Intersections

LOS*	V/C Ratio	Description of Conditions
A	0 to 0.60	Little or no delay/congestion
B	>0.60 to 0.70	Slight congestion/delay
C	>0.70 to 0.80	Moderate delay/congestion
D	>0.80 to 0.90	Significant delay/congestion
E	>0.90 to 1.00	Extreme congestion/delay
F	1.00 +	Intersection failure/gridlock

LOS – Level of Service

* The intersection LOS calculations were based on a maximum lane volume of 1,600 vehicles per lane for through lanes and single turn lanes and 2,880 vehicles per hour for multiple left-turn lanes as used by the POLB. For intersections within the City of Los Angeles, the maximum lane volume was based on 1,425 vehicles per hour per the capacities in the Circular 212 Critical Movement Analysis (CMA) methodology used by the City. Intersections with vehicular volumes that are at or near capacity (V/C ≅ 1.0) experience greater congestion and longer vehicle delays.

Source: TRB, 1985; and NCHRP, 1982.

Table 2.1.5-3
Level of Service Criteria for Unsignalized Intersections

LOS	Average Delay (seconds/vehicle)	Description of Conditions
A	≤ 10	Little or no delay
B	> 10 and ≤15	Slight delay
C	> 15 and ≤ 25	Moderate delay
D	> 25 and ≤ 35	Significant delay
E	> 35 and ≤50	Extreme congestion
F	> 50	Intersection gridlock

LOS – Level of Service

Source: TRB, 2000.

study area extends west along New Dock Street from its interchange with the Terminal Island Freeway to Pier S Avenue.

The traffic study area was defined to include the project site and other roadways estimated to carry sufficient additional traffic as a result of the construction and long-term operation of the Bridge Replacement Alternatives to potentially result in adverse traffic effects. Roadways receiving sufficient additional traffic to be included in the traffic study area were determined based on the criterion of including any intersection increasing in volume by 50 or more trips in any one peak hour. The number of additional trips was determined from a comparison of the future traffic volumes with and without the Bridge Replacement Alternatives, as presented in the section Traffic Forecasting Model below. The proposed build alternatives of the project, which entail rehabilitation or replacement of the existing roadway and bridge facilities, would not directly generate any additional new trips; however, the bridge replacement alternatives are expected to result in some local redistribution of traffic as motorists modify their travel paths to take advantage of the congestion-relief benefits of the Bridge Replacement Alternatives.

The study area includes roadway facilities where traffic changes are expected to be of sufficient magnitude to warrant study. The elimination from further consideration of the Toll-Operation Alternative substantially reduced the study area. (Section 1.7.1 presents the reasons that the Toll-Operation Alternative was eliminated from further consideration.) A toll facility would potentially impact traffic on I-110, SR 91, and I-405, as noted in Section 1.2. The proposed Bridge Replacement Alternatives would have more localized potential traffic effects. The northern limit of the study area on SR 710 is at 9th Street. Because there was no adverse effect of the proposed project on the portion of SR 710 south of 9th Street, which has fewer lanes than portions to the north, it was concluded that there would be no adverse effects to SR 710 or I-710 farther north where the highway has more lanes.

Within the traffic study area, eight roadway segments with potential traffic impacts associated with the project have been investigated. These are shown on Exhibit 2.1.5-2 and include:

1. Ocean Boulevard from Navy Way to Pier S Avenue;
2. Ocean Boulevard from Pier S Avenue to the Terminal Island Freeway;
3. Ocean Boulevard from the Terminal Island Freeway to the Horseshoe Ramps;
4. EB bridge upgrade (direction of travel is uphill) to the crest of the bridge;
5. WB bridge upgrade to the crest of the bridge;
6. Connectors between SR 710 and Ocean Boulevard;
7. SR 710 north of the Ocean Boulevard connectors; and
8. Ocean Boulevard from SR 710 Connectors to downtown Long Beach.

Within the traffic study area, 13 intersections with potential traffic impacts associated with the project have been investigated. The intersections are shown on Exhibit 2.1.5-3 and include:

1. Terminal Island Freeway and Ocean Boulevard (signalized);
2. Pier S Avenue and Ocean Boulevard (signalized);
3. Pier S Avenue and New Dock Street (signalized);
4. Navy Way and Seaside Avenue (signalized);
5. Pico Avenue/Pier B Street and 9th Street (signalized);
6. Pico Avenue and Pier C Street (signalized);
7. Terminal Island Freeway SB Off-Ramp and New Dock Street (stop sign controlled);
8. Terminal Island Freeway Northbound (NB) On-Ramp and New Dock Street (stop sign controlled);
9. Pico Avenue and Pier D Street (stop sign controlled);
10. Pico Avenue and Broadway (stop sign controlled);
11. Pico Avenue and Pier E Street (stop sign controlled);
12. Ocean Boulevard and Golden Shore (signalized); and
13. Ocean Boulevard and Magnolia Avenue (signalized).

The intersection of Navy Way and Seaside Avenue (Intersection 4) is located in Los Angeles, while the other intersections are located in Long Beach. Intersections 1 through 6, 12, and 13 are signalized in the existing year 2005 condition. Intersections 7 through 11 are currently controlled with stop signs. Traffic signals are proposed at intersections 9 and 11 as part of the construction traffic detour plans for the North-side and South-side Alignment Alternatives (bridge replacement alternatives), and these signals would remain after implementation of the proposed project; therefore, these signals are considered implemented in the analysis of future year 2015 and 2030 conditions with the proposed Bridge Replacement Alternatives of the project.

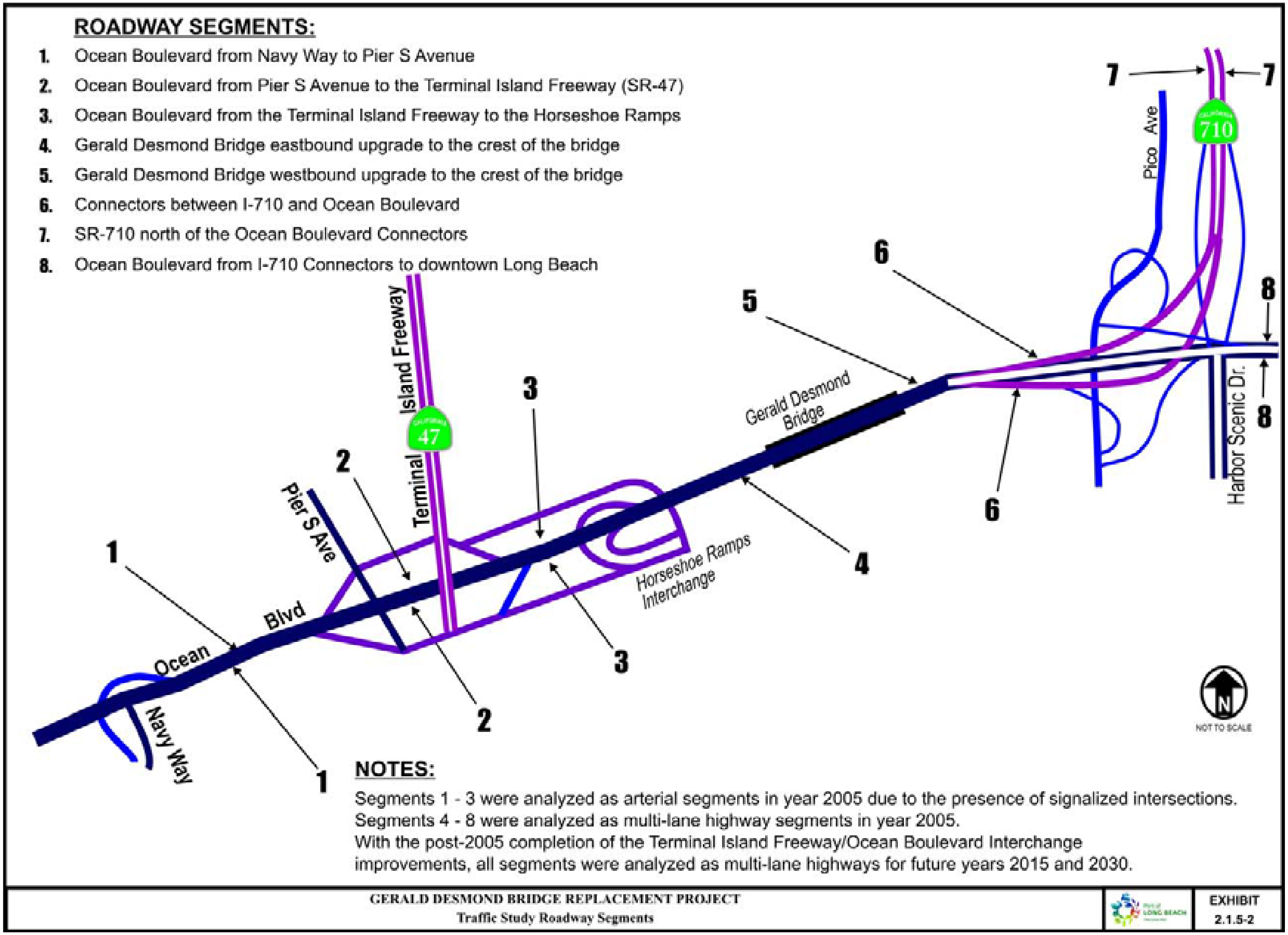
The analysis of future year 2015 and 2030 conditions with the No Action/Rehabilitation Alternatives assumes that signals would not be in place at intersections 9 and 11, because no construction traffic detour plans would be necessary if the existing bridge is rehabilitated or if no action is taken.

Existing Lane Configuration

Exhibits 2.1.5-4a and 2.1.5-4b show the existing lane configuration of the Gerald Desmond Bridge and roadways within the immediate project area.

Gerald Desmond Bridge

The Gerald Desmond Bridge is a five-lane thoroughfare with two traffic lanes in each direction and one truck lane in each direction on the uphill side of the bridge. The truck lanes end at the roadway crest on the bridge.


ROADWAY SEGMENTS:
1. Ocean Boulevard from Navy Way to Pier S Avenue
2. Ocean Boulevard from Pier S Avenue to the Terminal Island Freeway (SR-47)
3. Ocean Boulevard from the Terminal Island Freeway to the Horseshoe Ramps
4. Gerald Desmond Bridge eastbound upgrade to the crest of the bridge
5. Gerald Desmond Bridge westbound upgrade to the crest of the bridge
6. Connectors between I-710 and Ocean Boulevard
7. SR-710 north of the Ocean Boulevard Connectors
8. Ocean Boulevard from I-710 Connectors to downtown Long Beach
Terminal Island Freeway
47
Pier S Ave
Ocean Blvd
Navy Way
Horseshoe Ramps Interchange
Gerald Desmond Bridge
Pico Ave
710
Harbor Scenic Dr.
NOT TO SCALE
NOTES:
Segments 1 - 3 were analyzed as arterial segments in year 2005 due to the presence of signalized intersections.
Segments 4 - 8 were analyzed as multi-lane highway segments in year 2005.
With the post-2005 completion of the Terminal Island Freeway/Ocean Boulevard Interchange improvements, all segments were analyzed as multi-lane highways for future years 2015 and 2030.
GERALD DESMOND BRIDGE REPLACEMENT PROJECT
Traffic Study Roadway Segments
EXHIBIT 2.1.5-2

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Signalized	1	Terminal Island Freeway and Ocean Boulevard
Signalized	2	Pier S Avenue and Ocean Boulevard
Signalized	3	Pier S Avenue and New Dock Street
Signalized	4	Navy Way and Seaside Avenue
Signalized	5	Pico Avenue/Pier B Street and 9th Street
Signalized	6	Pico Avenue and Pier C Street
STOP	7	Terminal Island Freeway Southbound Off-Ramp and New Dock Street
STOP	8	Terminal Island Freeway Northbound On-Ramp and New Dock Street
STOP	9	Pico Avenue and Pier D Street
STOP	10	Pico Avenue and Broadway
STOP	11	Pico Avenue and Pier E Street
Signalized	12	Ocean Boulevard and Golden Shore Street
Signalized	13	Ocean Boulevard and Magnolia Avenue

Key

- 13 Study Intersection
- ---- Traffic Study Area
- Signalized Intersection
- STOP Stop Sign Controlled

Note:
Intersections #5, #6, and #9-11 are currently controlled with stop signs. Traffic signals are proposed at intersections #9 and #11 as part of the construction traffic detour plans for the North-side and South-side Alignment Alternatives (Bridge Replacement Alternatives) and these signals would remain after implementation of the proposed project. Therefore, these signals are considered implemented in the analysis of future year 2015 and 2030 conditions under the proposed Bridge Replacement Alternatives of the project. The analysis of future year 2015 and 2030 conditions under the No Action/Rehabilitation Alternatives assumes that signals would not be in place at intersections #9 and #11, since no construction traffic detour plans would be necessary if the existing bridge is rehabilitated or if no action is taken.

GERALD DESMOND BRIDGE REPLACEMENT PROJECT
Traffic Study Intersections

EXHIBIT 2.1.5-3

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PARSONS - HNTB

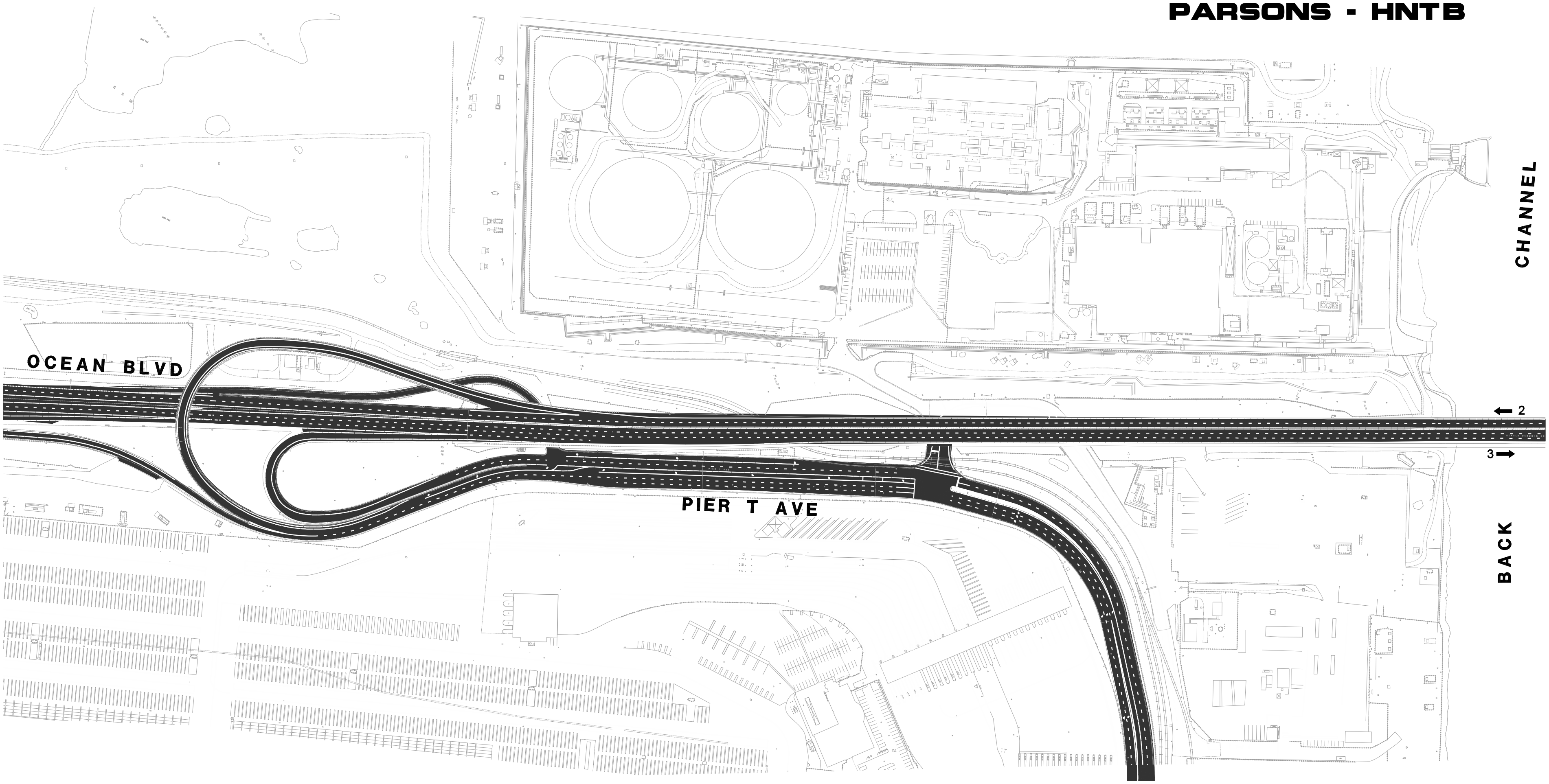

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EXHIBIT 2.1.5-4a

GERALD DESMOND BRIDGE REPLACEMENT PROJECT

Existing Roadway Segment Lane Configuration

Port of LONG BEACH The Green Port

DRAWN DWP DATE 03/28/08

DESIGNED P.E. NO.

PROJ. MGR. P.E. NO.

SECT. HEAD P.E. NO. C

ASS'T CHIEF HARBOR ENGR. P.E. NO. C-25677 DATE

CHIEF HARBOR ENGINEER P.E. NO. C-43065 DATE

MARK | DATE | BY | REVISIONS

SCALE SHEET OF

SPECIFICATION NUMBER

DRAWING NUMBER

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DATE: 11/4/2009 TIME: 10:58:08 AM
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USER: p0033148

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PARSONS - HNTB

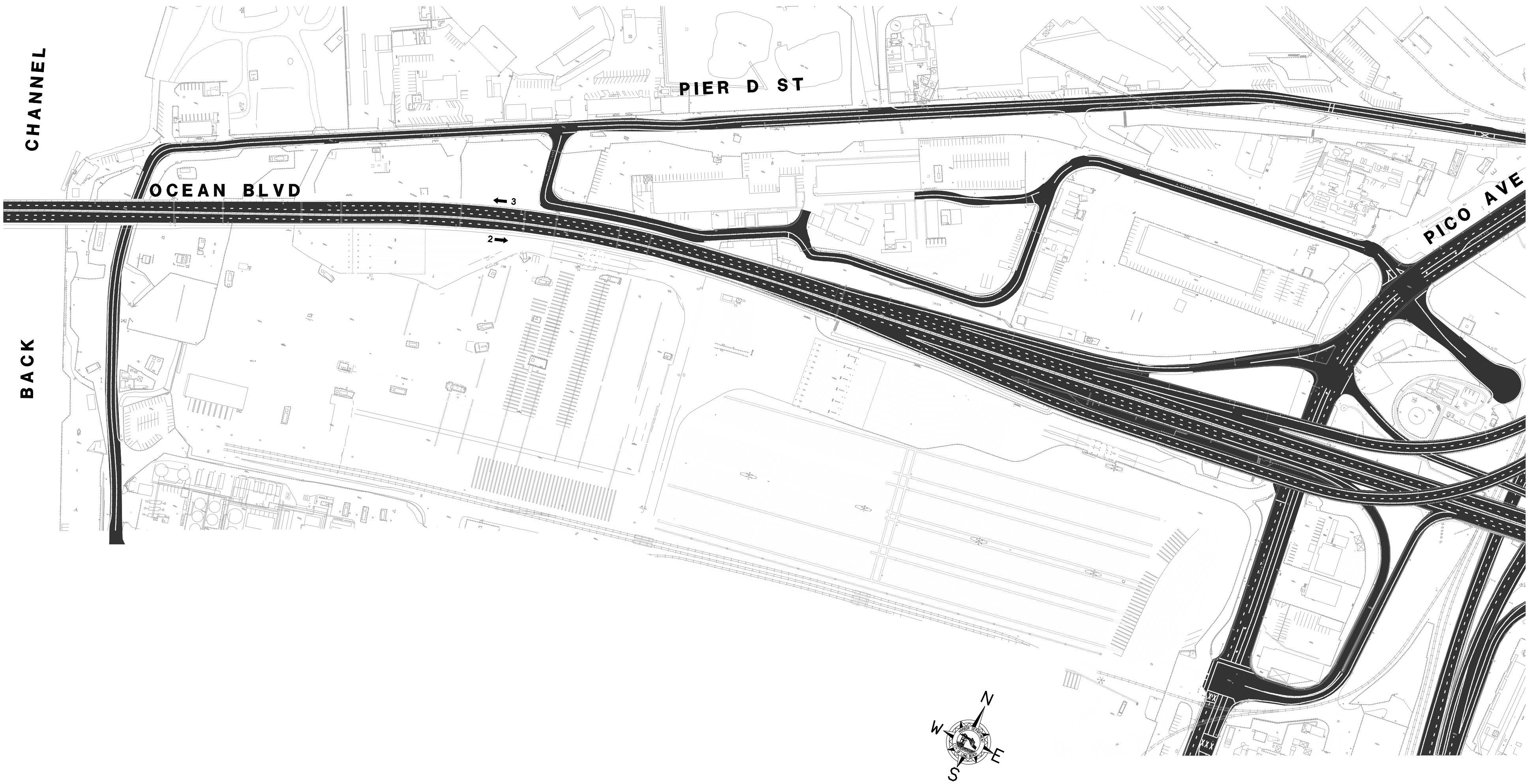

EXHIBIT 2.1.5-4b

GERALD DESMOND BRIDGE REPLACEMENT PROJECT

Existing Roadway Segment Lane Configuration

Port of LONG BEACH The Green Port

DRAWN DWP DATE 03/28/08
DESIGNED P.E. NO.
PROJ. MGR. P.E. NO.
SECT. HEAD P.E. NO. C
ASS'T CHIEF HARBOR ENGR. P.E. NO. C-25677 DATE
CHIEF HARBOR ENGINEER P.E. NO. C-43065 DATE
MARK DATE BY REVISIONS
SCALE SHEET OF
SPECIFICATION NUMBER
DRAWING NUMBER

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PLTDRV: N:\STD\MS\PLOT_DRV\v8\DWP-pdf.plt
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USER: p0033148

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Ocean Boulevard

The section of Ocean Boulevard connecting to the Gerald Desmond Bridge also has two or three lanes in each direction, depending upon the exact location and direction. The roadway has three lanes in each direction east of the Pico Avenue interchange and west of the Ocean Boulevard/ Terminal Island Freeway interchange.

Interchanges and Ramps

Major interchanges along Ocean Boulevard within the project area include Terminal Island East, SR 710, and Pico Avenue, as shown in Exhibit 2.1.5-2.

The Terminal Island East interchange, which is identified by its "horseshoe ramps," is located at the west end of the Gerald Desmond Bridge. (Note: the Terminal Island East interchange is referred to in this subsection as the Horseshoe Ramps to avoid confusion with the Terminal Island Freeway interchange.) The Horseshoe Ramps provide access to the Pier T area and include ramps to and from Ocean Boulevard in both directions. The SR 710 freeway and Pico Avenue interchanges lie immediately east of the Gerald Desmond Bridge. The SB SR 710 connector ramp to WB Ocean Boulevard consists of two lanes that merge into one lane prior to merging with Ocean Boulevard. The connector ramp for the opposite move (EB Ocean Boulevard to NB SR 710) consists of two lanes.

Existing (Year 2005) Traffic Conditions

The existing (year 2005) average daily traffic (ADT) on the Gerald Desmond Bridge is approximately 59,700 vpd, which includes approximately 25 percent trucks. This truck percentage is higher than on typical urban roadways and is principally attributable to the large truck volumes generated by the ports.

Study Methodology

Based on traffic counts taken for the existing year (2005), the morning (AM), midday (MD), and evening (PM) peak traffic hours were determined to be 8:00 a.m. to 9:00 a.m., 2:00 p.m. to 3:00 p.m., and 4:00 p.m. to 5:00 p.m., respectively. The AM and PM peak hours represent traffic peaks typical of commuter traffic. In addition to commuter traffic, the traffic activity at the Ports consists of a component associated with cargo movement. The cargo movement traffic peaks during the typical workday in the early afternoon and creates a third peak hour (MD). Because of this distinctive tri-modal peaking of traffic, all three peak-hour time periods were used for analysis of the existing and future traffic conditions.

Subsequent to 2005, the segment of Ocean Boulevard between Pier S Avenue and the Terminal Island Freeway was improved with a grade-separated overpass for through traffic on Ocean Boulevard. Because these improvements were implemented subsequent to the 2005 issuance of the NOP, they are not included in the analysis of existing year (2005) traffic conditions; the improvements are included in all analysis of future year traffic conditions. The grade separation improvements elevate the mainline of Ocean Boulevard over the Terminal Island Freeway and Pier S Street, so that through traffic on Ocean Boulevard avoids intersections at both the Terminal Island Freeway and Pier S Street. At-grade segments of Ocean Boulevard parallel to the elevated segment serve Ocean Boulevard traffic going to and from the Terminal Island Freeway and Pier S Street. Thus, intersections of Ocean Boulevard with the Terminal Island Freeway and Pier S Street remain but are avoided by Ocean Boulevard motorists continuing past both the Terminal Island Freeway and Pier S Street. The intersections of Ocean Boulevard with the Terminal Island Freeway and Pier S Street are signalized.

Because Ocean Boulevard was a restricted-access facility east of its intersection with the Terminal Island Freeway in the year 2005 condition, it was analyzed using the HCM multi-lane highway method. The segments of Ocean Boulevard west of the Terminal Island Freeway with at-grade intersections were analyzed as arterial streets using the HCM method. Exhibit 2.1.5-2 indicates which segments were analyzed as multi-lane highway segments and which were analyzed as arterial segments.

The LOS analysis of multi-lane highway segments was performed using the Traffic Software Integrated System Corridor Simulation (CORSIM) micro-simulation program developed by FHWA. CORSIM uses microscopic traffic following logic to simulate corridor segment operations on freeways and arterial streets. Results are reported in terms of vehicle density (vehicles per mile per lane) during peak hours on analysis segments, along with travel speeds, to determine the segment LOS, consistent with the HCM methods. CORSIM was used because it incorporates the effects of upstream and downstream operations into each study segment, and it can explicitly model the merge condition at the crest of the Gerald Desmond Bridge where the truck climbing lanes end under the existing and no action/rehabilitation alternatives conditions.

LOS analysis was conducted for the unsignalized study intersections in the City of Long Beach using the HCM unsignalized intersection method.

The signalized intersections in the City of Long Beach were analyzed using the ICU method, consistent with City of Long Beach requirements. The one signalized intersection in the City of Los Angeles was analyzed using the Critical Movement Analysis (CMA) method, consistent with City of Los Angeles requirements. Traffix software was used to perform the HCM, ICU, and CMA intersection analyses.

The merge and diverge areas (ramp junctions) where ramps enter and leave a roadway represent locations of potential congestion and delay. The HCM ramp junction method was used for these analyses. Because of the more complex traffic maneuvers occurring at ramp merges and diverges than on a multi-lane highway segment, similar vehicle densities result in slightly lower LOS at ramp junctions than on a mainline segment. Merge/diverge analysis was performed for the ramp junction areas where the ramp from SR 710 SB merges with Ocean Boulevard WB and the ramp to SR 710 NB diverges from Ocean Boulevard EB. On-ramp locations that join the mainline by adding a mainline lane and off-ramps that diverge by dropping a mainline lane were not analyzed because they are not true ramp junctions and do not constitute true merge/diverge sections.

<u>Results of Analysis</u>

Exhibit 2.1.5-5 shows the existing peak-hour traffic volumes on roadway segments in the traffic study area for the AM, MD, and PM peak periods.

The LOS analysis results of the study segments with existing year 2005 conditions are shown in Table 2.1.5-4. Generally, the segments operate at acceptable LOS A to C in the peak hours; however, on Ocean Boulevard between Pier S Avenue and the Terminal Island Freeway (Segment 2), failing LOS F conditions occur in both directions during the peak hours, except for the EB direction during the midday peak hour when there are LOS E conditions. Additionally, WB Ocean Boulevard between the Horseshoe Ramps and the Terminal Island Freeway (Segment 3) has LOS E conditions during all three peak periods.

The results of the ramp junction LOS analyses for existing year 2005 conditions are shown in Table 2.1.5-5. All of the ramp junction areas analyzed operate at acceptable LOS B during the peak hours.

The results of the study intersections LOS analyses under existing year 2005 conditions are shown in Table 2.1.5-6. All of the study intersections operate at acceptable LOS D or better during peak hours under the existing year 2005 conditions, except the intersection of the Terminal Island Freeway and Ocean Boulevard, which operates at LOS E conditions in the PM peak hour.

2.1.5.3 Environmental Consequences

Evaluation Criteria

Criteria for the determination of an adverse effect to traffic were identified by the Port and are consistent with criteria used in other recent projects within the Port. The criteria are those required by the jurisdiction in which the study roadway or intersection is situated, unless that jurisdiction has no appropriate criteria, in which case criteria identified by the Port were used.

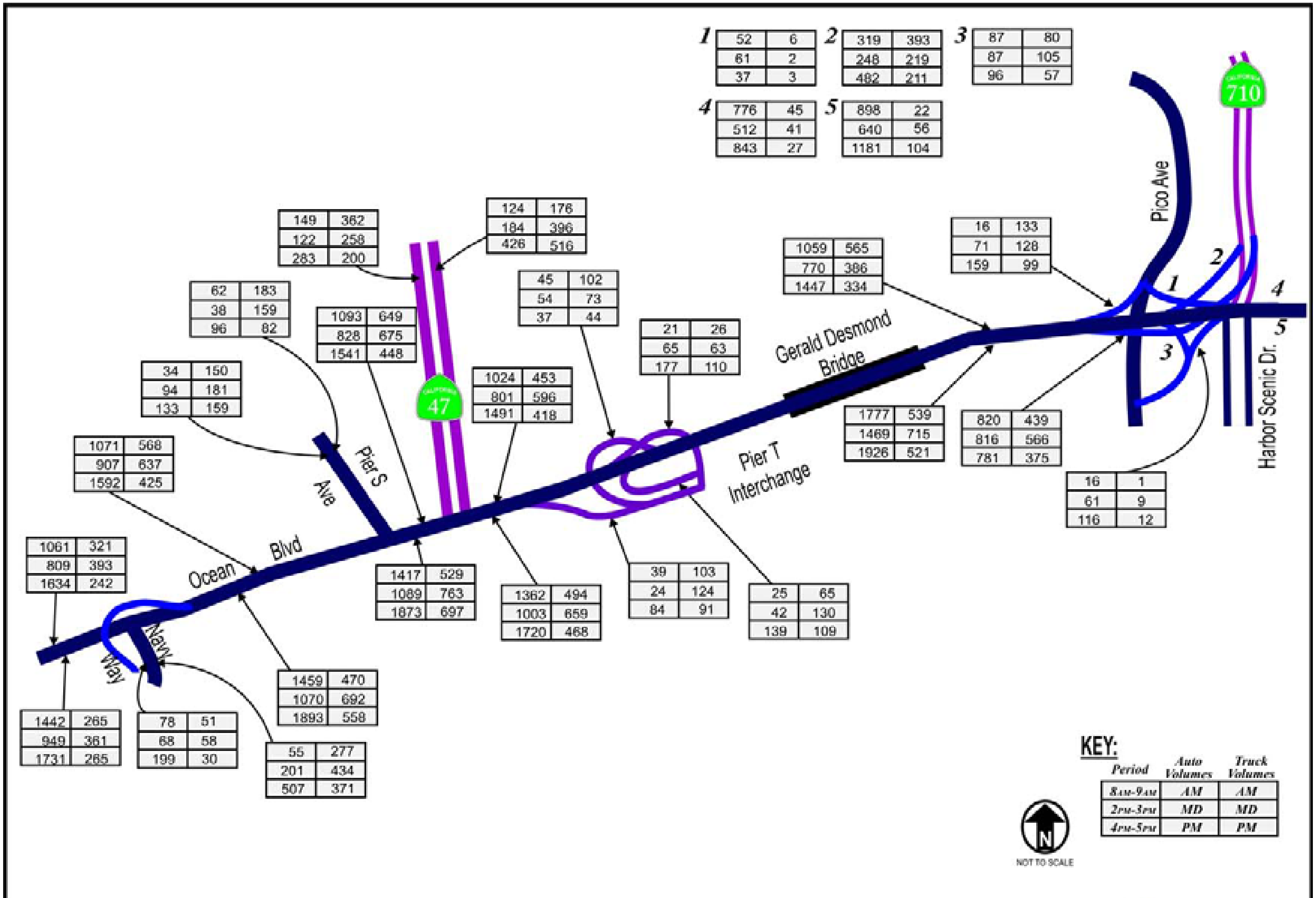
For signalized intersections, the proposed project would result in an adverse effect if the following thresholds established by the cities of Long Beach and Los Angeles are exceeded:

- City of Long Beach: Build condition LOS is E or F and the intersection volume-to-capacity ratio (V/C) increases by more than 0.020 from the no build to the build condition;
- City of Los Angeles:
  - Build condition LOS is C (defined as V/C greater than 0.700 to 0.800) and the V/C increases by more than 0.040;
  - Build condition LOS is D (defined as V/C greater than 0.800 to 0.900 and the V/C increases by more than 0.020; or
  - Build condition LOS is E or F (defined as V/C greater than 0.900) and the V/C increases by more than 0.010.

All of the unsignalized study area intersections are located in Long Beach. The City of Long Beach has no established criteria for determination of adverse effects at unsignalized intersections. The criteria used in this analysis are:

> If the Build condition has an LOS E or F at an unsignalized intersection, then the intersection is to be reanalyzed using the signalized intersection method and criteria to identify any adverse effects.

Similarly, the City of Long Beach has no criteria for the determination of adverse effects for intersections at which signal installation is part of the proposed project. For comparisons of intersections that are unsignalized with the no action/rehabilitation alternatives and signalized with the Bridge Replacement Alternatives, this analysis assumes that there would be an adverse effect if the Bridge Replacement Alternatives would result in LOS E or F at the future signalized intersection.



GERALD DESMOND BRIDGE REPLACEMENT PROJECT
Existing/Baseline (Year 2005) Peak Hour Traffic Volumes on Roadway Segments

EXHIBIT 2.1.5-5

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Table 2.1.5-4
Existing (Year 2005) Peak-Hour LOS for Arterial and Highway Segments

Segment		From	To	Speed* or Vehicle Density	LOS
AM Peak Hour					
1	EB Ocean Boulevard	Navy Way	Pier S Avenue	38.0*	A
	WB Ocean Boulevard	Pier S Avenue	Navy Way	30.4*	B
2	EB Ocean Boulevard	Pier S Avenue	Terminal Island Freeway	10.6*	F
	WB Ocean Boulevard	Terminal Island Freeway	Pier S Avenue	9.4*	F
3	EB Ocean Boulevard	Terminal Island Freeway	Horseshoe Ramps	29.6*	B
	WB Ocean Boulevard	Horseshoe Ramps	Terminal Island Freeway	14.4*	E
4	EB Gerald Desmond Bridge	Upgrade	Crest	17.0	B
	EB Gerald Desmond Bridge	Crest	Downgrade	21.8	C
5	WB Gerald Desmond Bridge	Upgrade	Crest	20.2	C
	WB Gerald Desmond Bridge	Crest	Downgrade	20.1	C
6	NB Connector	EB Ocean Boulevard	NB SR 710	13.8	B
	SB Connector	SB SR 710	WB Ocean Boulevard	17.4	B
7	SR 710 NB	NB Connector	NB SR 710 Mainline	14.2	B
	SR 710 SB	SB SR 710 Mainline	SB Connector	9.2	A
8	EB Ocean Boulevard	NB Connector	Downtown	4.6	A
	WB Ocean Boulevard	Downtown	SB Connector	6.6	A
MD Peak Hour					
1	EB Ocean Boulevard	Navy Way	Pier S Avenue	37.6*	A
	WB Ocean Boulevard	Pier S Avenue	Navy Way	31.8*	B
2	EB Ocean Boulevard	Pier S Avenue	Terminal Island Freeway	14.0*	E
	WB Ocean Boulevard	Terminal Island Freeway	Pier S Avenue	9.2*	F
3	EB Ocean Boulevard	Terminal Island Freeway	Horseshoe Ramps	29.5*	B
	WB Ocean Boulevard	Horseshoe Ramps	Terminal Island Freeway	13.7*	E
4	EB Gerald Desmond Bridge	Upgrade	Crest	18.8	C
	EB Gerald Desmond Bridge	Crest	Downgrade	23.1	C
5	WB Gerald Desmond Bridge	Upgrade	Crest	19.4	C
	WB Gerald Desmond Bridge	Crest	Downgrade	19.0	C
6	NB Connector	EB Ocean Boulevard	NB SR 710	16.0	B
	SB Connector	SB SR 710	WB Ocean Boulevard	10.7	A
7	SR 710 NB	NB Connector	NB SR 710 Mainline	17.4	B
	SR 710 SB	SB SR 710 Mainline	SB Connector	6.5	A
8	EB Ocean Boulevard	NB Connector	Downtown	1.8	A
	WB Ocean Boulevard	Downtown	SB Connector	6.6	A

Table 2.1.5-4
Existing (Year 2005) Peak-Hour LOS for Arterial and Highway Segments

	Segment	From	To	Speed* or Vehicle Density	LOS
PM Peak Hour					
1	EB Ocean Boulevard	Navy Way	Pier S Avenue	36.1*	A
	WB Ocean Boulevard	Pier S Avenue	Navy Way	33.8*	B
2	EB Ocean Boulevard	Pier S Avenue	Terminal Island Freeway	9.7*	F
	WB Ocean Boulevard	Terminal Island Freeway	Pier S Avenue	9.3*	F
3	EB Ocean Boulevard	Terminal Island Freeway	Horseshoe Ramps	29.7*	B
	WB Ocean Boulevard	Horseshoe Ramps	Terminal Island Freeway	12.7*	E
4	EB Gerald Desmond Bridge	Upgrade	Crest	20.2	C
	EB Gerald Desmond Bridge	Crest	Downgrade	25.7	C
5	WB Gerald Desmond Bridge	Upgrade	Crest	18.9	C
	WB Gerald Desmond Bridge	Crest	Downgrade	19.5	C
6	NB Connector	EB Ocean Boulevard	NB SR 710	13.2	B
	SB Connector	SB SR 710	WB Ocean Boulevard	14.4	B
7	SR 710 NB	NB Connector	NB SR 710 Mainline	13.8	B
	SR 710 SB	SB SR 710 Mainline	SB Connector	8.3	A
8	EB Ocean Boulevard	NB Connector	Downtown	8.5	A
	WB Ocean Boulevard	Downtown	SB Connector	6.9	A

LOS – Level of Service; EB – eastbound; WB – westbound; NB – northbound; SB – southbound

* In the existing year 2005 condition, Segments 1 through 3 are analyzed as arterial segments because of the presence of traffic signals on Ocean Boulevard at the Terminal Island Freeway, Pier S Avenue, and Navy Way. The LOS for arterials is determined by speed (in miles per hour). For Urban Street Class II arterials, the speed range for each LOS is LOS A >35 mph; LOS B >28-35 mph; LOS C >22-28 mph; LOS D >17-22 mph; LOS E >13-17 mph; and LOS F ≤ 13 mph. All other segments are analyzed as multi-lane highways where LOS is determined by vehicle density (vehicles per lane per mile).

Source: Iteris, 2009.

Table 2.1.5-5
Existing (Year 2005) Peak-Hour LOS for Ramp Junctions

Ramp Location	AM Peak Hour		MD Peak Hour		PM Peak Hour	
	Density (pc/mi/ln)	LOS*	Density (pc/mi/ln)	LOS*	Density (pc/mi/ln)	LOS*
EB Ocean Boulevard to SR 710/ Downtown Diverge	11.1	B	10.9	B	15.5	B
SB SR 710 Connector Ramp and WB Ocean Boulevard	16.7	B	15.2	B	16.2	B

LOS – Level of Service; NB – northbound; pc/mi/ln – passenger cars equivalents per mile per lane; SB – southbound

* LOS criteria for ramp junction areas are in density (pc/mi/ln). Density ranges for different LOS types: LOS A: 0 - 10; LOS B: 10.1 - 20; LOS C: 20.1 - 28; LOS D: 28.1 - 35; LOS E: 35.1 - 43; LOS F: >43.

Source: Iteris, 2009.

Table 2.1.5-6
Existing (Year 2005) Peak-Hour LOS for Intersections

	Intersection	LOS	V/C or Delay*
AM Peak Hour			
1	Terminal Island Freeway / Ocean Boulevard	C	0.792
2	Pier S Avenue / Ocean Boulevard	C	0.709
3	Pier S Avenue / New Dock Street	A	0.327
4	Navy Way / Seaside Avenue	A	0.474
5	Pico Avenue / Pier B Street and 9th Street	A	0.428
6	Pico Avenue / Pier C Street	A	0.309
7	Terminal Island Freeway SB Off-Ramp / New Dock	B	*10.8*
8	Terminal Island Freeway NB On-Ramp / New Dock	A	*7.4*
9	Pico Avenue / Pier D Street	B	*10.1*
10	Pico Avenue / Broadway	B	*10.6*
11	Pico Avenue / Pier E Street	A	*9.9*
12	Ocean Boulevard / Golden Shore Street	A	0.570
13	Ocean Boulevard / Magnolia Avenue	B	0.693
MD Peak Hour			
1	Terminal Island Freeway / Ocean Boulevard	D	0.833
2	Pier S Avenue / Ocean Boulevard	C	0.700
3	Pier S Avenue / New Dock Street	A	0.350
4	Navy Way / Seaside Avenue	A	0.414
5	Pico Avenue / Pier B Street and 9th Street	A	0.455
6	Pico Avenue / Pier C Street	A	0.340
7	Terminal Island Freeway SB Off-Ramp / New Dock	A	*9.1*
8	Terminal Island Freeway NB On-Ramp / New Dock	A	*7.6*
9	Pico Avenue / Pier D Street	B	*11.3*
10	Pico Avenue / Broadway	B	*11.2*
11	Pico Avenue / Pier E Street	B	*11.8*
12	Ocean Boulevard / Golden Shore Street	A	0.569
13	Ocean Boulevard / Magnolia Avenue	A	0.575
PM Peak Hour			
1	Terminal Island Freeway / Ocean Boulevard	E	0.912
2	Pier S Avenue / Ocean Boulevard	D	0.824
3	Pier S Avenue / New Dock Street	A	0.356
4	Navy Way / Seaside Avenue	A	0.581
5	Pico Avenue / Pier B Street and 9th Street	A	0.494
6	Pico Avenue / Pier C Street	A	0.343
7	Terminal Island Freeway SB Off-Ramp / New Dock	A	*9.3*
8	Terminal Island Freeway NB On-Ramp / New Dock	A	*7.9*
9	Pico Avenue / Pier D Street	B	*10.7*
10	Pico Avenue / Broadway	B	*10.5*
11	Pico Avenue / Pier E Street	B	*11.3*
12	Ocean Boulevard / Golden Shore Street	A	0.593
13	Ocean Boulevard / Magnolia Avenue	B	0.601

LOS – Level of Service; NB – northbound; SB – southbound

* V/C (volume-to-capacity ratio) is reported for signalized intersections, and average stopped delay in seconds is reported for unsignalized intersections in italics.

Source: Iteris, 2009.

The determination of potential adverse effects on roadway study segments is based on whether a segment is forecast to operate at LOS F with the bridge replacement alternatives, and if LOS F were forecast, whether the vehicle density (vehicles per mile per lane) during the peak hours with the Bridge Replacement Alternatives would be worse (higher) than with the No Action/ Rehabilitation Alternatives. A higher density is an indicator of a worse LOS F condition.

Construction Impacts

Rehabilitation Alternative

The work associated with the Rehabilitation Alternative would be limited to nighttime closures of one lane at a time on the Gerald Desmond Bridge and its approaches. The existing concrete median barrier would be removed for the construction period, and four lanes (two in each direction) would be maintained during the nighttime construction period. During the daytime, the existing lane configuration would be maintained. Rehabilitation of single-lane ramps may require some ramp closures during the nighttime hours. A TMP would be prepared for the Rehabilitation Alternative to address signing for the temporary lane closures, hours of closure, placement of traffic cones and other temporary channelizing devices, and other elements of traffic management during the construction period. The construction activity associated with the Rehabilitation Alternative is not expected to have adverse traffic effects, and construction detour routes would not be required under this alternative. Traffic volumes at night are light and not sufficient to warrant detours.

Bridge Replacement Alternatives

This section summarizes the plan for staged construction of the proposed Bridge Replacement Alternatives, including an identification of the detours necessary during their construction. The construction stages of the two Bridge Replacement Alternatives (the North-side Alignment and the South-side Alignment) would be the same in terms of their potential impacts on traffic. A traffic analysis is presented of the detour routes included in the stages of construction of the Bridge Replacement Alternatives. The discussion includes an identification of the construction-related traffic effects that are anticipated under the proposed Bridge Replacement Alternatives.

Each construction stage is anticipated to last approximately 1-year; however, it is expected that the latter part of each stage would overlap the beginning of the next stage. Demolition of the existing bridge would take place in the fifth stage of the project following the four construction stages. As part of the required TMP for the Bridge Replacement Alternatives, coordination with the construction activities associated with the Schuyler Heim Bridge replacement project and proposed SR 47 improvements would occur, as necessary, to minimize traffic effects during the potentially overlapping construction phases of the projects.

First Stage. The first stage would include construction of temporary pavement widening along Pico Avenue and widening of ramps and intersections as required.

Second Stage. During the second stage, the SB-to-WB SR 710 connector would be closed. SB traffic would be directed to Pico Avenue from SB SR 710 at the existing Pico Avenue off-ramp. Vehicles would then travel south on Pico Avenue to the existing WB Ocean Boulevard on-ramp. Widening is proposed at both ramps to accommodate the detoured traffic. During this stage of construction, Pico Avenue would be modified to provide three SB lanes and two NB lanes. Other changes along the corridor are also proposed, as will be discussed later.

During both the second and third stages of construction, traffic entering Pier T from WB Ocean Boulevard would have to use the Terminal Island Freeway interchange to make a U-turn and access the EB Pier T off-ramp because the WB Pier T off-ramp ramp would be removed from service during those stages of construction.

Third and Fourth Stages. During the third and fourth stages, the new WB portion of the bridge and connector roadways would be open, and traffic would be directed to the new facility. EB traffic crossing the bridge to travel north on SR 710 would be directed to the Pico Avenue off-ramp to travel NB on Pico Avenue. Vehicles would access SR 710 using the existing Pico Avenue on-ramp located north of C Street. During these final stages, Pico Avenue would be restriped to provide three NB lanes and two SB lanes.

Traffic Analysis of Detours

An analysis was conducted for the entire project area, especially the Terminal Island Freeway interchange and Pico Avenue, to determine if the proposed construction phasing plan would be feasible and to identify what modifications would be required to accommodate projected traffic volumes on detour routes. The analysis was conducted for only the AM and PM peak hours because they represent the higher and more critical peaks. Stage

1 requires no analysis because the existing travel lane configuration would be maintained.

Table 2.1.5-7 shows that the additional traffic diverted to the detour routes in construction Stage 2 is expected to result in poor LOS (E or F) during either the AM or PM peak hour at four intersections along the detour routes:

- Ocean Boulevard and SR 47 (North Intersection);
- Ocean Boulevard and SR 47 (South Intersection);
- Pico Avenue and Pier B Street/9th Street; and
- Pico Avenue and Pier D Street.

Table 2.1.5-8 shows that the additional traffic diverted to the detour routes in construction Stages 3 and 4 is expected to result in poor LOS (E or F) during either the AM or PM peak hour at five intersections along the detour routes:

- Ocean Boulevard and SR 47 (North Intersection);
- Ocean Boulevard and SR 47 (South Intersection);
- Pico Avenue and Pier B Street/9th Street;
- Pico Avenue and Pier D Street; and
- Pico Avenue and Pier E Street.

Table 2.1.5-7
Bridge Replacement Alternatives: Detour Route Level of Service – Construction Stage 2

Intersection	Without Mitigation			
	AM Peak Hour		PM Peak Hour	
	LOS	Delay[1]	LOS	Delay[1]
1a. Ocean Boulevard and SR -47 (North Intersection)	D	50.2	E	64.6
1b. Ocean Boulevard and SR -47 (South Intersection)	D	38.6	F	131.3
2a. Ocean Boulevard and Pier S Avenue (North Intersection)	C	27.9	C	26.3
2b. Ocean Boulevard and Pier S Avenue (South Intersection)	C	26.8	C	23.8
5. Pico Avenue and Pier B Street / 9th Street	F	206.0	E	59.2
6. Pico Avenue and Pier C Street	A	7.7	A	6.4
9. Pico Avenue and Pier D Street[2]	F	428.9	F	227.8
11. Pico Avenue and Pier E Street[2]	B	11.9	C	18.2

[1] Delay is in seconds per vehicle.
[2] Existing 4-way stop intersection.
Source: Iteris, 2009.

Table 2.1.5-8
Bridge Replacement Alternatives: Detour Route Level of Service – Construction Stages 3 and 4

Intersection	Without Mitigation			
	AM Peak Hour		PM Peak Hour	
	LOS	Delay[1]	LOS	Delay[1]
1a. Ocean Boulevard and SR 47 (North Intersection)	D	50.2	E	64.6
1b. Ocean Boulevard and SR 47 (South Intersection)	D	38.6	F	131.3
2a. Ocean Boulevard and Pier S Avenue (North Intersection)	C	27.9	C	26.3
2b. Ocean Boulevard and Pier S Avenue (South Intersection)	C	26.8	C	23.8
5. Pico Avenue and Pier B Street/9th Street	F	389.9	F	383.5
6. Pico Avenue and Pier C Street	A	3.2	A	3.8
9. Pico Avenue and Pier D Street[2]	F	450.9	F	418.3
11. Pico Avenue and Pier E Street[2]	F	OVRFL[3]	F	OVRFL[3]

[1] Delay is in seconds per vehicle.
[2] Existing 4-way stop intersection.
[3] V/C ratio too high to calculate delay. Delay would be excessive.
Source: Iteris, 2009.

Adverse Traffic Effects during Construction of the Bridge Replacement Alternatives

LOS E or F at an intersection on a detour route is considered an adverse traffic effect of construction. This is a more stringent criterion than stated above, but it provides a conservative estimate of potential adverse effects of construction on detour routes. Five intersections on detour routes would have adverse traffic effects during construction. The affected intersections are discussed below.

- Ocean Boulevard and SR 47 North Intersection would operate at LOS E during the PM peak hour during construction Stages 2, 3, and 4.

The LOS E during the PM peak hour at this intersection is an adverse temporary effect attributed to construction detour traffic associated with the Bridge Replacement Alternatives. Additional lanes at the intersection were investigated as mitigation. Due to ROW constraints and lack of available land for additional lanes, it was determined that there is no feasible mitigation to address this temporary adverse effect of the Bridge Replacement Alternatives upon the operating condition at the Terminal Island Freeway interchange. The effect attributed to the Bridge Replacement Alternatives is considered a temporary, adverse, and unavoidable effect. This temporary condition would occur during a portion of the construction period, amounting to approximately 18 months of the planned 4-year construction period.

- Ocean Boulevard and SR 47 South Intersection would operate at LOS F during the PM peak hour during construction Stages 2, 3, and 4.

The LOS F during the PM peak hour at this intersection is an adverse temporary effect attributed to construction detour traffic associated with the Bridge Replacement Alternatives. Additional lanes at the intersection were investigated as mitigation. Due to ROW constraints and lack of available land for additional lanes, it was determined that there is no feasible mitigation to address this temporary adverse effect of the Bridge Replacement Alternatives upon the operating condition at the Terminal Island Freeway interchange. The effect attributed to the Bridge Replacement Alternatives is considered a temporary, adverse, and unavoidable effect. This temporary condition would occur during a portion of the construction period, amounting to approximately 18 months of the planned 4-year construction period.

- Pico Avenue and Pier B Street/9th Street intersection would operate at LOS E or F during both the AM and PM peak hours during construction Stages 2, 3, and 4.

The LOS E and F during the AM and PM peak hours at this intersection is an adverse temporary effect attributed to construction detour traffic associated with the Bridge Replacement Alternatives. Two sets of mitigations are proposed at this intersection for the different construction stages of a Bridge Replacement Alternative. One set would be implemented during construction Stage 2 and another set during construction Stages 3 and 4. The mitigations proposed for Stage 2 and for Stages 3 and 4 of a Bridge Replacement Alternative are shown in Tables 2.1.5-9 and 2.1.5-10, respectively.

The proposed mitigation measures listed in Tables 2.1.5-9 and 2.1.5-10 would be implemented as part of the TMP required for the project. Prior to construction, the TMP will be submitted to the Port and Caltrans for approval. The TMP, at a minimum, will include detour routes, flagmen, traffic controls, signing, and traffic lane closure scheduling to minimize impacts. The TMP will be implemented after approval.

The mitigations proposed for Stage 2 would mitigate the temporary adverse effect and provide an acceptable LOS B during peak hours.

During Stages 3 and 4, the diverted traffic on NB Pico Avenue must turn left onto the ramp to access NB SR 710. To improve the projected operating conditions at this intersection, the conflicting traffic movements (SB through volumes from Pier B Street and WB-to-SB left turns from 9th Street) must be rerouted to eliminate the conflict with the NB left-turning traffic from Pico Avenue accessing the ramp. All feasible mitigation measures have been proposed for Stages 3 and 4. The mitigation measures would reduce delay, but LOS F and E would remain during the AM and PM peak hours, respectively. This is considered a temporary and unavoidable adverse effect during Stages 3 and 4 of a Bridge Replacement Alternative. This temporary condition would occur during a portion of the construction period, amounting to approximately 22 months of the planned 4-year construction period.

- Pico Avenue and Pier D Street intersection would operate at LOS F during both the AM and PM peak hours during construction Stages 2, 3, and 4.

Table 2.1.5-9
Bridge Replacement Alternatives: Detour Route Level of Service with Mitigation – Construction Stage 2

Intersection	With Mitigation				Mitigation Notes
	AM Peak Hour		PM Peak Hour		
	LOS	Delay[1]	LOS	Delay[1]	
5. Pico Avenue and Pier B Street/9th Street	B	19.4	B	11.4	**TC-1** - Add dual NB right-turn lanes - Restripe EBTR to EBR. Provide one (1) EBT - Continue two (2) SR 710 SB off-ramp lanes to Pico Avenue
9. Pico Avenue/Pier D Street[2]	D	47.7	C	26.2	**TC-3** - Signalize

LOS – level of service; NB – northbound; SB – southbound; EBT – eastbound through; EBTR – eastbound through/right; EBR – eastbound right
[1] Delay is in seconds per vehicle.
[2] Existing 4-way stop intersection.
Source: Iteris, 2009.

Table 2.1.5-10
Bridge Replacement Alternatives: Detour Route Level of Service with Mitigation – Construction Stages 3 and 4

Intersection	With Mitigation				Mitigation Notes
	AM Peak Hour		PM Peak Hour		
	LOS	Delay[1]	LOS	Delay[1]	
5. Pico Avenue and Pier B Street/9th Street	F	91.9	E	78.7	**TC-2** - Remove NB-SB split signal phasing - Restripe NBTL to NBL - Widen SB approach Provide two (2) LT lanes and one (1) TR lane - Continue two (2) on-ramp lanes to NB SR 710
9. Pico Avenue/Pier D Street[2]	E	58.6	D	41.7	**TC-3** -Signalize
11. Pico Avenue/Pier E Street[2]	B	16.5	B	14.7	**TC-4** - Signalize - Restripe NBTR to NBR to provide one (1) NBT - Add dual free-flow WB right-turn lanes - Continue two (2) EB Ocean Boulevard off-ramp lanes to Pico Avenue

LOS – level of service; EB – eastbound;; NB – northbound; SB – southbound; WB – westbound; NBTL – northbound through/left; NBL – northbound left; LT – left through; TR – through right; NBTR – northbound through/right; NBR – northbound right; NBT – northbound through
[1] Delay is in seconds per vehicle.
[2] Existing 4-way stop intersection.
Source: Iteris, 2009.

The LOS F during the AM and PM peak hours at this intersection is an adverse temporary effect attributed to construction detour traffic associated with the Bridge Replacement Alternatives. Two sets of mitigations are proposed at the intersection of Pico Avenue and Pier D Street for the different construction stages of a Bridge Replacement Alternative. One set would be implemented during construction Stage 2 and another set during construction Stages 3 and 4. The mitigations proposed for Stage 2 and for Stages 3 and 4 of a Bridge Replacement Alternative are shown in Tables 2.1.5-9 and 2.1.5-10, respectively.

The proposed mitigation measures listed in Tables 2.1.5-9 and 2.1.5-10 would be implemented as part of the TMP referenced above.

The mitigations proposed for Stage 2 would mitigate the adverse effect and provide acceptable LOS C or D during peak hours.

The Pier D Street intersection with Pico Avenue provides egress for all trucks from Piers D and E. The exiting volumes, combined with the large through volumes on NB Pico Avenue, result in the poor operating conditions at this intersection. All feasible mitigation measures have been proposed for Stages 3 and 4. The mitigation measures would reduce delay, but LOS E would remain during the AM peak hour. This is considered a temporary and unavoidable adverse effect during Stages 3 and 4 of a Bridge Replacement Alternative. This temporary condition would occur during a portion of the construction period, amounting to approximately 22 months of the planned 4-year construction period.

- Pico Avenue and Pier E Street would operate at LOS F during both the AM and PM peak hours during construction Stages 3 and 4.

The LOS F during the AM and PM peak hours at this intersection is an adverse temporary effect attributed to construction detour traffic associated with the Bridge Replacement Alternatives. A set of mitigations is proposed at this intersection to be implemented under the Bridge Replacement Alternatives. The proposed mitigations are shown in Table 2.1.5-10. The proposed mitigations would mitigate the adverse effect under the Bridge Replacement Alternative condition and provide an acceptable LOS B during peak hours.

The proposed mitigation measures listed in Table 2.1.5-10 would be implemented as part of the TMP referenced above.

Operational Impacts

For this analysis, the future traffic conditions are assumed the same for both the No Action Alternative and the Rehabilitation Alternative. This is because the Rehabilitation Alternative would have the same number of traffic lanes on the bridge and ramps/connectors as the No Action Alternative, and the design of roadways and intersections in the project area would be the same as with the No Action Alternative.

It is assumed in this analysis that for the Bridge Replacement Alternatives future traffic conditions would be the same for both the North-side Alignment Alternative and the South-side Alignment Alternative. This is because both the North-side and South-side Alignment Alternatives would have the same number of traffic lanes on the bridge and ramps/connectors. Because these two new bridge alignment options are spaced so close to each other, it is anticipated that the design and traffic operations on roadways and intersections in the project area would be the same with both alignment alternatives.

Year 2015 is the year in which the proposed project is scheduled to be open to traffic if one of the build options is implemented. Year 2030 is the design horizon year for the proposed project build alternatives; therefore, traffic analyses were conducted for the following four future conditions:

- Year 2015 without the proposed new bridge or with rehabilitation of the existing bridge, referred to as the “Year 2015 No Action/ Rehabilitation Alternatives;”
- Year 2015 with the proposed new bridge alternatives, referred to as the “Year 2015 Bridge Replacement Alternatives” (which includes both the North-side and South-side Alignment Alternatives);
- Year 2030 without the proposed new bridge or with rehabilitation of the existing bridge, referred to as the “Year 2030 No Action/ Rehabilitation Alternatives;” and
- Year 2030 with the proposed new bridge alternatives, referred to as the “Year 2030 Bridge Replacement Alternatives” (which includes both the North-side and South-side Alignment Alternatives).

All roadway study segments in the future conditions were analyzed as multi-lane highway segments because signals were removed from Ocean Boulevard (at Pier S Avenue and the Terminal

Island Freeway) with the recent construction of the Terminal Island Freeway interchange.

Traffic Forecasting Model

In addition to the existing (year 2005) traffic conditions, the traffic LOS analysis was conducted for the years 2015 and 2030 for the Bridge Replacement Alternatives (which includes both the North-side Alignment and South-side Alignment Alternatives for the proposed new bridge) and the No Action/Rehabilitation Alternatives (which represents the traffic conditions that would occur with the existing bridge configuration if no action is taken or if the existing bridge is rehabilitated and not replaced with a new bridge). A traffic forecasting model was used as part of the study to forecast future traffic volumes with and without the proposed new bridge in the years 2015 and 2030. The project is expected to be opened to traffic in year 2015, and year 2030 is the project horizon (design) year.

Appendix G provides details about the traffic model development methodology and model validation.

Year 2015 and 2030 Traffic Volume Forecasts

<u>Year 2015 No Action/Rehabilitation Alternatives – Traffic Volumes</u>

The ADT volumes forecast for the Gerald Desmond Bridge in year 2015 with the No Action/ Rehabilitation Alternatives is 77,000 vpd, which includes approximately 30 percent trucks. The increase in truck percentage over the existing condition of 25 percent is principally attributable to growth in TEU throughput at the Ports. Exhibit 2.1.5-6 shows the forecast 2015 peak-hour traffic volumes on study roadway segments in the traffic study area with the No Action/Rehabilitation Alternatives.

<u>Year 2015 Bridge Replacement Alternatives – Traffic Volumes</u>

The ADT volumes forecast for the bridge in year 2015 with the Bridge Replacement Alternatives is 87,000 vpd, which includes approximately 30 percent trucks. Exhibit 2.1.5-7 shows the forecast 2015 peak-hour traffic volumes on study roadway segments in the traffic study area with the Bridge Replacement Alternatives.

<u>Year 2030 No Action/Rehabilitation Alternatives – Traffic Volumes</u>

The ADT volumes forecast for the Gerald Desmond Bridge in year 2030 with the No Action/Rehabilitation Alternatives is 125,000 vpd, which includes approximately 44 percent trucks. Exhibit 2.1.5-8 shows the forecast 2030 peak-hour traffic volumes on study roadway segments in the traffic study area with the No Action/Rehabilitation Alternatives.

<u>Year 2030 Bridge Replacement Alternatives – Traffic Volumes</u>

The ADT volumes forecast for the bridge in year 2030 with the Bridge Replacement Alternatives is 136,000 vpd, which includes approximately 44 percent trucks. Exhibit 2.1.5-9 shows the forecast 2030 peak-hour traffic volumes on study roadway segments in the traffic study area with the Bridge Replacement Alternatives.

Future Traffic Operations

The proposed Bridge Replacement Alternatives provide a new bridge with grades of approximately 5 percent (compared to existing grades of 5.5 to 6.0 percent) carrying three lanes in each direction across the bridge and on the roadways approaching and leaving the bridge in both directions. The Bridge Replacement Alternatives also include reconstruction of direct connectors between Ocean Boulevard and SR 710 in both directions and other improvements more fully shown in Exhibit 1-6 (North-side Alignment) and Exhibit 1-7 (South-side Alignment). The Bridge Replacement Alternatives would construct the new bridge either just north or just south of the existing bridge and require some modifications to nearby circulation and access. The proposed new bridge would include left and right shoulders in both directions.

<u>Nearby Circulation</u>

As a result of implementation of the Bridge Replacement Alternatives, some modifications to the area’s circulation system and access would also be implemented. The Bridge Replacement Alternatives would not change traffic circulation patterns in the vicinity of the Horseshoe Ramps interchange because this interchange would provide the same connections to Pier T Avenue as the existing interchange. The following circulation system modifications would be similar for both the North-side Alignment and the South-side Alignment options with the Bridge Replacement Alternatives:

- Access to the LBGS would require modification of the existing access road from Pier T Avenue to allow bridge construction, but the general location and length of the route would not change.
- Construction of approach roadways to the proposed new bridge with the Bridge Replacement Alternatives would require a realignment of a section of West Broadway west of the Tidelands Warehouse. This realigned section of West Broadway, which is not a public through route, would link with Pico Avenue approximately 300 ft (91 m) south of its existing location.

- Circulation would be modified at the WB Ocean Boulevard ramps from Pico Avenue. The location of the WB off-ramp to Pico Avenue would remain unchanged; however, the WB Ocean Boulevard on-ramp from Pico Avenue would be reconfigured by locating the ramp intersection with Pico Avenue approximately 460 ft (140 m) north of its existing location. The reconfigured on-ramp would loop to the north and east over Pico Avenue and continue looping to the south and west to join the ramp from SB SR 710 before entering WB Ocean Boulevard. The effect of this ramp redesign would be to slightly increase the distance for trips using the ramps compared to the existing "diamond" configuration of the WB ramps.

<u>Daily Traffic Comparisons</u>

Total ADT is useful in determining overall vehicle movement on the area roadway network and in assessing the redistribution of traffic among various origins and destinations; however, peak-hour traffic is used to analyze operations and determine the expected performance of project improvements and their potential effects. Operational analysis is presented below.

Table 2.1.5-11 shows the existing and forecast ADT volumes on the segments of Ocean Boulevard between the Horseshoe Ramps and SR 710. The following observations are based on averaging the volumes for all of the study conditions in years 2005, 2015, and 2030.

Total daily traffic is expected to grow by approximately 29 percent from 59,700 vpd to 77,070 vpd between years 2005 and 2015 with the No Action/Rehabilitation Alternatives.

The improvements provided by the Bridge Replacement Alternatives would potentially draw an estimated 13 percent more vehicles (86,730 vpd) to the new bridge in year 2015 than the vehicle volume projected under the No Action/ Rehabilitation Alternatives (77,070 vpd). Because this project does not add any vehicle trips, the additional traffic on the new bridge, approximately 9,660 vpd, would be redistributed to the new bridge from other roadways and would not constitute an increase in the number of trips within the region.

Total daily traffic is expected to increase by approximately 62 percent, from 77,070 vpd to 124,670 vpd, between years 2015 and 2030 with the No Action/Rehabilitation Alternatives.

The improvements provided by the proposed Bridge Replacement Alternatives would potentially draw an estimated nine percent more vehicles (135,930 vpd) to the new bridge in year 2030 than the vehicle volume projected under the No Action/ Rehabilitation Alternatives (124,670 vpd). Because this project does not add any vehicle trips, the additional traffic on the new bridge, approximately 11,260 vpd, would be redistributed to the new bridge from other roadways and would not constitute an increase in trips within the region.

<u>Analysis of Future Traffic Operations</u>

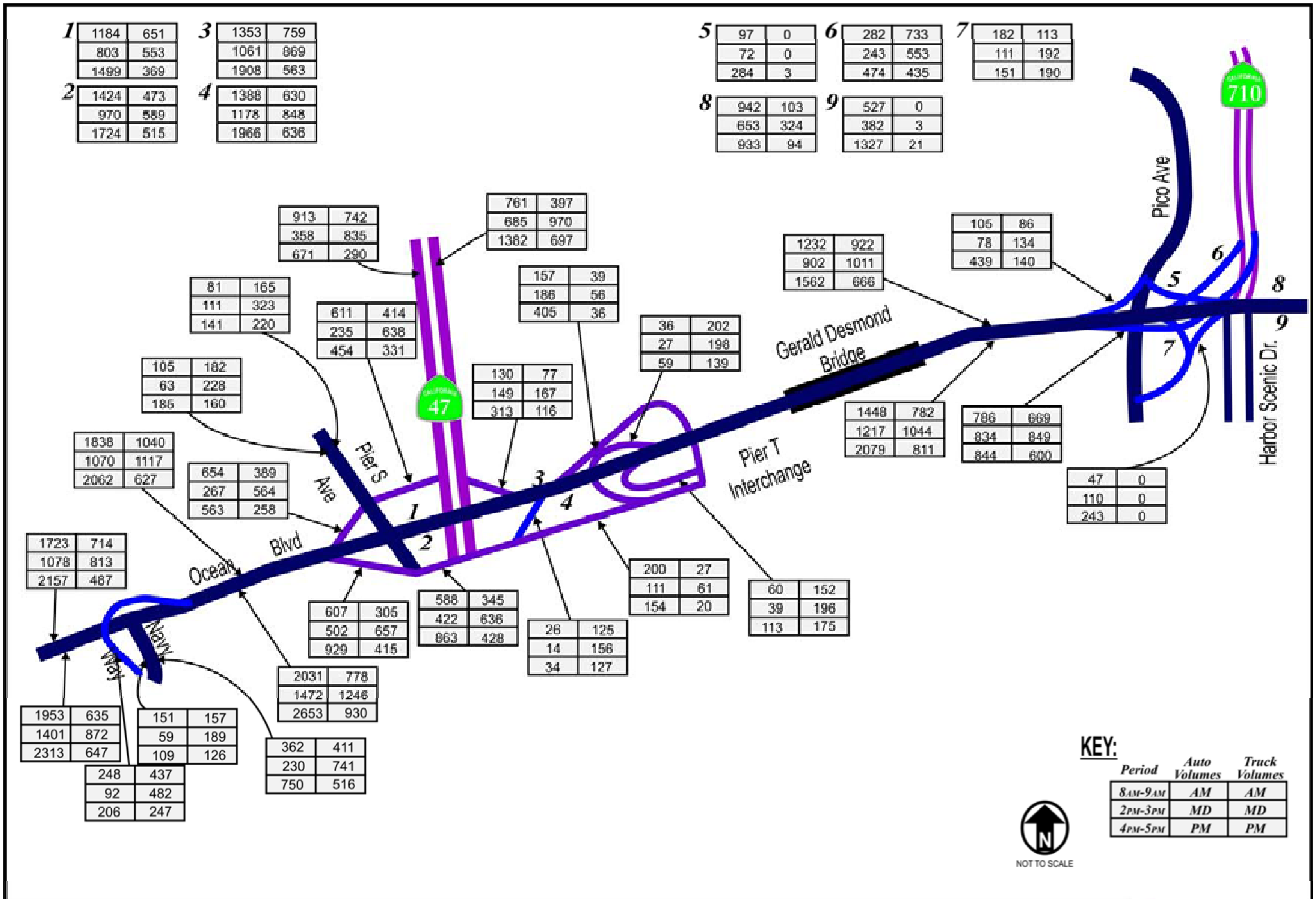
Future traffic operations for the four conditions identified above were analyzed. Table 2.1.5-12 presents the results of the years 2015 and 2030 peak-hour LOS analysis of the eight roadway study segments, along with the existing (year 2005) LOS for comparison purposes. Table 2.1.5-13 presents the results of the years 2015 and 2030 peak-hour LOS analysis at the ramp junctions. Table 2.1.5-14 presents the results of the years 2015 and 2030 peak-hour LOS analysis at the study intersections, along with the existing (year 2005) LOS for comparison purposes.

Table 2.1.5-11
Daily Traffic Volumes on Ocean Boulevard between Terminal Island Interchange and SR 710

Segment of Ocean Boulevard	Existing	2015 No Action/ Rehabilitation Alternatives	2015 Bridge Replacement Alternatives	2030 No Action/ Rehabilitation Alternatives	2030 Bridge Replacement Alternatives
EB from Horseshoe Ramps to SR 710	34,100	40,870	46,070	62,170	68,850
WB from SR 710 to Horseshoe Ramps	25,600	36,200	40,660	62,500	67,080
TOTAL – SR 710 to Horseshoe Ramps – Bridge	**59,700**	**77,070**	**86,730**	**124,670**	**135,930**

EB – eastbound; WB – westbound

Source: Iteris, 2009.



GERALD DESMOND BRIDGE REPLACEMENT PROJECT
Year 2015 No Action/Rehabilitation Alternatives Peak Hour Traffic Volumes on Roadway Segments

EXHIBIT 2.1.5-6

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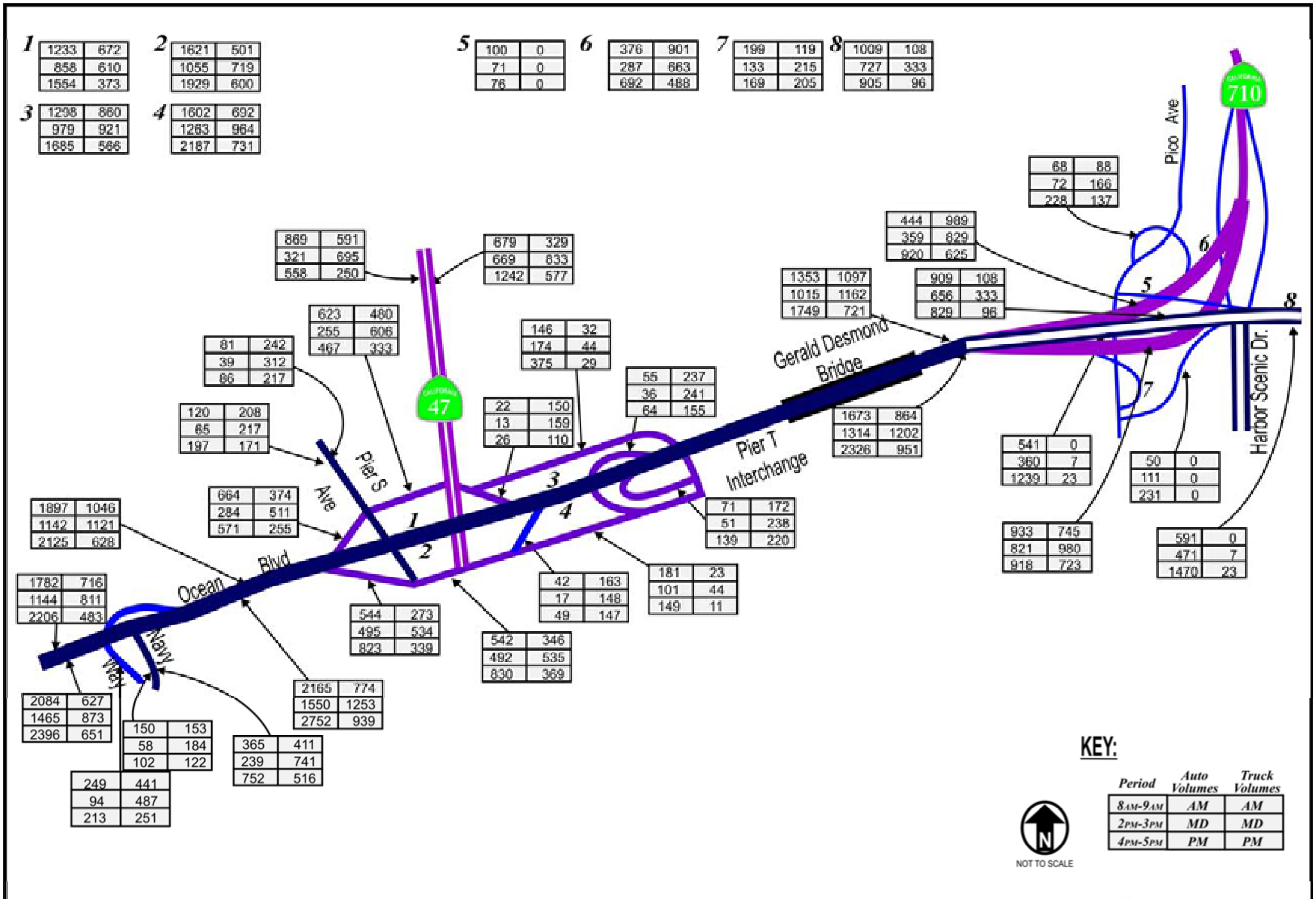

GERALD DESMOND BRIDGE REPLACEMENT PROJECT
Year 2015 Bridge Replacement Alternatives Peak Hour Traffic Volumes on Roadway Segments

EXHIBIT 2.1.5-7

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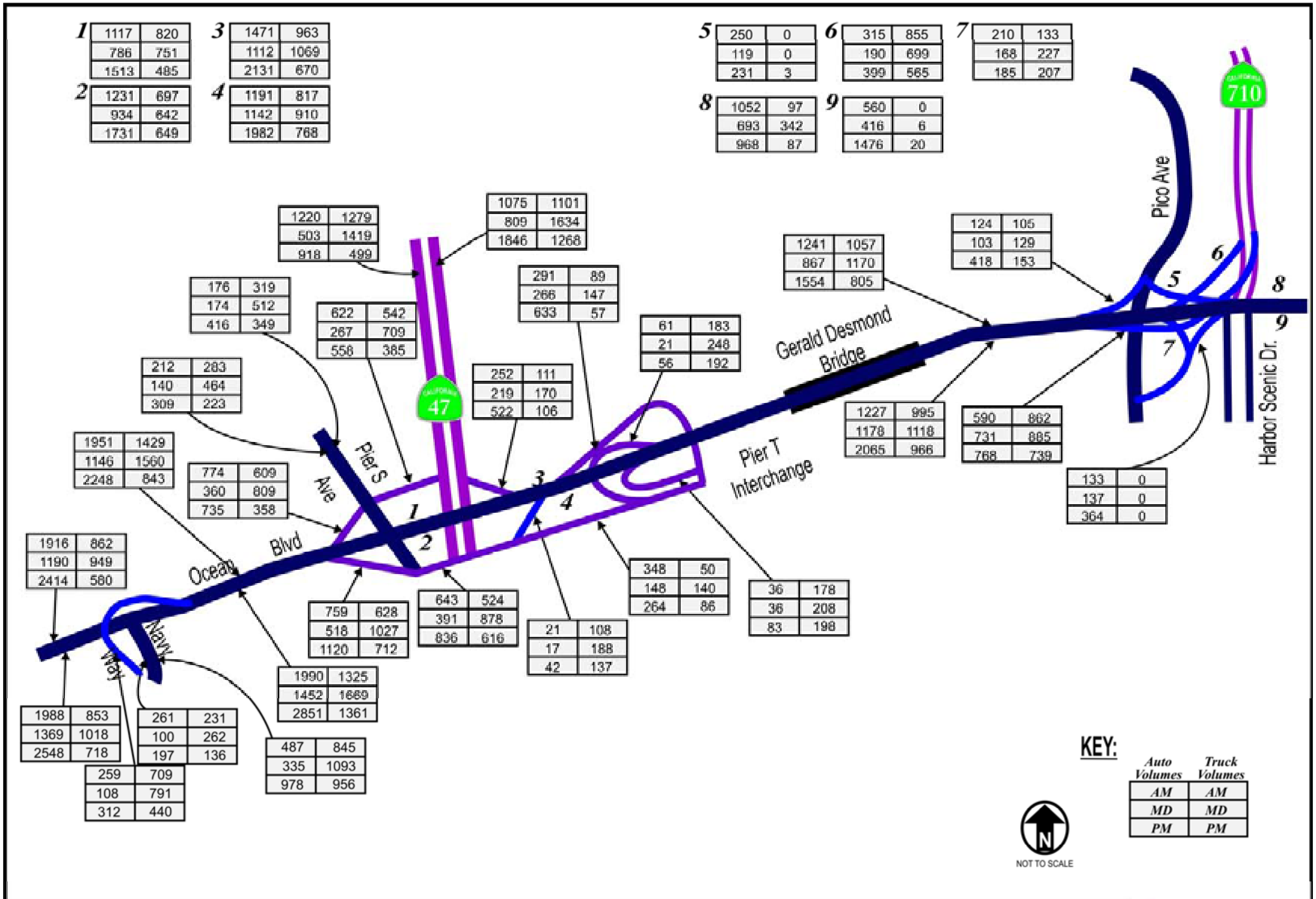

GERALD DESMOND BRIDGE REPLACEMENT PROJECT
Year 2030 No Action/Rehabilitation Alternatives Peak Hour Traffic Volumes on Roadway Segments

EXHIBIT 2.1.5-8

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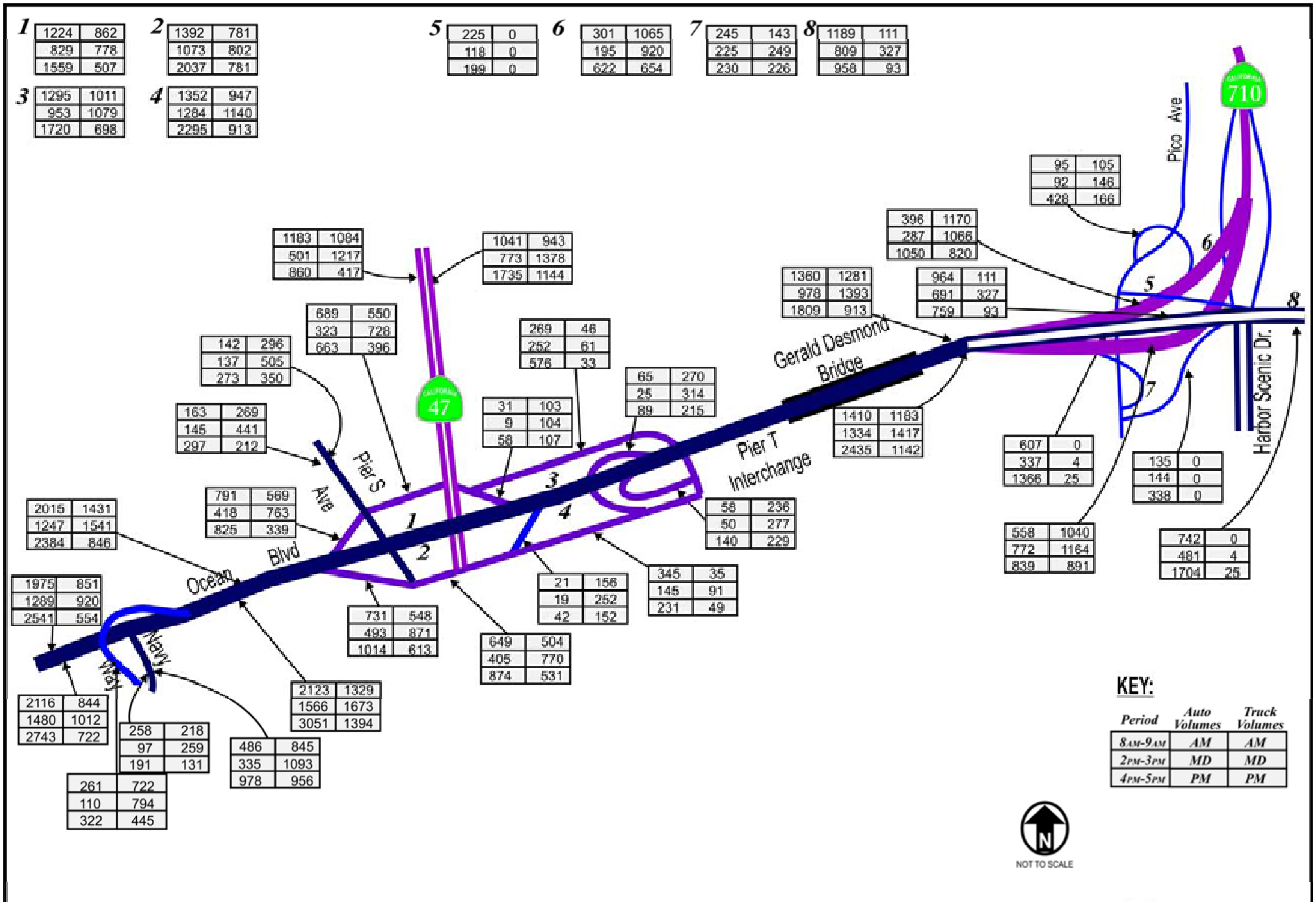

GERALD DESMOND BRIDGE REPLACEMENT PROJECT
Year 2030 Bridge Replacement Alternatives Peak Hour Traffic Volumes on Roadway Segments

EXHIBIT 2.1.5-9

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Table 2.1.5-12
Years 2015 and 2030 Forecast Peak-Hour LOS on Roadway Segments

	Segment	From	To	Year 2005		Year 2015				Year 2030			
				Existing		No Action/ Rehabilitation Alternatives		Bridge Replacement Alternatives		No Action/ Rehabilitation Alternatives		Bridge Replacement Alternatives	
				Speed* or Vehicle Density	LOS	Density	LOS	Density	LOS	Density	LOS	Density	LOS
AM Peak Hour													
1	EB Ocean Blvd	Navy Way	Pier S Avenue	38*	A	19.3	C	20.2	C	115.1	F	25.6	C
	WB Ocean Blvd	Pier S Avenue	Navy Way	30.4*	B	19.8	C	23.7	C	24.6	C	25.4	C
2	EB Ocean Blvd	Pier S Avenue	Terminal Island Freeway	10.6*	F	17.4	B	20.8	C	22.7	C	23.0	C
	WB Ocean Blvd	Terminal Island Freeway	Pier S Avenue	9.4*	F	16.6	B	19.8	C	19.0	C	20.8	C
3	EB Ocean Blvd	Terminal Island Freeway	Horseshoe Ramps	29.6*	B	17.8	B	21.4	C	18.1	C	23.7	C
	WB Ocean Blvd	Horseshoe Ramps	Terminal Island Freeway	14.4*	E	12.7	B	41.3	E	15.8	B	34.0	D
4	EB Gerald Desmond Bridge	Upgrade	Crest	17.0	B	23.3	C	24.8	C	23.2	C	29.5	D
	EB Gerald Desmond Bridge	Crest	Downgrade	21.8	C	28.6	D	21.3	C	27.7	D	24.3	C
5	WB Gerald Desmond Bridge	Upgrade	Crest	20.2	C	60.9	F	22.3	C	79.2	F	25.4	C
	WB Gerald Desmond Bridge	Crest	Downgrade	20.1	C	27.0	D	19.9	C	30.5	D	22.2	C
6	NB Connector	EB Ocean Blvd	NB SR 710	13.8	B	16.2	B	10.1	A	11.9	B	9.3	A
	SB Connector	SB SR 710	WB Ocean Blvd	17.4	B	25.7	C	17.8	B	30.6	D	19.6	C
7	SR 710 NB	NB Connector	NB SR 710 Mainline	14.2	B	15.9	B	10.1	A	11.1	B	9.1	A
	SR 710 SB	SB SR 710 Mainline	SB Connector	9.2	A	13.8	B	17.4	B	16.3	B	19.1	C
8	EB Ocean Blvd	NB Connector	Downtown	4.6	A	5.3	A	13.4	B	7.8	A	15.0	B
	WB Ocean Blvd	Downtown	SB Connector	6.6	A	7.3	A	16.0	B	5.8	A	17.0	B

Table 2.1.5-12
Years 2015 and 2030 Forecast Peak-Hour LOS on Roadway Segments

	Segment	From	To	Year 2005		Year 2015				Year 2030			
				Existing		No Action/ Rehabilitation Alternatives		Bridge Replacement Alternatives		No Action/ Rehabilitation Alternatives		Bridge Replacement Alternatives	
				Speed* or Vehicle Density	LOS	Density	LOS	Density	LOS	Density	LOS	Density	LOS
MD Peak Hour													
1	EB Ocean Blvd	Navy Way	Pier S Avenue	37.6*	A	22.0	C	23.0	C	175.3	F	165.8	F
	WB Ocean Blvd	Pier S Avenue	Navy Way	31.8*	B	18.4	C	22.0	C	19.3	C	22.8	C
2	EB Ocean Blvd	Pier S Avenue	Terminal Island Freeway	14*	E	16.5	B	21.0	C	17.3	B	19.2	C
	WB Ocean Blvd	Terminal Island Freeway	Pier S Avenue	9.2*	F	14.6	B	18.0	B	17.7	B	19.7	C
3	EB Ocean Blvd	Terminal Island Freeway	Horseshoe Ramps	29.5*	B	16.7	B	21.0	C	12.7	B	15.2	B
	WB Ocean Blvd	Horseshoe Ramps	Terminal Island Freeway	13.7*	E	12.8	B	47.0	F	127.7	F	47.6	F
4	EB Gerald Desmond Bridge	Upgrade	Crest	18.8	C	28.2	D	28.0	D	19.3	C	21.9	C
	EB Gerald Desmond Bridge	Crest	Downgrade	23.1	C	30.1	D	22.0	C	22.2	C	17.2	B
5	WB Gerald Desmond Bridge	Upgrade	Crest	19.4	C	52.0	F	21.0	C	70.8	F	24.5	C
	WB Gerald Desmond Bridge	Crest	Downgrade	19.0	C	25.4	C	19.0	C	29.6	D	21.4	C
6	NB Connector	EB Ocean Blvd	NB SR 710	16.0	B	18.0	B	13.0	B	11.8	B	8.8	A
	SB Connector	SB SR 710	WB Ocean Blvd	10.7	A	26.2	D	17.0	B	31.1	D	20.0	C
7	SR 710 NB	NB Connector	NB SR 710 Mainline	17.4	B	18.1	C	13.0	B	11.3	B	9.0	A
	SR 710 SB	SB SR 710 Mainline	SB Connector	6.5	A	14.7	B	16.0	B	16.9	B	20.0	C
8	EB Ocean Blvd	NB Connector	Downtown	1.8	A	3.3	A	9.0	A	4.3	A	7.3	A
	WB Ocean Blvd	Downtown	SB Connector	6.6	A	5.0	A	12.0	B	4.4	A	12.2	B

Table 2.1.5-12
Years 2015 and 2030 Forecast Peak-Hour LOS on Roadway Segments

	Segment	From	To	Year 2005		Year 2015				Year 2030			
				Existing		No Action/ Rehabilitation Alternatives		Bridge Replacement Alternatives		No Action/ Rehabilitation Alternatives		Bridge Replacement Alternatives	
				Speed* or Vehicle Density	LOS	Density	LOS	Density	LOS	Density	LOS	Density	LOS
PM Peak Hour													
1	EB Ocean Blvd	Navy Way	Pier S Avenue	36.1*	A	24.4	C	24.8	C	178.0	F	156.0	F
	WB Ocean Blvd	Pier S Avenue	Navy Way	33.8*	B	20.3	C	24.0	C	26.0	D	29.0	D
2	EB Ocean Blvd	Pier S Avenue	Terminal Island Freeway	9.7*	F	20.0	C	24.3	C	21.3	C	29.4	D
	WB Ocean Blvd	Terminal Island Freeway	Pier S Avenue	9.3*	F	22.9	C	24.8	C	23.4	C	28.2	D
3	EB Ocean Blvd	Terminal Island Freeway	Horseshoe Ramps	29.7*	B	20.4	C	24.6	C	16.4	B	25.2	D
	WB Ocean Blvd	Horseshoe Ramps	Terminal Island Freeway	12.7*	E	18.6	C	17.9	B	20.9	C	20.4	C
4	EB Gerald Desmond Bridge	Upgrade	Crest	20.2	C	26.7	D	29.2	D	20.7	C	28.8	D
	EB Gerald Desmond Bridge	Crest	Downgrade	25.7	C	32.9	D	24.7	C	26.1	C	24.3	C
5	WB Gerald Desmond Bridge	Upgrade	Crest	18.9	C	56.3	F	22.0	C	109.1	F	25.5	C
	WB Gerald Desmond Bridge	Crest	Downgrade	19.5	C	28.9	D	20.2	C	32.6	D	23.2	C
6	NB Connector	EB Ocean Blvd	NB SR 710	13.2	B	16.7	B	14.1	B	10.2	A	9.5	A
	SB Connector	SB SR 710	WB Ocean Blvd	14.4	B	20.4	C	14.3	B	23.4	C	16.0	B
7	SR 710 NB	NB Connector	NB SR 710 Mainline	13.8	B	16.2	B	13.7	B	9.5	A	9.1	A
	SR 710 SB	SB SR 710 Mainline	SB Connector	8.3	A	10.6	A	13.7	B	11.8	B	15.6	B
8	EB Ocean Blvd	NB Connector	Downtown	8.5	A	7.3	A	13.6	B	8.8	A	16.0	B
	WB Ocean Blvd	Downtown	SB Connector	6.9	A	8.6	A	20.8	C	7.9	A	19.4	C

LOS - Level of Service ; NB - Northbound; SB - Southbound; EB - Eastbound; WB - Westbound

* In the existing year 2005 condition, Segments 1-3 are analyzed as arterial segments because of the presence of traffic signals on Ocean Boulevard at the Terminal Island Freeway, Pier S Avenue, and Navy Way. The LOS for arterials is determined by speed (in mph). All other segments are analyzed as multi-lane highways whose LOS is determined by vehicle density (vehicles per lane per mile).

Source: Iteris, 2009.

Table 2.1.5-13
Years 2015 and 2030 Forecast Peak-Hour LOS at Ramp Junctions

Ramp Location	AM Peak		MD Peak		PM Peak	
	Density (pc/mi/ln)	LOS[1]	Density (pc/mi/ln)	LOS[1]	Density (pc/mi/ln)	LOS[1]
Year 2015 No Action/Rehabilitation Alternatives						
WB Ocean Boulevard						
Pico Avenue On-Ramp Merge to Ocean Boulevard	16.8	B	16.0	B	17.7	B
Horseshoe Off-Ramp to Pier T Avenue	24.9	C	23.3	C	24.5	C
EB Ocean Boulevard						
Horseshoe On-Ramp from Pier T Avenue	16.9	B	17.8	B	20.2	C
Ocean Boulevard to SR 710/Downtown Diverge	14.2	B	15.6	B	20.0	B
Ocean Boulevard to Pico Avenue Off-Ramp	6.9	A	5.6	A	13.7	B
Year 2015 Bridge Replacement Alternatives						
WB Ocean Boulevard						
Pico Avenue On-Ramp to Ocean Boulevard	17.0	B	14.4	B	16.4	B
Off-Ramp to Pier T Avenue	21.5	C	20.3	C	20.4	C
EB Ocean Boulevard						
On-Ramp from Pier T Avenue	18.9	B	19.8	B	22.9	C
Ocean Boulevard / SR 710 Diverge	22.5	C	24.6	C	25.8	C
Ocean Boulevard to Pico Avenue	17.6	B	20.3	C	18.0	B
Year 2030 No Action/Rehabilitation Alternatives						
WB Ocean Boulevard						
Pico Avenue On-Ramp Merge to Ocean Boulevard	17.9	B	17.0	B	18.6	B
Horseshoe Off-Ramp to Pier T Avenue	26.8	C	25.0	C	26.2	C
EB Ocean Boulevard						
Horseshoe On-Ramp from Pier T Avenue	17.4	B	18.2	B	21.3	C
Ocean Boulevard to SR 710/Downtown Diverge	15.0	B	16.2	B	21.9	C
Ocean Boulevard to Pico Avenue Off-Ramp	6.9	A	6.6	A	13.8	B
Year 2030 Bridge Replacement Alternatives						
WB Ocean Boulevard						
Pico Avenue On-Ramp to Ocean Boulevard	18.8	B	16.7	B	19.6	B
Off-Ramp to Pier T Avenue	23.1	C	22.0	C	22.5	C
EB Ocean Boulevard						
On-Ramp from Pier T Avenue	20.1	C	21.5	C	24.7	C
Ocean Boulevard / SR 710 Diverge	24.0	C	27.6	C	28.6	D
Ocean Boulevard to Pico Avenue	18.9	B	23.5	C	20.3	C

EB – eastbound; LOS – level of service; pc/mi/ln – passenger cars per mile per lane; WB – westbound

[1] LOS criteria for freeway weaving areas are in density (pc/mi/ln). Density ranges for different LOS types: LOS A, 0 – 10; LOS B, 10.1 – 20; LOS C, 20.1 – 28; LOS D, 28.1 – 35; LOS E, 35.1 – 43; LOS F, > 43.

Source: Iteris, 2009.

Table 2.1.5-14
Years 2015 and 2030 Forecast Peak-Hour LOS at Intersections

	Intersection	Year 2005			Year 2015						Year 2030					
		Existing			No Action/ Rehabilitation Alternatives			Bridge Replacement Alternatives			No Action/ Rehabilitation Alternatives			Bridge Replacement Alternatives		
		LOS	*Del/ Veh**	V/C Ratio*	LOS	*Del/ Veh**	V/C Ratio*	LOS	*Del/ Veh**	V/C Ratio*	LOS	*Del/ Veh**	V/C Ratio*	LOS	*Del/ Veh**	V/C Ratio*
AM Peak Hour																
1	Terminal Island Freeway/ Ocean Blvd	C		0.792	B		0.661	B		0.648	F		1.255	F		1.130
2	Pier S Ave/Ocean Blvd	C		0.709	B		0.681	B		0.679	F		1.110	F		1.008
3	Pier S Ave/New Dock St	A		0.327	A		0.328	A		0.352	B		0.678	A		0.591
4	Navy Way/Seaside Ave	A		0.474	C		0.735	C		0.776	E		0.904	E		0.931
5	Pico Avenue/ Pier B Street & 9th Street	A		0.428	B		0.606	A		0.594	C		0.766	C		0.708
6	Pico Avenue/Pier C Street	A		0.309	A		0.376	A		0.378	A		0.442	A		0.446
7	Terminal Island Freeway SB Off-Ramp/New Dock St	B	*10.8*		B	*12.2*		B	*10.8*		F	*95.1*		E	*48.2*	
	Analyzed as signalized	A		0.217	A		0.441	A		0.339	E		0.913	C		0.793
8	Terminal Island Freeway NB On-Ramp/New Dock St	A	*7.4*		A	*9.1*		A	*8.9*		C	*15.9*		B	*13.9*	
9	Pico Avenue/Pier D Street[a]	B	*10.1*		C	*23.3*		A		0.492	F	*55.1*		B		0.630
10	Pico Avenue/Broadway	B	*10.6*		B	*10.6*		B	*10.3*		B	*11.9*		B	*11.9*	
11	Pico Avenue/Pier E Street[a]	A	*9.9*		B	*12.4*		A		0.331	C	*18.7*		A		0.465
12	Ocean Blvd/Golden Shore Street	A		0.570	B		0.628	B		0.637	B		0.658	B		0.670
13	Ocean Blvd/Magnolia Ave	B		0.693	E		0.907	E		0.929	E		0.982	F		1.099

Table 2.1.5-14
Years 2015 and 2030 Forecast Peak-Hour LOS at Intersections

	Intersection	Year 2005			Year 2015						Year 2030					
		Existing			No Action/ Rehabilitation Alternatives			Bridge Replacement Alternatives			No Action/ Rehabilitation Alternatives			Bridge Replacement Alternatives		
		LOS	*Del/ Veh**	V/C Ratio*	LOS	*Del/ Veh**	V/C Ratio*	LOS	*Del/ Veh**	V/C Ratio*	LOS	*Del/ Veh**	V/C Ratio*	LOS	*Del/ Veh**	V/C Ratio*
MD Peak Hour																
1	Terminal Island Freeway/ Ocean Blvd	D		0.833	E		0.966	D		0.899	F		1.471	F		1.304
2	Pier S Ave/Ocean Blvd	C		0.700	C		0.761	B		0.656	F		1.274	F		1.202
3	Pier S Ave/New Dock St	A		0.350	A		0.420	A		0.432	D		0.843	C		0.739
4	Navy Way/Seaside Ave	A		0.414	C		0.753	C		0.768	D		0.854	D		0.875
5	Pico Avenue/ Pier B Street & 9th Street	A		0.455	A		0.594	B		0.613	D		0.897	B		0.640
6	Pico Avenue/Pier C Street	A		0.340	A		0.309	A		0.306	A		0.385	A		0.381
7	Terminal Island Freeway SB Off-Ramp/New Dock St	A	*9.1*		B	*13.3*		B	*12.1*		E	*47.3*		D	*29.6*	
	Analyzed as signalized	A		0.215	A		0.448	A		0.396	D		0.895	C		0.794
8	Terminal Island Freeway NB On-Ramp/New Dock St	A	*7.6*		B	*11.9*		B	*11.1*		D	*30.6*		C	*22.5*	
9	Pico Avenue/Pier D Street[a]	B	*11.3*		C	*19.2*		A		0.432	E	*42.0*		A		0.529
10	Pico Avenue/Broadway	B	*11.2*		A	*9.8*		A	*9.9*		B	*10.7*		B	*11.3*	
11	Pico Avenue/Pier E Street[a]	B	*11.8*		B	*14.0*		A		0.410	C	23.9		A		0.559
12	Ocean Blvd/Golden Shore Street	A		0.569	B		0.691	C		0.708	C		0.733	C		0.735
13	Ocean Blvd/Magnolia Ave	A		0.575	C		0.741	C		0.785	D		0.869	E		0.912

Table 2.1.5-14
Years 2015 and 2030 Forecast Peak-Hour LOS at Intersections

	Intersection	Year 2005			Year 2015						Year 2030					
		Existing			No Action/ Rehabilitation Alternatives			Bridge Replacement Alternatives			No Action/ Rehabilitation Alternatives			Bridge Replacement Alternatives		
		LOS	*Del/ Veh**	V/C Ratio*	LOS	*Del/ Veh**	V/C Ratio*	LOS	*Del/ Veh**	V/C Ratio*	LOS	*Del/ Veh**	V/C Ratio*	LOS	*Del/ Veh**	V/C Ratio*
PM Peak Hour																
1	Terminal Island Freeway/ Ocean Blvd	E		0.912	D		0.865	D		0.813	F		1.181	F		1.170
2	Pier S Ave/Ocean Blvd	D		0.824	B		0.650	A		0.597	F		1.114	F		1.011
3	Pier S Ave/New Dock St	A		0.356	A		0.337	A		0.337	B		0.684	A		0.588
4	Navy Way/Seaside Ave	A		0.581	E		0.914	E		0.935	F		1.091	F		1.125
5	Pico Avenue/ Pier B Street & 9th Street	A		0.494	A		0.575	A		0.588	B		0.688	B		0.625
6	Pico Avenue/Pier C Street	A		0.343	A		0.306	A		0.308	A		0.402	A		0.402
7	Terminal Island Freeway SB Off-Ramp/New Dock St	A	*9.3*		B	*10.5*		B	*10.3*		C	*15.4*		C	*15.3*	
	Analyzed as signalized	A		0.253	A		0.385	A		0.356	B		0.626	A		0.554
8	Terminal Island Freeway NB On-Ramp/New Dock St	A	*7.9*		B	*10.8*		B	*10.1*		D	*32.7*		C	*21.7*	
9	Pico Avenue/Pier D Street[a]	B	*10.7*		C	*15.5*		A		0.399	E	*36.8*		A		0.543
10	Pico Avenue/Broadway	B	*10.5*		A	*9.3*		A	*10.0*		B	*10.3*		B	*11.4*	
11	Pico Avenue/Pier E Street[a]	B	*11.3*		C	*18.9*		A		0.582	E	*47.6*		C		0.782
12	Ocean Blvd/Golden Shore Street	A		0.593	B		0.693	C		0.719	C		0.739	D		0.801
13	Ocean Blvd/Magnolia Ave	B		0.601	C		0.771	C		0.765	D		0.865	E		0.930

Notes:

LOS - Level of Service ; NB - Northbound; SB - Southbound; N/A - Not Applicable

* Volume-to-capacity (V/C) ratio is reported for signalized intersections and average stopped delay per vehicle (Del/Veh) in seconds is reported for unsignalized intersections *in italics*.

[a] This intersection is currently stop-sign controlled, and a traffic signal would be added at this intersection to accommodate construction detour routing required under the Bridge Replacement Alternatives (signal would be in place by year 2015); therefore, this intersection has been analyzed as a signalized intersection in the 2015 and 2030 future years under the Bridge Rehabilitation Alternatives. There would be no signal installed at this intersection under the No Action/Rehabilitation Alternatives, so this intersection has been analyzed as an unsignalized (stop-sign controlled) intersection in the 2015 and 2030 future years under the No Action/Rehabilitation Alternatives.

Source: Iteris, 2009.

Year 2015 No Action/Rehabilitation Alternatives – Traffic Operations. With the No Action/ Rehabilitation Alternatives, the existing Gerald Desmond Bridge structure and interchanges within the project limits would remain in place; however, the future traffic conditions with the No Action/Rehabilitation Alternatives would be affected by other planned improvements in the traffic study area, which would affect traffic patterns at the project site. One recently completed transportation network improvement is the replacement of the existing at-grade intersections along Ocean Boulevard at SR 47 and Pier S Avenue. This project implemented grade-separated split-diamond interchanges and resulted in Ocean Boulevard becoming a restricted-access facility east of Navy Way. Other planned improvements, including transportation and land development projects that would affect traffic patterns in the traffic study area, are included among the cumulative projects identified in Section 2.4 (Cumulative Impacts) of this document. The additional vehicular trips generated by planned transportation and land development projects are included in the traffic forecasting model used for this study (refer to Appendix G for details on the development of the traffic forecasting model).

Two potential transportation improvement projects are not included among the improvements included in the traffic forecasting model. These projects were not defined at the time that the traffic forecasting model was specified. These projects are truck lanes on SR 710 and I-710 and the SR 47 Expressway improvements, including the direct “flyover” connector ramp serving traffic from EB Ocean Boulevard to NB SR 47. These projects are included in a sensitivity traffic analysis presented in Section 2.4.4.3, which explicitly addresses the traffic effects of these two projects, as well as the effects of all other cumulative projects.

In general, in year 2015 with the No Action/ Rehabilitation Alternatives, peak-hour operating conditions are forecast to be acceptable LOS D or better in the traffic study area except that:

- LOS F would occur during all peak hours on the WB upgrade of the Gerald Desmond Bridge (Segment 5) where three lanes transition to two at the crest of the bridge;
- LOS E conditions would occur at the Terminal Island Freeway signalized intersection with the Ocean Boulevard ramps (Intersection 1) during the MD peak hour;
- LOS E is forecast for the PM peak hour at the intersection of Navy Way and Seaside Avenue (Intersection 4); and
- LOS E would occur during the AM peak hour at the signalized intersection of Ocean Boulevard and Magnolia Avenue (Intersection 13).

Year 2015 Bridge Replacement Alternatives – Traffic Operations. Both the North-side and South-side Alignment Alternatives would provide a new bridge with grades of approximately 5 percent carrying three lanes in each direction across the bridge and on the roadways approaching and leaving the bridge in both directions. Outside the limits of the proposed project site, the roadway network with the Year 2015 Bridge Replacement Alternatives would be the same as described under the Year 2015 No Action/Rehabilitation Alternatives.

In general, in year 2015 with the Bridge Replacement Alternatives, peak-hour operating conditions are forecast to be acceptable LOS A to D in the traffic study area, except that:

- WB Ocean Boulevard from the Horseshoe Ramps to the Terminal Island Freeway (Segment 3) during the AM and MD peak hours is forecast to operate at LOS E and F, respectively;
- LOS E is forecast for the PM peak hour at the intersection of Navy Way and Seaside Avenue (Intersection 4); and
- LOS E would occur during the AM peak hour at the signalized intersection of Ocean Boulevard and Magnolia Avenue (Intersection 13).

Year 2030 No Action/Rehabilitation Alternatives – Traffic Operations. The Year 2030 No Action/ Rehabilitation Alternatives roadway network would be the same as described under the Year 2015 No Action/Rehabilitation Alternatives. In general, in year 2030 with the No Action/Rehabilitation Alternatives, peak-hour operating conditions are forecast to be acceptable LOS D or better in the traffic study area, except that:

- LOS F would occur on EB Ocean Boulevard between Navy Way and Pier S Avenue (Segment 1) during all peak hours;
- LOS F would occur on WB Ocean Boulevard between the Horseshoe Ramps and the Terminal Island Freeway (Segment 3) during the MD peak hour;
- LOS F would occur during all peak hours on the WB upgrade of the Gerald Desmond Bridge (Segment 5) where three lanes transition to two at the crest of the bridge; and
- Intersection LOS is forecast to be LOS E or LOS F during one or more of the three peak hours analyzed at the following locations:

- Terminal Island Freeway and Ocean Boulevard (Intersection 1);
- Pier S Avenue and Ocean Boulevard (Intersection 2);
- Navy Way and Seaside Avenue (Intersection 4);
- Terminal Island Freeway SB Off-Ramp and New Dock (Intersection 7);
- Pico Avenue and Pier D Street (Intersection 9);
- Pico Avenue and Pier E Street (Intersection 11); and
- Ocean Boulevard and Magnolia Avenue (Intersection 13).

Year 2030 Bridge Replacement Alternatives – Traffic Operations. The roadway network with the Bridge Replacement Alternatives would be the same in year 2030 as in year 2015. In general, in year 2030 with the Bridge Replacement Alternatives, peak-hour operating conditions are forecast to be acceptable LOS A to D, except that:

- EB Ocean Boulevard from Navy Way to Pier S Avenue (Segment 1) is forecast to operate at LOS F in the MD and PM peak hours;
- WB Ocean Boulevard from the Horseshoe Ramps to the Terminal Island Freeway (Segment 3) is forecast to operate at LOS F during the MD peak hour;
- Intersection LOS is forecast to be LOS E or LOS F during one or more of the three peak hours analyzed at the following locations:
  - Terminal Island Freeway and Ocean Boulevard (Intersection 1);
  - Pier S Avenue and Ocean Boulevard (Intersection 2);
  - Navy Way and Seaside Avenue (Intersection 4);
  - Terminal Island Freeway SB Off-Ramp and New Dock (Intersection 7); and
  - Ocean Boulevard and Magnolia Avenue (Intersection 13).
- The unsignalized intersection of the Terminal Island Freeway SB Off-Ramp with New Dock Street (intersection 7) is forecast to operate at LOS E in the AM peak hour. Because of the forecast LOS E condition, this intersection was reanalyzed for the AM peak hour as a signalized intersection as stated in the Evaluation Criteria section above. With a future signal in place, this intersection would operate at an acceptable LOS C during the AM peak hour.

Adverse Effects to Traffic during Operation of the Bridge Replacement Alternatives

The process used to determine potential direct adverse traffic effects of the Bridge Replacement Alternatives involves comparisons of the future No Action/Rehabilitation Alternatives in years 2015 and 2030 to the future Bridge Replacement Alternatives in years 2015 and 2030. The traffic volumes and traffic operations analysis presented for the future No Action/Rehabilitation Alternatives and the future Bridge Replacement Alternatives include cumulative projects (i.e., those projects presented in Table 2.4-1 and other transportation and land development projects used in the travel demand forecasting model to emulate year 2015 and 2030 land use forecasts for the southern California region). (See Appendix G for more information on the travel demand forecasting model.)

The direct project effects were determined by comparing the future No Action/Rehabilitation Alternatives with the future Bridge Replacement Alternatives. The comparison quantifies the difference in traffic operations at study intersections and on study roadway segments between the future without the project (No Action/ Rehabilitation Alternatives) and the future with the project (Bridge Replacement Alternatives). If the amount of change expected in traffic operations exceeds the criteria identified in Section 2.1.5.3 above, then mitigation for the direct project effect was proposed. The comparison was made independently for the two future years (2015 and 2030), and direct project effects were identified separately for each year. (See Section 2.4.4.3 regarding cumulative effects on traffic.)

There are no criteria for determining adverse effects in ramp junction (i.e., merge and diverge) areas. A review of LOS conditions for ramp merge and diverge locations indicates that in years 2015 and 2030 these locations would operate at acceptable LOS A to D with both the No Action/ Rehabilitation Alternatives and Bridge Replacement Alternatives (refer to Table 2.1.5-13); therefore, no direct adverse effects of the proposed Bridge Replacement Alternatives to traffic are anticipated in the ramp junction areas.

Intersection Analysis:

As shown in Table 2.1.5-15, the comparison of the No Action/Rehabilitation Alternatives to the Bridge Replacement Alternatives for the 13 study intersections shows adverse effects attributed to operation of the Bridge Replacement Alternatives in 2015 and 2030 at Navy Way/Seaside Avenue (Intersection 4) and Ocean Boulevard/Magnolia Avenue (Intersection 13).

Navy Way/Seaside Avenue. The intersection of Navy Way and Seaside Avenue exceeds the City of Los Angeles criteria for adverse effects at an intersection in years 2015 and 2030. LOS C is expected at this intersection during the **AM peak hour in year 2015** under the Bridge Replacement Alternative conditions. The V/C ratio is 0.041 higher under the Bridge Replacement Alternative conditions than under the No Action/Rehabilitation Alternatives, which exceeds the threshold criterion of an increase of 0.040 in the V/C ratio for a build condition LOS C. LOS E is expected at this intersection during the **PM peak hour in year 2015** under the Bridge Replacement Alternative conditions. The V/C ratio is 0.021 higher under the Bridge Replacement Alternative conditions than under the No Action/Rehabilitation Alternatives, which exceeds the threshold criterion of an increase of 0.010 in the V/C ratio for a build condition LOS E or F.

During the **AM peak hour in year 2030**, LOS E is expected under the Bridge Replacement Alternative conditions at the intersection of Navy Way and Seaside Avenue. The V/C ratio is 0.027 higher under the Bridge Replacement Alternative conditions than under the No Action/Rehabilitation Alternatives, which exceeds the threshold criterion of an increase of 0.010 in the V/C ratio for a build condition LOS E. During the **MD peak hour in year 2030,** LOS D is expected under the Bridge Replacement Alternative conditions. The V/C ratio is 0.021 higher under the Bridge Replacement Alternative conditions than under the No Action/ Rehabilitation Alternatives, which exceeds the threshold criterion of an increase of 0.020 in the V/C ratio for a build condition LOS D. During the **PM peak hour in year 2030**, LOS F is expected under the Bridge Replacement Alternative conditions. The V/C ratio is 0.034 higher under the Bridge Replacement Alternative conditions than under the No Action/Rehabilitation Alternatives, which exceeds the threshold criterion of an increase of 0.010 in the V/C ratio for a build condition LOS F.

An additional left-turn lane from NB Navy Way to WB Seaside Avenue is proposed to mitigate the adverse effect at this intersection. Table 2.1.5-16 shows that the proposed mitigation would result in V/C ratios under the Bridge Replacement Alternative that are less than the V/C ratios under the No Action/Rehabilitation Alternatives; therefore, the proposed mitigation removes the adverse effect under the Bridge Replacement Alternatives.

Ocean Boulevard/Magnolia Avenue. The intersection of Ocean Boulevard and Magnolia Avenue in downtown Long Beach exceeds the City of Long Beach criteria for adverse effects at an intersection in years 2015 and 2030. LOS E is expected at this intersection during the **AM peak hour in year 2015** under the Bridge Replacement Alternative conditions. The V/C ratio is 0.022 higher under the Bridge Replacement Alternative conditions than under the No Action/Rehabilitation Alternatives, which exceeds the threshold criterion of an increase of 0.020 in the V/C ratio for a build condition LOS E. During **all three peak hours in year 2030**, LOS E or F is expected at this intersection under the Bridge Replacement Alternative conditions. The V/C ratio is higher under the Bridge Replacement Alternative conditions than under the No Action/Rehabilitation Alternatives by 0.117, 0.043, and 0.065 during the AM, MD, and PM peak hours, respectively. All of these increases in the V/C ratio exceed the threshold criterion of an increase of 0.010 in the V/C ratio for a build condition LOS E or F.

The expected intersection LOS and changes in V/C ratio are presented in Table 2.1.5-13. One cause of the increase in the V/C ratio is the increased volume traveling through the intersection because the congestion-relief benefits of the Bridge Replacement Alternatives are expected to redistribute traffic to the bridge and approach roadways to avoid other more-congested roadways.

Conversion of the #2 SB through lane on the Magnolia Avenue approach to Ocean Boulevard to a shared through/right-turn lane, along with associated signalization improvements, has been identified as one potential way to mitigate the adverse effect at this intersection. Table 2.1.5-17 shows that the identified restriping and signalization improvements would result in V/C ratios under the Bridge Replacement Alternative condition that are lower than under the No Action/Rehabilitation Alternatives; therefore, restriping and signalization improvements remove the adverse effect under the Bridge Replacement Alternatives. The Port will coordinate with the Long Beach City Traffic Engineer and provide funding for restriping and/or signalization improvements at the intersection of Ocean Boulevard and Magnolia Avenue as mitigation for the effect of a Bridge Replacement Alternative at the intersection.

Table 2.1.5-15 Project Effects at Study Intersections

		Year 2015								Year 2030							
		No Action/ Rehabilitation Alternatives			Bridge Replacement Alternatives			No Action/Rehab Alts. vs. 2015 Bridge Replace Alts.		No Action/ Rehabilitation Alternatives			Bridge Replacement Alternatives			No Action/Rehab Alts. vs. 2030 Bridge Replace Alts.	
	Intersection	LOS	*Del/Veh**	V/C Ratio*	LOS	*Del/Veh**	V/C Ratio*	Difference	Adverse Effect[b]	LOS	*Del/Veh**	V/C Ratio*	LOS	*Del/Veh**	V/C Ratio*	Difference	Adverse Effect[b]
AM Peak Hour																	
1	Terminal Island Freeway/Ocean Boulevard	B		0.661	B		0.648	-0.013	No	F		1.255	F		1.130	-0.125	No
2	Pier S Avenue/Ocean Boulevard	B		0.681	B		0.679	-0.002	No	F		1.110	F		1.008	-0.102	No
3	Pier S Avenue/New Dock Street	A		0.328	A		0.352	0.024	No	B		0.678	A		0.591	-0.087	No
4	Navy Way/Seaside Avenue	C		0.735	C		0.776	0.041	Yes	E		0.904	E		0.931	0.027	Yes
5	Pico Avenue/Pier B Street & 9th Street	B		0.606	A		0.594	-0.012	No	C		0.766	C		0.708	-0.058	No
6	Pico Avenue/Pier C Street	A		0.376	A		0.378	0.002	No	A		0.442	A		0.446	0.004	No
7	Terminal Island Freeway SB Off-Ramp/New Dock St	B	*12.2*		B	*10.8*				F	*95.1*		E	*48.2*			
	analyzed as a signal (see Note B, City of Long Beach)	A		0.441	A		0.339	-0.102	No	E		0.913	C		0.793	-0.120	No
8	Terminal Island Freeway NB On-Ramp/New Dock St	A	*9.1*		A	*8.9*		*-0.2*	No	C	*15.9*		B	*13.9*		*-2.0*	No
9	Pico Avenue/Pier D Street[a]	C	*23.3*		A		0.492	*N/A*	No	F	*55.1*		B		0.630	*N/A*	No
10	Pico Avenue/Broadway	B	*10.6*		B	*10.3*		*-0.3*	No	B	*11.9*		B	*11.9*		*0.0*	No
11	Pico Avenue/Pier E Street[a]	B	*12.4*		A		0.331	*N/A*	No	C	*18.7*		A		0.465	*N/A*	No
12	Ocean Boulevard/Golden Shore Street	B		0.628	B		0.637	0.009	No	B		0.658	B		0.670	0.012	No
13	Ocean Boulevard/Magnolia Avenue	E		0.907	E		0.929	0.022	Yes	E		0.982	F		1.099	0.117	Yes
MD Peak Hour																	
1	Terminal Island Freeway/Ocean Boulevard	E		0.966	D		0.899	-0.067	No	F		1.471	F		1.304	-0.167	No
2	Pier S Avenue/Ocean Boulevard	C		0.761	B		0.656	-0.105	No	F		1.274	F		1.202	-0.072	No
3	Pier S Avenue/New Dock Street	A		0.420	A		0.432	0.012	No	D		0.843	C		0.739	-0.104	No
4	Navy Way/Seaside Avenue	C		0.753	C		0.768	0.015	No	D		0.854	D		0.875	0.021	Yes
5	Pico Avenue/Pier B Street & 9th Street	A		0.594	B		0.613	0.019	No	D		0.897	B		0.640	-0.257	No
6	Pico Avenue/Pier C Street	A		0.309	A		0.306	-0.003	No	A		0.385	A		0.381	-0.004	No
7	Terminal Island Freeway SB Off-Ramp/New Dock St	B	*13.3*		B	*12.1*		*-1.2*	No	E	*47.3*		D	*29.6*		*-17.7*	No
	analyzed as a signal (see Note B, City of Long Beach)	A		0.448	A		0.396	-0.052	No	D		0.895	C		0.794	-0.101	No
8	Terminal Island Freeway NB On-Ramp/New Dock St	B	*11.9*		B	*11.1*		*-0.8*	No	D	*30.6*		C	*22.5*		*-8.1*	No
9	Pico Avenue/Pier D Street[a]	C	*19.2*		A		0.432	*N/A*	No	E	*42.0*		A		0.529	*N/A*	No
10	Pico Avenue/Broadway	A	*9.8*		A	*9.9*		*0.1*	No	B	*10.7*		B	*11.3*		*0.6*	No
11	Pico Avenue/Pier E Street[a]	B	*14.0*		A		0.410	*N/A*	No	C	*23.9*		A		0.559	*N/A*	No
12	Ocean Boulevard/Golden Shore Street	B		0.691	C		0.708	0.017	No	C		0.733	C		0.735	0.002	No
13	Ocean Boulevard/Magnolia Avenue	C		0.741	C		0.785	0.044	No	D		0.869	E		0.912	0.043	Yes
PM Peak Hour																	
1	Terminal Island Freeway/Ocean Boulevard	D		0.865	D		0.813	-0.052	No	F		1.181	F		1.170	-0.011	No
2	Pier S Avenue/Ocean Boulevard	B		0.650	A		0.597	-0.053	No	F		1.114	F		1.011	-0.103	No
3	Pier S Avenue/New Dock Street	A		0.337	A		0.337	0.000	No	B		0.684	A		0.588	-0.096	No
4	Navy Way/Seaside Avenue	E		0.914	E		0.935	0.021	Yes	F		1.091	F		1.125	0.034	Yes
5	Pico Avenue/Pier B Street & 9th Street	A		0.575	A		0.588	0.013	No	B		0.688	B		0.625	-0.063	No
6	Pico Avenue/Pier C Street	A		0.306	A		0.308	0.002	No	A		0.402	A		0.402	0.000	No
7	Terminal Island Freeway SB Off-Ramp/New Dock St	B	*10.5*		B	*10.3*		*-0.2*	No	C	*15.4*		C	*15.3*		*-0.1*	No
	analyzed as a signal (see Note B, City of Long Beach)	A		0.385	A		0.356	-0.029	No	B		0.626	A		0.554	-0.072	No
8	Terminal Island Freeway NB On-Ramp/New Dock St	B	*10.8*		B	*10.1*		*-0.7*	No	D	*32.7*		C	*21.7*		*-11.0*	No
9	Pico Avenue/Pier D Street[a]	C	*15.5*		A		0.399	*N/A*	No	E	*36.8*		A		0.543	*N/A*	No
10	Pico Avenue/Broadway	A	*9.3*		A	*10.0*		*0.7*	No	B	*10.3*		B	*11.4*		*1.1*	No
11	Pico Avenue/Pier E Street[a]	C	*18.9*		A		0.582	*N/A*	No	E	*47.6*		C		0.782	*N/A*	No
12	Ocean Boulevard/Golden Shore Street	B		0.693	C		0.719	0.026	No	C		0.739	D		0.801	0.062	No
13	Ocean Boulevard/Magnolia Avenue	C		0.771	C		0.765	-0.006	No	D		0.865	E		0.930	0.065	Yes

Notes: LOS - Level of Service ; NB - Northbound; SB - Southbound; N/A - Not Applicable

* Volume-to-capacity (V/C) ratio is reported for signalized intersections and average stopped delay per vehicle (Del/Veh) in seconds is reported for unsignalized intersections *in italics*. "Difference" is the change in the applicable V/C ratio or Del/Veh.

a This intersection is currently stop-sign controlled and a traffic signal would be added at this intersection to accommodate construction detour routing required under the Bridge Replacement Alternatives (signal would be in place by year 2015). Therefore, this intersection has been analyzed as a signalized intersection in the 2015 and 2030 future years under the Bridge Rehabilitation Alternatives. There would be no signal installed at this intersection under the No Action/Rehabilitation Alternatives, so this intersection has been analyzed as an unsignalized (stop sign controlled) intersection in the 2015 and 2030 future years under the No Action/Rehabilitation Alternatives.

b **Criteria and Thresholds Used to Determine Adverse Effect:**

- City of Long Beach, signalized intersections (applies to intersections #1-3, #5-6, and #12-13): Adverse effect would occur where the Build condition (Bridge Replacement Alternatives) would result in LOS E or F and the intersection V/C ratio increases by more than 0.020 over the No Build (No Action/Rehabilitation Alternatives) condition or the existing condition.
- City of Long Beach, unsignalized intersections (applies to intersections #7-11): The City has no established criteria for determination of adverse effects at unsignalized intersections. If the Build condition has an LOS E or F at an unsignalized intersection, then the intersection must be reanalyzed using the signalized intersection method and criteria to identify any adverse effects. This analysis assumes that there would be an adverse effect under the No Action/Rehabilitation Alternatives if LOS E or F is forecast for an unsignalized intersection in year 2015 or 2030. For comparisons of intersections which are unsignalized under the No Action/Rehabilitation Alternatives and signalized under the Bridge Replacement Alternatives, this analysis assumes that there would be an adverse effect if the Bridge Replacement Alternatives would result in LOS E or F at the future signalized intersection.
- City of Los Angeles (applies to signalized intersection #4): Adverse effect would occur where the final (future) LOS is E or F and an increase in V/C of 0.01 or greater would occur as a result of the project; for LOS D, an increase of 0.02 or greater; or for LOS C, an increase of 0.04 or greater.

Yes Highlight indicates locations with adverse effect where threshold criteria for an adverse effect have been exceeded and the effect is directly attributable to the proposed Bridge Replacement Alternatives.

Source: Iteris, 2009.

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Table 2.1.5-16
Intersection Effects With and Without Mitigation at Navy Way/Seaside Avenue

Peak Hour		Year 2005		Year 2015				Year 2030			
		Existing		No Action/ Rehabilitation Alternatives		Bridge Replacement Alternatives		No Action/ Rehabilitation Alternatives		Bridge Replacement Alternatives	
		LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C
AM	Navy Way/ Seaside Avenue	A	0.474	C	0.735	C	0.776	E	0.904	E	0.931
	with Additional NB Left-Turn Lane					C	0.734			D	0.863
MD	Navy Way/ Seaside Avenue	A	0.414	C	0.753	C	0.768	D	0.854	D	0.875
	with Additional NB Left-Turn Lane					C	0.716			D	0.807
PM	Navy Way/ Seaside Avenue	A	0.581	E	0.914	E	0.935	F	1.091	F	1.125
	with Additional NB Left-Turn Lane					D	0.874			F	1.029

LOS – level of service; NB – northbound; V/C – volume-to-capacity ratio
Source: Iteris, 2009.

Table 2.1.5-17
Intersection Effects With and Without Mitigation at Ocean Boulevard/Magnolia Avenue

Peak Hour		Year 2005		Year 2015				Year 2030			
		Existing		No Action/ Rehabilitation Alternatives		Bridge Replacement Alternatives		No Action/ Rehabilitation Alternatives		Bridge Replacement Alternatives	
		LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C
AM	Ocean Blvd/ Magnolia Avenue	B	0.693	E	0.907	E	0.929	E	0.982	F	1.099
	with proposed restriping and signalization					C	0.769			E	0.931
MD	Ocean Blvd/ Magnolia Avenue	A	0.575	C	0.741	C	0.785	D	0.869	E	0.912
	with proposed restriping and signalization					B	0.657			D	0.812
PM	Ocean Blvd/ Magnolia Avenue	B	0.601	C	0.771	C	0.765	D	0.865	E	0.930
	with proposed restriping and signalization					B	0.649			C	0.791

LOS – level of service; V/C – volume-to-capacity ratio
Source: Iteris, 2009.

Roadway Segment Analysis:

As shown in Table 2.1.5-18, the comparison of the study roadway segments in 2015 and 2030 for the Bridge Replacement Alternatives to the No Action/Rehabilitation Alternatives shows an adverse effect at WB Ocean Boulevard from the Horseshoe Ramps to the Terminal Island Freeway interchange (Segment 3) during the MD peak hour in 2015 and no adverse effect on any roadway segment in 2030.

WB Segment of Ocean Boulevard from the Horseshoe Ramps to the Terminal Island Freeway Interchange. This segment of Ocean Boulevard is forecast to operate at LOS F during the **MD peak hour in year 2015** under the Bridge Replacement Alternative condition with a density of 47.0 vehicles per lane per mile, as shown in Table 2.1.5-18. In year 2015 under the No Action/ Rehabilitation Alternatives, this segment is forecast to operate at LOS B, with a density of 12.8; therefore, an adverse effect is found under the Bridge Replacement Alternative condition in year 2015 due to the forecast LOS F and increased vehicle density that would occur along this WB segment of Ocean Boulevard.

The better LOS and lower density predicted along this WB segment of Ocean Boulevard under the No Action/Rehabilitation Alternatives than under the Bridge Replacement Alternatives is a result of the existing lane configuration that is reduced from three lanes to two at the crest of the Gerald Desmond Bridge. The existing lane configuration causes an increase in traffic congestion on WB Ocean Boulevard, which limits the volume of vehicles that can flow into the WB segment of Ocean Boulevard from the Horseshoe Ramps to the Terminal Island Freeway interchange, thereby providing a relatively low density and better LOS than would be experienced under the Bridge Replacement Alternative condition. The proposed Bridge Replacement Alternatives include three through lanes in each direction on the bridge, thus eliminating the existing transition from three to two lanes at the crest of the bridge, and thereby allowing a higher volume and density of traffic to flow into the WB segment of Ocean Boulevard from the Horseshoe Ramps to the Terminal Island Freeway interchange. It is predicted that this increase in traffic flow under the Bridge Replacement Alternative condition would strain the Terminal Island Freeway interchange, resulting in an increased traffic queue (traffic backup). The queue would cause traffic on WB Ocean Boulevard from the Horseshoe Ramps to the Terminal Island Freeway interchange to operate poorly at LOS F.

During the **MD peak hour in year 2030,** the WB segment of Ocean Boulevard from the Horseshoe Ramps to the Terminal Island Freeway interchange is forecast to operate at LOS F under both the No Action/Rehabilitation Alternatives and the Bridge Replacement Alternative conditions, with vehicle densities of 127.0 and 47.6, respectively. Because the density is lower under the Bridge Replacement Alternative condition, traffic operations are forecast to be better under the Bridge Replacement Alternative condition; therefore, no adverse effect under the Bridge Replacement Alternative condition would occur in year 2030. The finding of an adverse effect in year 2015 and no adverse effect in year 2030 under the Bridge Replacement Alternative condition results from a deterioration of operating conditions under the No Action/ Rehabilitation Alternatives attributable to local and regional traffic growth between years 2015 and 2030. Operating conditions under the No Action/ Rehabilitation Alternatives deteriorate on this segment because traffic from Pier T destined for Ocean Boulevard west of the Terminal Island Freeway and for the Terminal Island Freeway itself uses this segment of the Ocean Boulevard mainline. Under the Bridge Replacement Alternatives, traffic operations do not deteriorate substantially because traffic from Pier T does not use the Ocean Boulevard mainline between the Horseshoe Ramps and the Terminal Island Freeway; traffic from Pier T uses the parallel Ocean Boulevard service road and enters the Ocean Boulevard mainline west of Pier S Street.

Because the adverse effect is expected in year 2015 but not in year 2030, the adverse effect is considered temporary. A grade-separated “flyover” ramp serving traffic from EB Ocean Boulevard to NB SR 47 is proposed as a component of the Schuyler Heim Bridge Replacement and SR 47 Expressway project. The proposed construction schedule shows completion of the flyover in 2015 (Caltrans, 2007a). Operation of the flyover in conjunction with either of the Bridge Replacement Alternatives would relieve the strain on the Terminal Island Freeway interchange and result in improved LOS on WB Ocean Boulevard, and there would be no adverse effect of the Bridge Replacement Alternatives on WB Ocean Boulevard from the Horseshoe Ramps to the Terminal Island Freeway interchange. The effect of the proposed Bridge Replacement Alternatives in conjunction with the reasonable foreseeable construction of the SR 47 Flyover under Schuyler Heim Bridge Replacement and SR 47 Expressway project would be a cumulative benefit to traffic operations on the WB segment of Ocean Boulevard from the Horseshoe Ramps to the Terminal Island Freeway interchange, as discussed in Section 2.4.4.3.

Table 2.1.5-18 Project-Related Effects on Roadway Segments

				Year 2015						Year 2030					
				No Action/ Rehab. Alts.		Bridge Replace Alternatives		No Action/Rehab. Alternatives vs. 2015 Bridge Replace Alts.		No Action/ Rehab. Alts.		Bridge Replace Alternatives		No Action/Rehab. Alternatives vs. 2030 Bridge Replace Alternatives	
	Segment	From	To	Density	LOS	Density	LOS	Density Difference	Adverse Effect[a]	Density	LOS	Density	LOS	Density Difference	Adverse Effect[a]
AM Peak Hour															
1	EB Ocean Boulevard	Navy Way	Pier S Avenue	19.3	C	20.2	C	1.0	No	115.1	F	25.6	C	-89.5	No
	WB Ocean Boulevard	Pier S Avenue	Navy Way	19.8	C	23.7	C	3.9	No	24.6	C	25.4	C	0.8	No
2	EB Ocean Boulevard	Pier S Avenue	Terminal Island Freeway	17.4	B	20.8	C	3.3	No	22.7	C	23.0	C	0.3	No
	WB Ocean Boulevard	Terminal Island Freeway	Pier S Avenue	16.6	B	19.8	C	3.1	No	19.0	C	20.8	C	1.8	No
3	EB Ocean Boulevard	Terminal Island Freeway	Horseshoe Ramps	17.8	B	21.4	C	3.6	No	18.1	C	23.7	C	5.6	No
	WB Ocean Boulevard	Horseshoe Ramps	Terminal Island Freeway	12.7	B	41.3	E	28.6	No	15.8	B	34.0	D	18.2	No
4	EB Gerald Desmond Bridge	Upgrade	Crest	23.3	C	24.8	C	1.5	No	23.2	C	29.5	D	6.2	No
	EB Gerald Desmond Bridge	Crest	Downgrade	28.6	D	21.3	C	-7.3	No	27.7	D	24.3	C	-3.5	No
5	WB Gerald Desmond Bridge	Upgrade	Crest	60.9	F	22.3	C	-38.6	No	79.2	F	25.4	C	-53.8	No
	WB Gerald Desmond Bridge	Crest	Downgrade	27.0	D	19.9	C	-7.1	No	30.5	D	22.2	C	-8.3	No
6	NB Connector	EB Ocean Boulevard	NB I-710	16.2	B	10.1	A	-6.1	No	11.9	B	9.3	A	-2.6	No
	SB Connector	SB I-710	WB Ocean Boulevard	25.7	C	17.8	B	-7.9	No	30.6	D	19.6	C	-11.0	No
7	I-710 NB	NB Connector	NB I-710 Mainline	15.9	B	10.1	A	-5.8	No	11.1	B	9.1	A	-2.0	No
	I-710 SB	SB I-710 Mainline	SB Connector	13.8	B	17.4	B	3.6	No	16.3	B	19.1	C	2.8	No
8	EB Ocean Boulevard	NB Connector	Downtown	5.3	A	13.4	B	8.1	No	7.8	A	15.0	B	7.2	No
	WB Ocean Boulevard	Downtown	SB Connector	7.3	A	16.0	B	8.7	No	5.8	A	17.0	B	11.2	No
MD Peak Hour															
1	EB Ocean Boulevard	Navy Way	Pier S Avenue	22.0	C	23.0	C	1.0	No	175.3	F	165.8	F	-9.5	No
	WB Ocean Boulevard	Pier S Avenue	Navy Way	18.4	C	22.0	C	3.6	No	19.3	C	22.8	C	3.6	No
2	EB Ocean Boulevard	Pier S Avenue	Terminal Island Freeway	16.5	B	21.0	C	4.5	No	17.3	B	19.2	C	1.8	No
	WB Ocean Boulevard	Terminal Island Freeway	Pier S Avenue	14.6	B	18.0	B	3.4	No	17.7	B	19.7	C	2.0	No
3	EB Ocean Boulevard	Terminal Island Freeway	Horseshoe Ramps	16.7	B	21.0	C	4.3	No	12.7	B	15.2	B	2.5	No
	WB Ocean Boulevard	Horseshoe Ramps	Terminal Island Freeway	12.8	B	47.0	F	34.2	Yes	127.7	F	47.6	F	-80.1	No
4	EB Gerald Desmond Bridge	Upgrade	Crest	28.2	D	28.0	D	-0.2	No	19.3	C	21.9	C	2.6	No
	EB Gerald Desmond Bridge	Crest	Downgrade	30.1	D	22.0	C	-8.1	No	22.2	C	17.2	B	-5.0	No
5	WB Gerald Desmond Bridge	Upgrade	Crest	52.0	F	21.0	C	-31.0	No	70.8	F	24.5	C	-46.3	No
	WB Gerald Desmond Bridge	Crest	Downgrade	25.4	C	19.0	C	-6.4	No	29.6	D	21.4	C	-8.2	No
6	NB Connector	EB Ocean Boulevard	NB I-710	18.0	B	13.0	B	-5.0	No	11.8	B	8.8	A	-3.0	No
	SB Connector	SB I-710	WB Ocean Boulevard	26.2	D	17.0	B	-9.2	No	31.1	D	20.0	C	-11.1	No
7	I-710 NB	NB Connector	NB I-710 Mainline	18.1	C	13.0	B	-5.1	No	11.3	B	9.0	A	-2.3	No
	I-710 SB	SB I-710 Mainline	SB Connector	14.7	B	16.0	B	1.3	No	16.9	B	20.0	C	3.1	No
8	EB Ocean Boulevard	NB Connector	Downtown	3.3	A	9.0	A	5.7	No	4.3	A	7.3	A	3.0	No
	WB Ocean Boulevard	Downtown	SB Connector	5.0	A	12.0	B	7.0	No	4.4	A	12.2	B	7.8	No
PM Peak Hour															
1	EB Ocean Boulevard	Navy Way	Pier S Avenue	24.4	C	24.8	C	0.4	No	178.0	F	156.0	F	-21.9	No
	WB Ocean Boulevard	Pier S Avenue	Navy Way	20.3	C	24.0	C	3.8	No	26.0	D	29.0	D	3.0	No
2	EB Ocean Boulevard	Pier S Avenue	Terminal Island Freeway	20.0	C	24.3	C	4.3	No	21.3	C	29.4	D	8.1	No
	WB Ocean Boulevard	Terminal Island Freeway	Pier S Avenue	22.9	C	24.8	C	2.0	No	23.4	C	28.2	D	4.8	No
3	EB Ocean Boulevard	Terminal Island Freeway	Horseshoe Ramps	20.4	C	24.6	C	4.2	No	16.4	B	25.2	C	8.8	No
	WB Ocean Boulevard	Horseshoe Ramps	Terminal Island Freeway	18.6	C	17.9	B	-0.8	No	20.9	C	20.4	C	-0.5	No
4	EB Gerald Desmond Bridge	Upgrade	Crest	26.7	D	29.2	D	2.4	No	20.7	C	28.8	D	8.1	No
	EB Gerald Desmond Bridge	Crest	Downgrade	32.9	D	24.7	C	-8.2	No	26.1	D	24.3	C	-1.8	No
5	WB Gerald Desmond Bridge	Upgrade	Crest	56.3	F	22.0	C	-34.3	No	109.1	F	25.5	C	-83.6	No
	WB Gerald Desmond Bridge	Crest	Downgrade	28.9	D	20.2	C	-8.7	No	32.6	D	23.2	C	-9.5	No
6	NB Connector	EB Ocean Boulevard	NB I-710	16.7	B	14.1	B	-2.6	No	10.2	A	9.5	A	-0.7	No
	SB Connector	SB I-710	WB Ocean Boulevard	20.4	C	14.3	B	-6.1	No	23.4	C	16.0	B	-7.4	No
7	I-710 NB	NB Connector	NB I-710 Mainline	16.2	B	13.7	B	-2.5	No	9.5	A	9.1	A	-0.4	No
	I-710 SB	SB I-710 Mainline	SB Connector	10.6	A	13.7	B	3.2	No	11.8	B	15.6	B	3.8	No
8	EB Ocean Boulevard	NB Connector	Downtown	7.3	A	13.6	B	6.3	No	8.8	A	16.0	B	7.2	No
	WB Ocean Boulevard	Downtown	SB Connector	8.6	A	20.8	C	12.2	No	7.9	A	19.4	C	11.5	No

Notes: LOS - Level of Service ; NB - Northbound; SB - Southbound; EB - Eastbound; WB - Westbound
* In the existing year 2005 condition, segments 1-3 are analyzed as arterial segments because of presence of traffic signals on Ocean Boulevard at the TI Freeway, Pier S Avenue, & Navy Way. The LOS for arterials is determined by speed (in miles-per-hour). All other segments are analyzed as multi-lane highways whose LOS is determined by vehicle density (vehicles per lane per mile).
a Criteria and Thresholds Used to Determine Adverse Effect:
- Adverse effect would occur where the Build condition (Bridge Replacement Alternatives) would result in LOS F and the vehicle density is greater in the No Build (No Action/Rehabilitation Alternatives) condition or the existing condition.
Yes(1) - Density comparison not available, but increased density assumed based on deterioration of LOS.
Yes Highlight indicates locations with adverse effect where threshold criteria for an adverse effect have been exceeded and the effect is directly attributable to the proposed Bridge Replacement Alternatives.
Source: Iteris, 2009.

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If the flyover is not implemented prior to opening one of the Bridge Replacement Alternatives, then there would be a temporary unavoidable adverse effect of the Bridge Replacement Alternatives on the WB segment of Ocean Boulevard from the Horseshoe Ramps to the Terminal Island Freeway interchange that would exist until the flyover is constructed or until 2030, as discussed above.

Nonrecurring Congestion

The Bridge Replacement Alternatives of the proposed project would have the benefit of reducing nonrecurring congestion in the project area caused by automobile crashes, disabled vehicles, work zones, adverse weather events, and planned special events. The addition of standard-width left- and right-side shoulders on the bridge and its approaches would provide adequate room for emergency response vehicles, roadway maintenance vehicles, and disabled automobiles without causing major congestion or requiring roadway closures.

To better understand the potential effects caused by a nonrecurring incident, a computer simulation of a nonrecurring incident on the existing Gerald Desmond Bridge was conducted for the Bridge Replacement Alternatives and the No Action/ Rehabilitation Alternatives conditions in year 2030. The CORSIM program was used to conduct the simulation. The analysis compares the duration of restricted traffic operations resulting from an accident or other nonrecurring incident.

One difference between the Bridge Replacement Alternatives and the No Action/Rehabilitation Alternatives conditions is the inclusion of a third lane on the downhill side of the bridge with the Bridge Replacement Alternatives. For this reason, the simulation included an incident on that portion of the bridge to comparatively estimate the amount of time that would elapse before traffic operations would return to pre-incident levels. The incident was assumed to block the EB right lane on the downhill side of the bridge. The incident itself was assumed to last 1-hour during the PM peak travel period. With the No Action/ Rehabilitation Alternatives condition, the incident was assumed to block the right lane for the full hour and then be cleared from the area. With the Bridge Replacement Alternatives condition, the incident was assumed to block the right lane for 10 minutes and then moved to the shoulder for the next 50 minutes, at which time it would be cleared from the area.

Exhibit 2.1.5-10 shows summary graphs of travel speed in each lane approaching the incident for 1-hour before the incident occurred, 1-hour during the incident, and 1-hour after the incident was cleared from the bridge for the No Action/ Rehabilitation Alternatives and the Bridge Replacement Alternatives conditions. Each graph shows the plotted mean speed for each 5-minute increment during the 3-hour period and a smoothed speed curve. A nearly horizontal line links pre- and post-incident speed and illustrates likely speeds with no incident.

The No Action/Rehabilitation Alternatives condition results show that the average vehicle travel speed would decrease from approximately 45 to 50 miles per hour (mph) before the incident in both lanes to 20 to 25 mph after the incident occurs. Speeds would remain slow for the whole hour of the incident plus an additional 25 to 30 minutes after the incident is cleared from the area, or a total duration of 85 to 90 minutes after the incident occurred. The Bridge Replacement Alternatives condition results show that the average vehicle travel speed would return to pre-incident levels approximately 20 minutes after the incident is moved to the shoulder, or a total duration of 30 minutes after the incident occurred; therefore, over 1-hour of incident-related delay could be saved as a result of implementing the Bridge Replacement Alternatives.

<u>Effects to Nonrecurring Congestion from the Long-Term Operation of the Bridge Replacement Alternatives</u>

Nonrecurring congestion due to incidents such as crashes and disabled vehicles would not be worse under the Bridge Replacement Alternatives than under the No Action/Rehabilitation Alternatives. Rather, such nonrecurring congestion is likely to be reduced by the presence of shoulders on the new bridge that would be implemented under the Bridge Replacement Alternatives; therefore, it is concluded that the proposed Bridge Replacement Alternatives would have a beneficial effect upon nonrecurring congestion.

Bridge Bicycle and Pedestrian Access

The Bridge Replacement alternatives of the proposed project would transform Ocean Boulevard, which is currently a city street, into a state highway that would be a limited-access extension of the SR 710 freeway as far west as the Terminal Island Freeway. Bicycle access to/ from downtown Long Beach across the new bridge via Ocean Boulevard would be permitted only at on- and off-ramps (see Exhibit 2.1.5-13).

Terminal Island is an industrial area within the Harbor District where there is currently no residential, retail, or public recreational facilities. Since the closing of the Naval Shipyard and the opening of the Pier T container terminal, there has been low demand from nonmotorized traffic (e.g., pedestrians or bicycles) on Ocean Boulevard over the Gerald Desmond Bridge, despite a patchwork of sidewalks that exist along the roadway. In addition, Terminal Island does not include any designated bicycle route.

The finished roadway improvements of the Bridge Replacement Alternatives would include standard, full-width paved inside and outside shoulders for emergency vehicle breakdown and motorist safety. No designated bike routes or pedestrian sidewalks are included in the project plans. Both pedestrians and cyclists can utilize the regularly scheduled bus service equipped with bicycle racks provided by the Los Angeles Department of Transportation to travel between downtown Long Beach, Terminal Island, and San Pedro. A designated bike route exists to the north of the Port on Anaheim Street at the northern edge of the Harbor District.

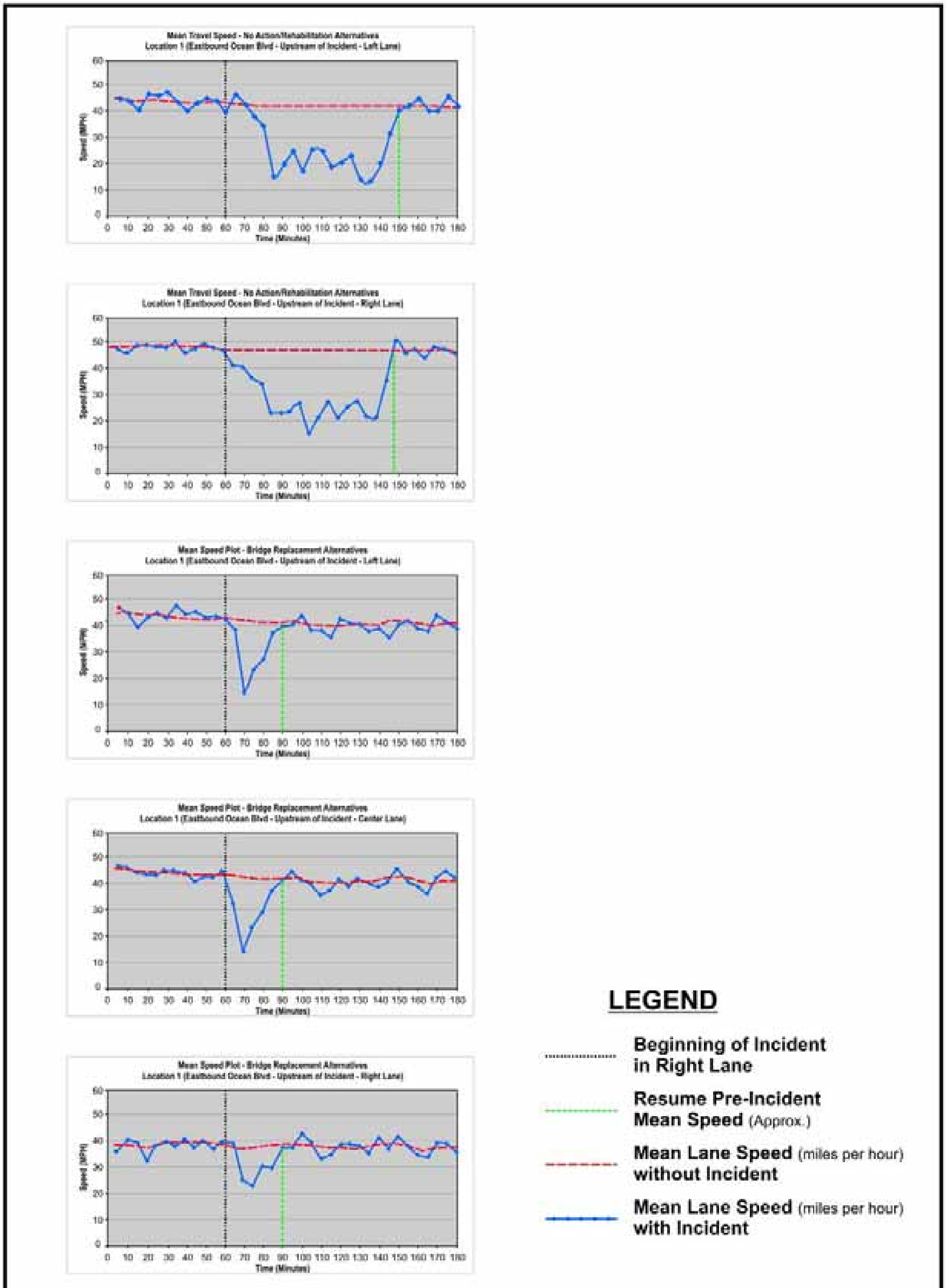
Of the other two bridges that provide access to Terminal Island, neither the Schuyler Heim Bridge nor the Vincent Thomas Bridge provides shoulders or walkways for nonmotorized traffic. The current bicycle master plans for the cities of Long Beach and Los Angeles do not include any designated bike routes in the Harbor Districts, including Terminal Island (refer to Exhibits 2.1.5-11 and 2.1.5-12 for the maps of the bicycle master plans for the cities of Long Beach and Los Angeles). In June 2006, the Los Angeles County Metropolitan Transportation Authority (MTA) adopted two bicycle planning documents: *Metro Bicycle Transportation Strategic Plan* (Strategic Plan) and *Bicycle Transportation Account Compliance* (BTA) document. These two plans replace the Countywide Bicycle Policy Document and six area bicycle plans. The Strategic Plan and BTA document are consistent with Metro's Long Range Transportation Plan. The BTA document fulfills a Caltrans requirement by consolidating information into one countywide document that each City and the County can adopt as their local bicycle plan. The Strategic Plan was designed for use by local agencies to plan bicycle facilities around transit and set priorities to improve regional mobility. One aspect of the Strategic Plan is to identify gaps in the inter-jurisdictional bike network. The Strategic Plan identifies an Ocean Boulevard Corridor connecting the Harbor bike lanes in San Pedro to the LA River Bike Trail terminus in the City of Long Beach, as recommended by "LA City/Stakeholders." As previously discussed, the proposed project is within the Cities of Long Beach and Los Angeles, and there are no proposed or designated bike routes in City plans within the Port of Long Beach.

Federal regulation requires the inclusion of nonmotorized routes in roadway improvement projects only if the facility already includes an existing major nonmotorized route. The existing Gerald Desmond Bridge has a pedestrian walkway, but it is not considered a "major nonmotorized route." The Port addressed this issue in January 2004 in consideration of federal statute Title 23, section 217, as amended by the Transportation Equity Act for the 21st Century (TEA-21) and SAFETEA-LU, which states, "The Secretary shall not approve any project or take any regulatory action that will sever an existing major nonmotorized route or adversely affect the safety of nonmotorized traffic and light motorcycles, unless a reasonable alternate route exists or is established. [1202(c)]."

Based on a memorandum dated January 6, 2004, which discusses coordination with the MTA Bikeway Modal Lead and Gateway Cities Team Planner, the MTA staff determined that a bikeway or a pedestrian walkway is not required for this project. Additional considerations regarding bikeway and pedestrian access are presented below.

<u>Designated Bicycle Routes</u>

Though there is no designated bike route planned for the proposed new bridge, the California Vehicle Code (CVC) stipulates that nonmotorized vehicles (i.e., bicycles) be allowed to travel along roadways unless specifically prohibited by Caltrans or local authorities. Bicyclists would be prohibited from using the two ramps connecting Ocean Boulevard to downtown Long Beach for safety reasons, because they would be required to traverse the high-speed mainline SR 710 through lanes connected to the proposed bridge. Locations where bicyclists would be prohibited with the North-side Alignment Alternative are shown in Exhibit 2.1.5-13. Bicycle access would also be prohibited at the same ramp locations under the South-side Alignment Alternative. Under the Bridge Replacement Alternatives, bicyclists could use the Pico Avenue on- and off-ramps to Ocean Boulevard to travel to and from downtown Long Beach across the new bridge (see Exhibit 2.1.5-13)



GERALD DESMOND BRIDGE REPLACEMENT PROJECT
Non-Recurring Congestion Incident Simulation - Year 2030

EXHIBIT 2.1.5-10

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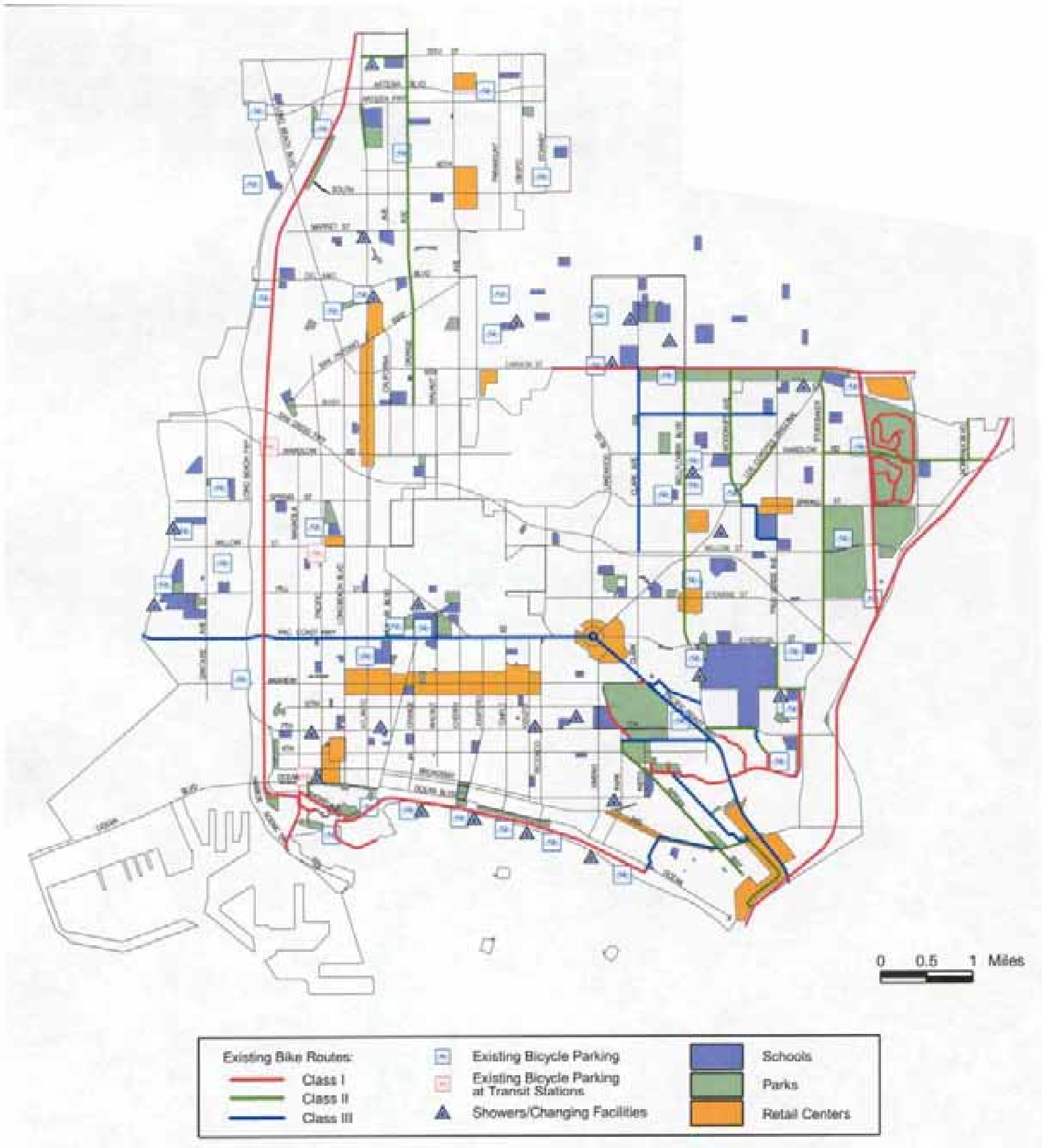

GERALD DESMOND BRIDGE REPLACEMENT PROJECT
Long Beach Bicycle Master Plan - Existing Bikeway Facilities

EXHIBIT 2.1.5-11

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GERALD DESMOND BRIDGE REPLACEMENT PROJECT
Los Angeles Citywide Bikeways System

EXHIBIT 2.1.5-12

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Bicycle Restrictions/Access on Replacement Bridge

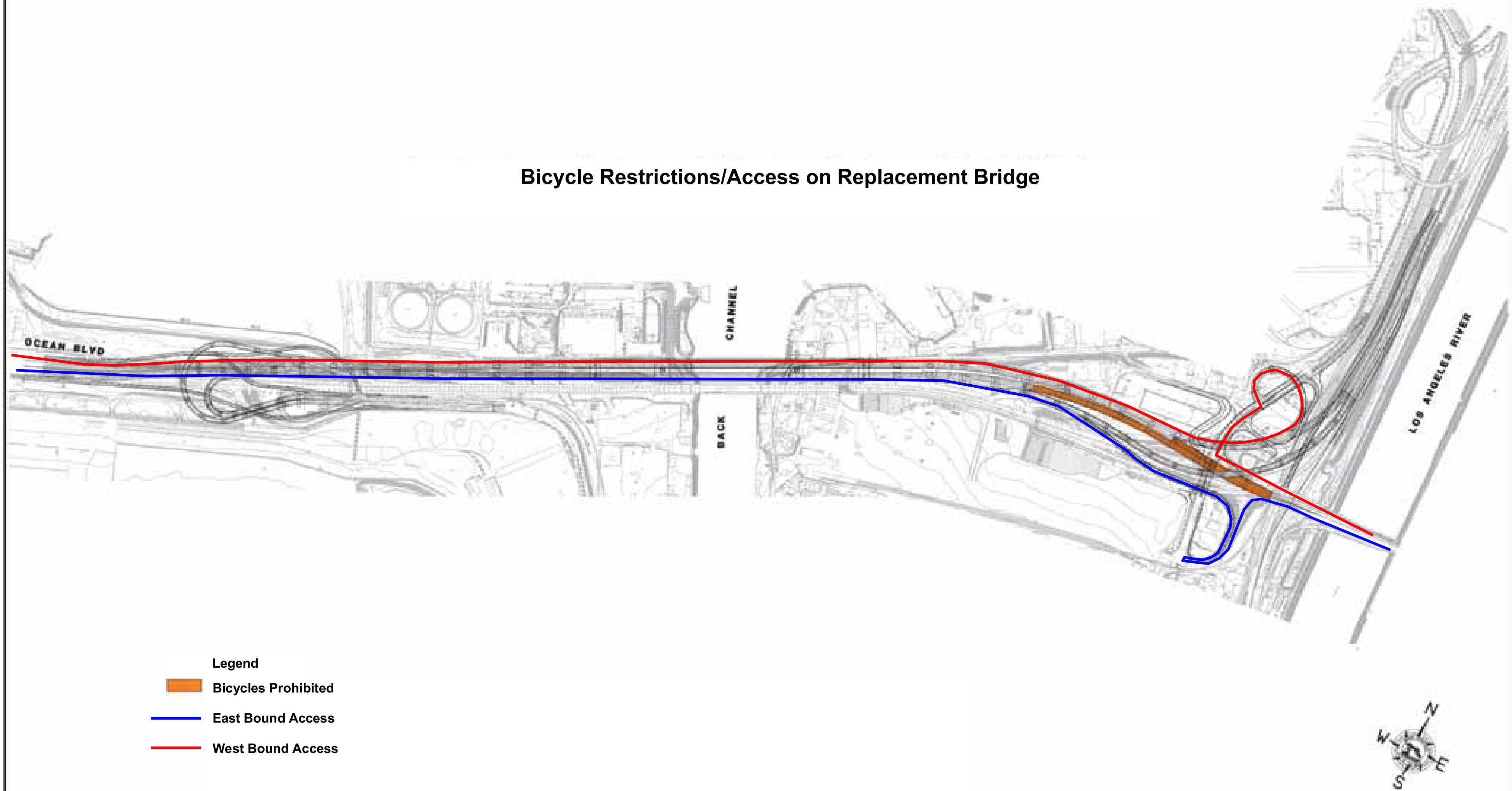

EXHIBIT 2.1.5-13

Port of LONG BEACH

GERALD DESMOND BRIDGE REPLACEMENT PROJECT

North-Side Bridge Replacement Alternative Alignment

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The agency bicycle master plans previously discussed provide bicycle facilities on other roadways that avoid the heavy industrial traffic area of the Ports.

There are no existing or planned bike routes on Ocean Boulevard between downtown Long Beach and San Pedro.

Pedestrian Walkways

Additional considerations relative to pedestrian issues are as follows:

- The proposed new bridge with the Bridge Replacement Alternatives would become an extension of the SR 710 freeway, and pedestrian movements are typically not accommodated on freeway facilities. CVC 21960 allows Caltrans the discretion to prohibit or restrict the use of freeways to pedestrians, bicycles, and/or other nonmotorized traffic[5].
- Terminal Island is an industrial area and not a major pedestrian destination.
- There are no pedestrian facilities along Ocean Boulevard/Seaside Avenue on Terminal Island west of the Gerald Desmond Bridge. Pedestrian facilities have not been provided in recently completed projects along Ocean Boulevard between the Vincent Thomas Bridge and the Gerald Desmond Bridge.

Effects to Bicycle and Pedestrian Access from the Long-Term Operation of the Bridge Replacement Alternatives

With the Bridge Replacement Alternatives, there would be no adverse effects associated with the removal of pedestrian sidewalks or the change in bicycle access across the new bridge. Effects on pedestrians would be minimal because Terminal Island is an industrial area with no public recreational facilities and is not a pedestrian destination. Effects on cyclists would also be minimal because access is only modified, not eliminated, and a designated bike route is located on Anaheim Street parallel to Ocean Boulevard north of the Ports. In addition, Terminal Island is an industrial area with no other supporting bicycle infrastructure west of the bridge, and there are no planned or designated bike routes along Ocean Boulevard between downtown Long Beach and San Pedro. Future nonmotrized demand is anticipated to be low.

2.1.5.4 Avoidance, Minimization, and/or Mitigation Measures

Temporary Measures

North- and Southside Alignment Alternatives

All of the temporary mitigation measures to be implemented during construction of either of the Bridge Replacement Alternatives will be implemented in conjunction with a TMP to minimize traffic impacts during construction. The TMP will be submitted to and approved by the Port and Caltrans. The TMP, at a minimum, should include detour routes, flagmen, traffic controls, signing, traffic lane closure scheduling to minimize impacts, public notification, and coordination with emergency service providers. The TMP shall be implemented after approval.

TC-1 Prior to the start of construction Stage 2, the following improvements will be made to the intersection of Pico Avenue, Pier B Street, and 9th Street to mitigate the project's temporary adverse effect during construction at that intersection during Stage 2:

- Add dual NB right-turn lanes;
- Restripe EB through/right lane to a right-turn lane;
- Provide one (1) EB through lane; and
- Continue two (2) SR 710 SB off-ramp lanes to Pico Avenue.

TC-2 Prior to the start of construction Stages 3 and 4, the following improvements will be made to the intersection of Pico Avenue, Pier B Street, and 9th Street to mitigate the project's temporary adverse effect during construction at that intersection during Stages 3 and 4:

- Remove NB-SB split-signal phasing;

[5] CVC 21960(a): Caltrans and local authorities, by order, ordinance, or resolution, with respect to freeways, expressways, or designated portions thereof under their respective jurisdictions, to which vehicle access is completely or partially controlled, may prohibit or restrict the use of the freeways, expressways, or any portion thereof by pedestrians, bicycles, or other nonmotorized traffic or by any person operating a motor-driven cycle, motorized bicycle, or motorized scooter. A prohibition or restriction pertaining to bicycles, motor-driven cycles, or motorized scooters shall be deemed to include motorized bicycles; and no person may operate a motorized bicycle wherever that prohibition or restriction is in force. (Amended Sec. 6, Ch. 722, Stats. 1999. Effective January 1, 2000).

- Restripe NB through lane to a NB left-turn lane;
- Widen SB approach and provide two (2) left-turn lanes and one (1) through lane; and
- Continue two (2) on-ramp lanes to NB SR 710.

TC-3 Prior to the start of construction Stage 2, a traffic signal will be installed at the intersection of Pico Avenue and Pier D Street to mitigate the project's temporary adverse effect during construction at that intersection during Stages 2, 3, and 4. The traffic signal will be permanent and will not be removed after completion of construction of a Bridge Replacement Alternative.

TC-4 Prior to the start of construction Stages 3 and 4, the following improvements will be made to the intersection of Pico Avenue and Pier E Street to mitigate the project's temporary adverse effect during construction at that intersection during Stages 3 and 4:

- Permanently signalize the intersection (the signal will not be removed after completion of construction of a Bridge Replacement Alternative);
- Restripe NB through lane to a NB right-turn lane, providing a single NB through lane;
- Add dual free-flow WB right-turn lanes; and
- Continue two (2) EB Ocean Boulevard off-ramp lanes to Pico Avenue.

The *Middle Harbor Redevelopment Project Draft Environmental Impact Statement (DEIS)/Draft Environmental Impact Report (DEIR) and Application Summary Report (ASR)* prepared for the Port and USACE includes signalization of the Pico Avenue/Pier D Street and Pico Avenue/Pier E Street intersections. If these signals are implemented as part of that project prior to the start of construction Stage 2 for the Pico Avenue/ Pier D Street intersection and construction Stage 3 for the Pico Avenue/Pier E Street intersection, then that would remove the need for the signalization component of the proposed mitigations under TC-3 and TC-4, respectively.

Permanent Measures

<u>North- and Southside Alignment Alternatives</u>

TC-5 During the design phase of a Bridge Replacement Alternative, the Port shall add a third NB left-turn lane to mitigate the project effect at the Navy Way/ Seaside Avenue intersection.

POLA is currently considering two potential projects at the Navy Way/Seaside Avenue intersection. One project would provide grade separation of left turns and the other would implement a centerline barrier on Seaside Avenue that would eliminate left turns. Either project would remove the signal at the intersection, thereby eliminating the adverse effect of the proposed Bridge Replacement Alternatives at the intersection. If either of these projects or any other comparable project is implemented prior to construction of the Bridge Replacement Alternatives, then the adverse effect of the Bridge Replacement Alternatives at the intersection would be removed and the proposed mitigation measure would not be required.

TC-6 The Port will coordinate with the Long Beach City Traffic Engineer and provide funding for restriping and/or signalization improvements at the intersection of Ocean Boulevard and Magnolia Avenue as mitigation for the effect of a Bridge Replacement Alternative at the intersection.

Restriping and signalization improvements have been identified as one way to mitigate the adverse effect at this intersection. The Port will coordinate with the City of Long Beach on implementation of improvements at this intersection.

2.1.6 Maritime Navigation

2.1.6.1 Regulatory Setting

CEQA Guidelines, Appendix G, Item XV, Transportation/Circulation requires the Port to consider the potential of a project to substantially increase hazards due to a design feature or incompatible use. For certain Port projects, the environmental evaluation should consider the potential for design, construction, and/or operational features to introduce or substantially increase hazards to navigation. The vessel transportation section of the EIR (or joint CEQA/NEPA document) identifies routes and rules pertaining to navigation, estimates existing vessel transportation volumes, presents vessel accident data for a period of at least 5 years, and evaluates the project impact in light of this information and the evaluation criteria provided in Section 2.1.6.3 (Environmental Consequences, Evaluation Criteria).

2.1.6.2 Affected Environment

Several types of commercial vessels call at the POLB. The vessels follow vessel traffic lanes established by the United States Coast Guard (USCG). The Marine Exchange of Southern California and USCG are responsible for vessel traffic safety in the approach areas to the Port. Vessels enter the Long Beach Harbor through Queens Gate. In 2005, 829 berth calls were made at the POLB through the Cerritos Channel. Of these calls, 529 (63 percent) were container ships (POLB, 2008a). Once inside the harbor, some vessels use anchorages for a short time. The Port has six anchorage areas where vessels can bunker (refuel), wait for a dock, or wait for orders or minor repairs (USACE/LAHD, 1992). Container vessels will usually bunker at dockside while their cargo is being loaded or unloaded, rather than at anchorages, to minimize time in the Port.

Water depths throughout the Port range from 76 ft (23 m) in the Main Channel to 52 ft (15.8 m) in the Inner Harbor and 55 ft (17 m) in parts of the Middle Harbor. The 700-ft-wide (213-m-wide) Main Channel has a depth of 76 ft (23 m). Anchorage areas in the Outer Harbor on both sides of the Main Channel have depths of 36 ft (11 m) to 70 ft (21 m) (POLB, 2001). The navigable Back Channel is 300 ft (91 m) wide and approximately 60 ft (18 m) in depth from the MLLW. The depth of the Back Channel poses navigational obstacles for the new models of container ships passing under the bridge due to their larger dimensions. These areas of the Port are primarily used or are being developed for containerized cargo.

Existing and future operations within the Back Channel and Inner Harbor areas of the Port are most affected by the existing vertical vessel clearance of the Gerald Desmond Bridge. The span's maximum height above water, vertical vessel clearance, or air draft, is 156 ft (47.5 m) at mean high water (MHW). The Port's pilots can navigate under the bridge with a minimum 3-ft (1-m) overhead clearance for their vessels. Accordingly, this limits ships to an air draft of approximately 153 ft (46.6 m) (POLB, 2005a).

In addition to the constraints of the bridge and channel, SCE's high-voltage transmission lines that cross the Cerritos Channel from the LBGS currently limit the air draft of vessels transiting to Piers A and S (under development). The vertical clearance afforded by the transmission lines is currently 3 ft (1-m) less than the existing Gerald Desmond Bridge clearance of 156 ft (47.5 m). The North- and South-side Alignment Alternatives would provide a 200-ft (61-m) air draft to safely accommodate the larger container vessels currently in service and planned for the future; however, because the SCE transmission lines would still restrict maritime access to the Inner Harbor, coordination with SCE to relocate the lines as part of the navigational improvements is necessary. The Port is committed to working with SCE to provide the needed additional vertical clearance consistent with the planned bridge replacement. An analysis was undertaken to determine the most feasible solutions for addressing the transmission lines and towers. Different transmission line options were analyzed for their relocation (see Section 2.1.4 [Utilities and Service Systems] for a summary of the analysis).

The Port's Back Channel currently accommodates container ships transporting up to 8,000 TEUs. The *MSC Texas* was the first ship of that size to call on the Back Channel in September 2004. Calls on the Back Channel by 8,000-TEU ships increased from 11 in 2005 to 59 in 2008 (POLB, 2005b and 2009). It is assumed that an average of one 8,000-TEU ship per week calls on the Back Channel. These container vessels have air drafts ranging from 130 ft to 165 ft (40 m to 50 m) depending on their design and configuration.

Looking to the future, the next generation of vessels is called Ultra Large Container Vessels (ULCS). The air draft for this generation is not likely to increase substantially due to limitations in stacks of containers (i.e., 10 containers maximum at present) and major bridge clearances around the world; however, a potential 12,500-TEU ULCS of the future (based on current proposals) could have an air draft of approximately 180 ft (55 m). Industry experts believe that the first order for a 12,500-TEU ULCS will occur within the next 10 years, assuming that world trade continues to expand. Larger vessels of 18,000-TEU ULCS are being discussed, but these involve substantial technical and operational problems, so the timeframe for that potential generation of vessels cannot be predicted (FORCE Technology-DMI, 2002).

2.1.6.3 Environmental Consequences

Evaluation Criteria

An adverse effect on marine vessel transportation would occur if a change in vessel traffic related to construction and/or operations results in congestion within the harbor and/or the capacity for maritime commerce to operate efficiently and safely is exceeded.

No Action Alternative

The No Action Alternative would not replace the existing Gerald Desmond Bridge. A review of the specifications for some of the larger container vessels currently in the world fleet reveals that ships in the 8,000 to 9,999 TEU range are approaching the limits of what constitutes safe passage under the Gerald Desmond Bridge. Based on published specifications, most of these vessels can physically pass under the bridge if fully loaded, but they are within the 3-ft (1-m) clearance area. Unloaded or partially loaded vessels (in the 8,000 to 9,999 TEU range) are able to pass by taking on more ballast water to lower the ship. It can be concluded that some vessels in this size range can access Pier A and future Pier S; however it is assumed that vessels greater than 10,000 TEUs cannot serve these terminals (POLB, 2007).

North-side Alignment Alternative

This alternative would replace the existing vertically restricted (156-ft [47.5-m] air draft) Gerald Desmond Bridge with a 200-ft (61-m) air draft bridge. Not taking into consideration channel depth, the additional air draft provided by the new bridge would provide safer passage for the largest container vessels calling on the Port, which are currently the new “seventh generation” (8,800 to 9,200 TEUs), and the future “eighth generation” vessels that are expected to have a capacity of approximately 10,000 to 12,000 TEUs. One “seventh generation” ship currently calls at Pier A, notwithstanding a calculated air draft of 154.2 ft (47 m). As a result, it is assumed that some vessels in this size range can access Piers A and S (when developed), and that vessels greater 10,000 TEUs cannot serve these terminals. While the increase in air draft provided by the new bridge would make it safer for larger ships to pass, ships accommodating larger container capacity are still constrained by the depth of the channel (POLB, 2007).

Construction of the North-side Alignment Alternative could temporarily affect operations at adjacent facilities. The North-side Alignment would require ROW and relocation of the main office building at Connolly Pacific, demolition of the Port Maintenance Yard facilities to accommodate construction access and the new bridge footings, easements during demolition of the existing bridge from the California United Terminals and Weyerhaeuser Company, and temporary relocation of Fire Boat Station #20 during construction (see Sections 2.1.1 [Land Use, Recreation, and Coastal Zone] and 2.1.3.2 [Relocations] for further detail regarding affected land use and facilities). Landside effects on these facilities would have no effect on ship access to Port facilities or piers.

Construction of the North-side Alignment Alternative would not affect the Port’s capacity for maritime commerce; rather, it would allow the Inner Harbor terminals to operate safer and more efficiently. Construction of this alternative would be planned to avoid closure of the channel during construction.

South-side Alignment Alternative

The South-side Alignment Alternative would result in the same benefits to maritime safety described under the North-side Alignment Alternative. In addition, the South-side Alignment Alternative would also temporarily affect operations at Piers T, D, and E during construction. The South-side Alignment Alternative would require ROW from Pier T and would also require reconfiguration of terminal land-based operations on these piers (see Sections 2.1.1 [Land Use, Recreation, and Coastal Zone] and 2.1.3.2 [Relocations] for further detail regarding affected land use and facilities). Landside effects on these facilities would have no effect on ship access to Port facilities or piers. Construction of the South-side Alignment Alternative would not affect the Port’s capacity for maritime commerce; rather, it would allow the Inner Harbor terminals to operate safer and more efficiently. Construction of this alternative would be planned to avoid closure of the channel during construction.

Rehabilitation Alternative

Construction required under the Rehabilitation Alternative would take place within the footprint of the existing bridge and the paved approach roadways. Construction of this alternative would be planned to avoid closure of the channel during construction. Once construction is completed, effects of the Rehabilitation Alternative on maritime safety and commerce would be the same as the No Action Alternative.

2.1.6.4 Avoidance, Minimization and/or Mitigation Measures

No measures are required.

2.1.7 Visual and Aesthetics

This section summarizes the results of the Visual Impact Assessment completed in February 2006 and revised in September 2008 to incorporate the Rehabilitation Alternative. The Visual and Aesthetics Analysis evaluated the potential effects to visual resources resulting from the construction and operation of the proposed project.

2.1.7.1 Regulatory Setting

NEPA: NEPA establishes that the federal government use all practicable means to ensure all Americans safe, healthful, productive, and *aesthetically* (emphasis added) and culturally pleasing surroundings [42 U.S.C. 4331(b)(2)]. To further emphasize this point, FHWA in its implementation of NEPA [23 U.S.C. 109(h)] directs that final decisions regarding projects are to be made in the best overall public interest taking into account adverse environmental effects, including among others, the destruction or disruption of aesthetic values.

CEQA: CEQA establishes that it is the policy of the State to take all action necessary to provide the people of the state "with…enjoyment of *aesthetic*, natural, scenic and historic environmental qualities." [CA PRC Section 21001(b)].

California Coastal Act of 1976: Consistent with the California Coastal Act of 1976, the Port has a CCC-certified PMP that addresses environmental, recreational, and other concerns of the Port and surrounding regions (PMP discussion below).

State of California Scenic Highways Program: California's Scenic Highways Program was created by the Legislature in 1963 to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways (Streets and Highways Code, Section 260 *et seq.*). A highway may be designated scenic depending upon how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes upon the traveler's enjoyment of the view.

A scenic corridor is the land generally adjacent to and visible from the roadway. A scenic corridor is identified using a motorist's cone of vision. A reasonable boundary is selected when the view extends to the distant horizon.

The nearest official state-designated scenic highway is located approximately 31 mi (49 km) northeast of the Port, at SR 91 east of SR 55 in Anaheim. SR 1, also known as PCH, is classified as "eligible" for state scenic designation and is approximately 5.4 mi (8.7 km) east of the Port. Because it is not officially designated, it does not warrant any special attention.

City of Long Beach: The City of Long Beach Municipal Code (21.42.032) specifies that "the landscape requirements for Industrial Zoned (IP) properties shall be those established in the Master Landscape Plan for the Port. The Port Planning Bureau shall review and approve all landscape plans for projects located in the IP zone." All property in the study area is zoned IP.

<u>General Plan:</u> The project study area land uses are designated by the City of Long Beach General Plan (LBGP). The Long Beach Harbor area falls within Land Use District Number 12. This District includes existing freeways, the Port, and the Long Beach Airport. The LBGP indicates that the water and land use designations within the harbor area are separately formulated and adopted in the PMP, as amended. The LBGP indicates that the responsibilities for planning within legal boundaries of the harbor lie with the Board of Harbor Commissioners.

PMP: The PMP Public Access, Visual Quality, and Recreational/Tourist Element "concentrates on Queensway Bay," which is a buffer between the highly industrialized inner port complex and the waterfront recreation activities of the Port and City of Long Beach. The visual resources goals noted in this element include:

- Provide landscaping between recreational facilities and port industries
- Minimize disruptive views
- Improve appearance of Harbor lands at and along major vehicular approaches

According to the PMP, the most sensitive views within the PMP planning area include:

- Predominant structures visible to the east from downtown Long Beach and along ocean bluffs;
- Ground-level views along the boundary of Queensway Bay; and
- Ground-level views along Harbor Scenic Drive from the SB lanes south of Anaheim Street.

The Board of Harbor Commissioners pays particular attention to color, form, texture, and scale during the review of proposed projects.

2.1.7.2 Affected Environment – Project Study Area

Local Project Visual Setting

The Gerald Desmond Bridge was constructed in 1966 and was seismically upgraded in 1995. The existing bridge consists of a tied-arch truss structure with a 409.5-ft (124.8-m) suspended span (Parsons-HNTB, 2002b). The trusses form vertical sides to the bridge, connected to one another by transverse beams, and by stringers and other members that support the deck. The main span is a through truss design, where there are struts and top lateral bracing above the sides of the two trusses. One drives "through" the trusses; hence, it is called a through truss bridge type (Caltrans, 1990). The existing vertical clearance of the main span is 156 ft (47.5 m) above MHWL (i.e., 4.6 ft [1.4 m]).

The proposed project site consists mostly of port and industrial development and is located in a predominantly flat area at the Port. The eastern portion of the Gerald Desmond Bridge crosses Pier D, the main span of the bridge crosses the Back Channel, and the western portion of the bridge bisects Piers S and T. Various Port operations (e.g., container terminal operations, lumber and oil storage, metal recycling) on Piers D, E, and T are located south of the existing bridge. The port and industrial property is developed with light blue metal shed buildings, gray cranes and oil storage tanks, and burgundy cargo containers that tend to dominate the skylines. Other less-predominant features include landscaping and trees that are sparsely planted throughout the Port. The Gerald Desmond Bridge approach structure and the main-span metal truss are painted a dull, light blue color.

The cranes, shipping containers, and large metal storage sheds tend to dominate the Port's skyline, and they are generally between 50 ft and 100 ft (15 m and 30 m) high. They tend to tower above their surrounding environment and overshadow open space and other smaller features (e.g., port vehicles and smaller building structures). Immediately north of the Gerald Desmond Bridge on the WB approach are the LBGS (NRG Energy, Inc.), the SCE high-voltage transmission lines that cross the Cerritos Channel, and the Pacific Pipeline System, LLC, tank farm.

The LBGS site consists of a rectangular-shaped building with four large circular smoke stacks above the building that stand approximately 150 ft (45 m) high and transmission towers that cross the Cerritos Channel. This power plant, along with the transmission towers, was formerly operated by SCE, and they were determined to be eligible for listing in the NRHP (see Section 2.1.8 [Cultural Resources]). The transmission towers emanating from the old power plant are approximately 200 ft (61 m) high, and the vertical clearance afforded by the transmission lines is currently 153 ft (46.6 m) above the channel, which is 3 ft (1-m) less than the existing Gerald Desmond Bridge clearance of 156 ft (47.5 m). The Pacific Pipeline System, LLC, property is located to the west of the LBGS, and it has two large oil storage tanks adjacent to the Gerald Desmond Bridge that are approximately 40 ft (12 m) high. There are four smaller oil storage tanks that are behind these large ones; however, they are not visible from the bridge because the two large oil storage tanks tower over the smaller ones.

In summary, the large-scale industrial development that surrounds the proposed project is typical of development within the Port. The project site is mostly paved and barren, as there is no vegetation located on or around the bridge approach structure and main-span areas.

Regional Project Visual Setting

The proposed project is located in a heavily urbanized portion of southern California. The immediate vicinity of the project is characterized by Port-related industrial uses. The topography of the study area is flat and has been extensively modified through port and roadway development over the last 80 years. Nearly all of the vegetation are exotic species that have been purposely introduced (i.e., landscaping) or inadvertently introduced (i.e., weedy species).

The Ocean Boulevard roadway corridor, which would contain the proposed replacement bridge, interchange, and roadway improvements, consists of open space and urban landscape units. The Gerald Desmond Bridge spans the Back Channel connecting the Port's Inner Harbor and Middle Harbor. At the east end of the roadway corridor, Ocean Boulevard crosses the Los Angeles River into downtown Long Beach and connects to SR 710 to the north. The west end of the corridor connects to the Terminal Island Freeway (SR 47 and SR 103) to the north. The corridor continues west as SR 47 through the POLA and crosses the Vincent Thomas Bridge to connect to the Harbor Freeway (I-110) in San Pedro. The Outer Harbor and the Pacific Ocean are located to the south.

The port and industrial development that makes up most of the study area is characterized by the large open areas of the port container handling and bulk handling infrastructure. Larger structures near the corridor are the Tidelands Oil Production Company warehouse (1370 W. Broadway) and the LBGS power plant building north of Ocean Boulevard along the west approach to the Gerald Desmond Bridge. A large area at the western end of the corridor is vacant or partially vacant, and undergoing redevelopment as the Pier S container terminal.

Distant views are provided from the existing Gerald Desmond Bridge and approach roadways. In the WB direction, the Palos Verdes Hills provide a backdrop to POLA, San Pedro, and the Vincent Thomas suspension bridge. The dominant visual elements in the EB direction are the buildings of downtown Long Beach and a backdrop of nearer hills, such as the Puente Hills.

Viewershed and Viewer Sensitivity

The study area for the proposed project visual impact analysis is called the viewshed. The viewshed is all of the areas where physical changes associated with the proposed alternatives can be seen, and it is influenced by the existing topography, vegetation, and structures. Several viewshed areas have been evaluated for the quality of view and number of affected viewers.

The sensitivity of different types of viewers varies depending upon their activity, their awareness of the surrounding environment, and their familiarity with the environment. From most to least sensitive, viewer types are residents, passive recreation, business owners, active recreation, workers, shoppers/business, regular motorists, and occasional motorists. The following describes the comparative sensitivity of the various types of viewers in decreasing order of sensitivity.

<u>Residents</u>

The nearest notable residential area with a view towards the project is north of PCH (SR 1) and west of Santa Fe Avenue. It is 2 or more miles (3 or more kilometers) away from the Gerald Desmond Bridge. Due to the flat topography and the north-south and east-west street grid, other Long Beach residential areas do not have views of the project area. Residential areas on east-facing hillsides of San Pedro and the communities of Palos Verdes Hills have distant (i.e., 4 mi [6.4 km] and more) views towards the Gerald Desmond Bridge.

<u>Passive Recreation</u>

The lower Los Angeles River has park and trail areas in the project vicinity. Transportation corridors and port/industrial facilities block views from the west side of the river toward the project. The Gerald Desmond Bridge, approach roads, and roadway structures at the SR 710/Ocean Boulevard interchange are visible from recreational trails on the east side of the river.

<u>Business Owners</u>

Office towers in downtown Long Beach have views of the Gerald Desmond Bridge, approximately 1.5 mi (2.4 km) to the west. Within the Port, the bridge is generally visible where the views are not blocked by other structures. The bridge dominates the views along Pier D Street near the Back Channel.

<u>Active Recreation</u>

Active recreational opportunities in the project vicinity include public fishing areas along Harbor Scenic Drive and adjacent to Pier J; however, this area faces away from the bridge towards the east and southeast directions. Other active recreational opportunities include fishing piers and pedestrian/ skating paths along the east side of the Los Angeles River; the boat launch at the South Shore Launch Ramp; the Long Beach Downtown Marina, also on the east side of the river; and recreational sailboats in the harbor area located southeast of the bridge. Views toward the bridge from the recreation areas east of the river are limited by the visual barriers of elevated roadways and port structures, and stacked cargo containers. There are clear views toward the bridge and connecting roadways from the active recreation areas along the east side of the river.

<u>Workers</u>

Most work places in the study area that are appropriately oriented have views of the project. This includes wharf workers located within any of the piers at the Port with a view of the bridge. Downtown Long Beach office towers with west-facing windows also have project views.

<u>Shoppers and Businesses</u>

People in the port area on business activity will have views of the Gerald Desmond Bridge. The bridge is also visible from the industrial/ manufacturing area north of the port waterways and south of SR 1.

<u>Regular Motorists</u>

Ocean Boulevard carries approximately 55,000 vpd over the Gerald Desmond Bridge. SR 710, approaching Ocean Boulevard, carries approximately 70,000 vpd, and SR 47 brings approximately 50,000 vpd to and from the west and up to 20,000 vpd to and from the north via the Terminal Island

Freeway. The west and north approaches via SR 47 provide the clearest views of the Gerald Desmond Bridge. The bridge is also clearly visible from the SR 103 section of the Terminal Island Freeway, which is approximately 1-mi (1.6 km) north of the bridge.

Occasional Motorists

Occasional motorists are typically nonresident tourists. The major tourist attraction in the bridge vicinity is the Queen Mary, which is approximately 2 mi (3.2 km) southeast of the Gerald Desmond Bridge. The shops and restaurants on the southwest portion of downtown Long Beach near Ocean Boulevard and Shoreline Drive are also tourist attractions. Most tourists are assumed to approach from the north via SR 710 or from the northeast via the Queensway Bridge from downtown Long Beach. They would have views of the bridge to the west and northwest.

Methodology for Evaluating Visual Quality at Key Viewpoints

This visual impact assessment was prepared consistent with the methodologies set forth in the Port's Methodology for Visual Impact Assessment (POLB, 2005c) and FHWA's Visual Impact Assessment for Highway Projects (FHWA, 1988). The following discussion summarizes the requirements of these methodologies.

Port Methodology

Describe the proposed project site:

- Is the site predominantly flat, sloped in a particular direction, or undulating?
- What is the site elevation range of the project site (above mean sea level)?
- What are the vertical elements already on the project site (cranes, construction equipment, etc.)?
- Describe the way the project site fits into the overall Port environment.

Identify sensitive viewers and the views they experience:

- From which nearby locations can the project site be seen?
  - — Create a viewshed map indicating likely locations from which the project site could be visible. Identify the different uses and features (elevated roadways and bridges, parks and open space areas, commercial areas, recreational boating facilities, etc.).
  - — On a clear day, take photos toward the project site. On the photos, use arrows to identify the project site location (even if it is obscured by intermediate features), as well as one or two landmarks (bridges, other Port facilities, local features, etc.). On the viewshed map, record the direction that the photo was taken.
- Record the distance between the viewer and the project site, and the direction of the view.
  - — Measure the distance in miles or feet as appropriate, and record the direction from the view to the project site (north, south-east, etc.).
- What viewer types can see the project site from each location?
  - — Commuters, residents, recreational users, business owners, etc.
- What is the perceived and designated importance of the view and the location from which the view was taken?
  - — Viewer expectation is what the viewer anticipates should be in the location, based on the setting. For most Port projects within the confines of the existing developed Port areas, the viewer would anticipate an industrialized setting.
  - — Determine whether a feature is designated as important. Analyze whether the proposed project would be visible from that location and, if so, identify the view as a preliminary key view to carry forward for analysis.
- What are the dominant elements of each view?
  - — Describe each location and the existing view from that location in terms of the features in the foreground (within 0.5-mi [0.8-km]), middle ground (0.5- to 1-mi [0.8- to 1.6 km]) and background (more than 1-mi [1.6 km]).
  - — Describe each existing view in terms of the following, as applicable:
    - ○ **Line** – the dominant lines in terms of vertical, horizontal, diagonal, etc., and the sharpness or softness of corners.
    - ○ **Color** – the value (lightness or darkness), degree of reflectivity (shiny or dull) and hue (red, green, yellow, etc.) of the color.

    - **Form** – the visual mass or bulk (square, cylindrical). Describe the dominant shape of features viewed from the key view.
    - **Texture** – describe the surface coarseness or smoothness.
  - Describe the relationship between the elements within each existing view.
    - **Dominance:** Which element do you notice first?
    - **Scale:** Which elements are larger or smaller?
    - **Diversity:** Are the elements in the view similar to each other or different?
    - **Continuity:** Do the dominant elements continue throughout the scene, or are they scattered or irregularly placed?
- For how long would each existing view be experienced?
  - For passing motorists, if the view is oblique and would require the motorist to turn their head more than 45 degrees in either direction, the view would be fleeting or not readily apparent. By comparison, a residential view would be a more constant and enduring image.
- What would be visible at night?
  - Nighttime site visits to a selection of the key observation points may assist in determining the features that can be seen from a given area.

<u>FHWA Methodology</u>

The viewshed is divided into landscape units, which are areas of distinct, but not necessarily homogenous, visual character. The primary landscape units are the Urban Landscape Unit and the Open Landscape Unit. These are described in further detail below under Viewshed and Key Viewpoints. Typical views, called key viewpoints, are selected from each type of these landscape units to represent different types of views or landscape units (see Exhibit 2.1.7-1). The motorists' view is represented by an additional viewpoint called the "View from the Freeway."

The existing visual quality of the viewpoints was judged by three criteria: vividness, intactness, and unity:

Vividness is the visual power or memorability of landscape components as they combine in striking and distinctive patterns.

Intactness is the visual integrity of the visual environment and its freedom from encroaching elements.

Unity is the visual coherence and compositional harmony of the landscape when considered as a whole.

Urban Landscape Unit

This landscape unit is characterized by buildings of generally two types: multi-story office or apartment buildings; and very large, one- to two-story buildings such as offices, warehouses, or factories. Large areas of open space, consisting of landscaping, undeveloped land, or more commonly, parking lots, often separate the buildings. Despite the landscaping, these areas are dominated by hard surfaces, including the buildings themselves and the surrounding paved areas. Views within the Urban Landscape Unit are often extensive, especially from the upper floors of tall buildings.

An assessment was made to determine if the Gerald Desmond Bridge is visible from the San Pedro area. Various potential viewpoints along Harbor Boulevard (i.e., Harbor Boulevard to the Vincent Thomas Bridge on-ramp) and Beacon Street (i.e., Beacon Street to Palos Verdes) were surveyed to determine if the Gerald Desmond Bridge was visible from these viewpoints. Harbor Boulevard was chosen due to its close proximity to the Los Angeles Harbor, and Beacon Street was chosen due to its higher elevation and better vantage point of the Los Angeles Harbor. In addition, a survey was conducted on the 10th floor of the Sheraton Los Angeles Harbor Hotel located between 6th Street and Palos Verdes to determine if the Gerald Desmond Bridge is visible from this viewpoint. The surveys concluded that the Gerald Desmond Bridge was not visible anywhere within these locations. The gantry cranes, cargo ships, and oil storage tanks located within the POLA and the Vincent Thomas Bridge in the foreground obstructed any potential views of the Gerald Desmond Bridge.

The only bridge structure that was visible from this area, other than the Vincent Thomas Bridge, was the vertical abutments of the Schuyler Heim Bridge, which is located northeast of the Vincent Thomas Bridge.

Urban Landscape Unit – Viewpoint 1: Viewpoint 1 (Exhibit 2.1.7-2) is the Urban Landscape Unit viewpoint from the Port Administration Building (925 Harbor Plaza), which is located approximately 1-mi (1.6 km) southeast of the Gerald Desmond Bridge. Office buildings on the western edge of downtown Long Beach are visible from this viewpoint. The foreground of this view is dominated by paved-access roadways, containers, trailer storage and staging areas, and administrative buildings. The middle ground is dominated by the California United Terminals at Pier E and gray tanks. The Gerald Desmond Bridge is in the background of this view, where other large port/industrial structures – in particular, the cargo container gantry cranes – compete for the viewer's attention. Development is located adjacent to the piers and roads. The buildings and cargo containers are mostly rectangular shaped and appear to be continuous in the foreground and background, which adds to the horizontal line of the view. Located in the background are tall cranes, transmission towers, refineries, and the existing Gerald Desmond Bridge, which are all of various shapes and heights.

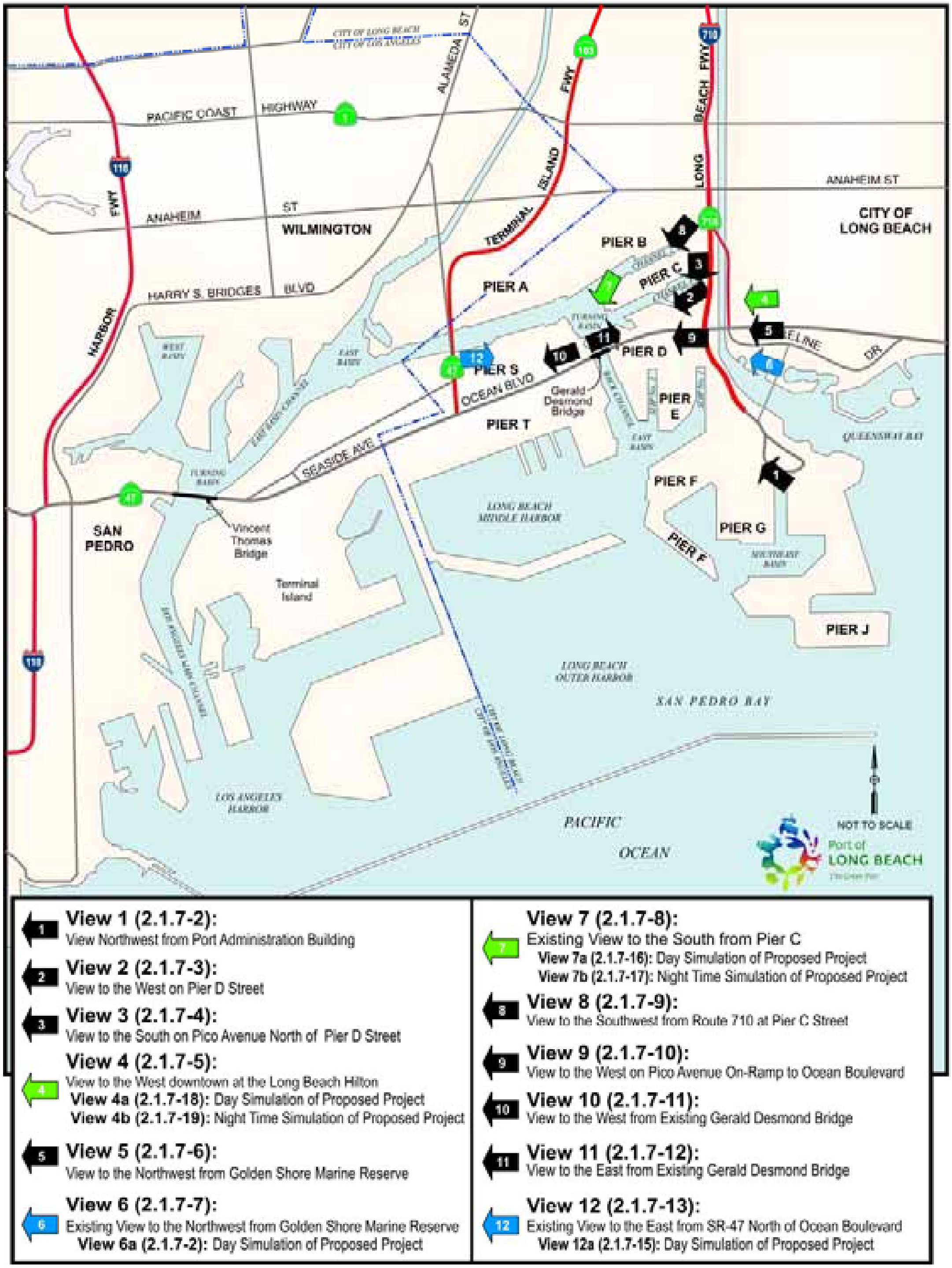
The dominant features in the background present a sense of continuity with their vertical height. Prevalent colors, such as the light blue metal shed building (Coke Shed) to the left (northwest), the gray paved-access roads and cranes in the background view, and the burgundy cargo containers, tend to dominate the skylines from this viewpoint. Because the photo was taken at a higher elevation from the Port's Administration Building, the features tend to appear relatively smooth in texture, particularly the light blue roof of the metal shed building west of the Port's Administration Building. Generally, the viewpoint does not change from this perspective because the viewers are looking at the bridge from a stationary location. The vividness is rated as moderate, as the gantry cranes and cargo containers from this viewpoint are common features. Its intactness and unity are rated as low, with the presence of scattered Port-related uses, including roadways, large oil storage tanks, and cargo containers.

Urban Landscape Unit – Viewpoint 2: Viewpoint 2 (Exhibit 2.1.7-3) is the view looking west along Pier D Street from in front of the G-P Gypsum Corporation offices. The bridge approach roadway is approximately 650 ft (198 m) southwest of this viewpoint. The viewers from this location tend to be office workers, motorists, and the Port's maintenance workers.

The foreground view is dominated by G-P Gypsum Corporation buildings that are representative of the scale of one- and two-story buildings that are interspersed along this street, which is one of the older areas of the Port. The Gerald Desmond Bridge main span is in the middle ground view. The main span is approximately 0.5-mi (0.8-km) away from the G-P Gypsum Corporation offices. The background view consists of power poles adjacent to the Gerald Desmond Bridge and its north bridge span approach. The dominant sight lines from this viewpoint tend to be vertical power line poles along Pier D Street. The semi-glossy yellow G-P Gypsum Corporation office buildings, which are located northeast of the bridge, appear brighter than the other elements. Other than the landscaping consisting of trees and groundcover that are adjacent to Pier D Street on the fill slope to the left of the picture (i.e., southwest), the predominant shape of the features from this view are vertical transmission lines. The office buildings, parking lot, and road in the foreground appear to have a smooth texture. Viewers looking at the elements from a moving vehicle on Pier D Street would experience a difference in the dominance and scale of the features, as they are either moving towards or away from the Gerald Desmond Bridge, whereas the office and Port's maintenance workers would not experience a change in the perspective because they are looking at the bridge from a stationary location. The vividness is rated as moderate due to the presence of the vertical electrical lines and the elevated landscape fill slope from this viewpoint; however, the landscaping of the fill slope along the south edge of the street adds a degree of unity. Its intactness and unity are rated as low, with the Pier D Street roadway separating the features from this view, which consists of the bridge to the south and additional electrical lines adjacent to the roadway to the north.

Urban Landscape Unit – Viewpoint 3: Viewpoint 3 (Exhibit 2.1.7-4) is a view looking south on Pico Avenue north of the Pier D Street intersection. The viewer types from this location are generally truckers, motorists, and workers of the businesses in this area with a south-facing view.

The foreground view consists of the SR 710 SB to Ocean Boulevard ramp, Port Petroleum Company, AERA Energy Tank, and trees adjacent to the east side of Pico Avenue, which are visible on the left side (i.e., southeast) of the picture. The SR 710 ramp has an approximate vertical height of 18 ft (5.4 m) above Pico Avenue, making it the dominant element in the foreground. The ramp crosses Pico Avenue approximately 900 ft (274 m)



LEGEND

- Existing View
- Existing View and Daytime Simulation
- Existing View, Day Simulation and Night Simulation

EXHIBIT 2.1.7-1

Key Viewpoint Locations in the Vicinity of the Gerald Desmond Bridge Replacement Project

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Exhibit 2.1.7-2
Viewpoint 1 – View to the Northwest from the Port Administration Building

Exhibit 2.1.7-3
Viewpoint 2 – View to the West on Pier D Street

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Exhibit 2.1.7-4
Viewpoint 3 – View to the South on Pico Avenue North of Pier D Street

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beyond the intersection. The middle ground view consists of the Gerald Desmond Bridge, which is visible on the far right (i.e., southwest). Other than the gantry cranes, the background views are not generally visible because the surrounding foreground features, such as the SR 710 ramp, Port Petroleum Company building, trees, and truck scale, dominate the view from this location. The dominant sight lines from this viewpoint tend to be horizontal along the SR 710 ramp and the Pico Avenue roadway. The transmission lines form a vertical mass on the east and west sides of this view. This viewpoint appears to be mostly light brown and gray, as the unpaved dirt parcels adjacent to the road and at the truck scale are the dominating features in the foreground. Because the paved road (i.e., Pico Avenue) and adjacent dirt parcels are in the foreground, the texture appears to be relatively smooth. The passing motorists or truckers driving toward or away from Pier D Street on Pico Avenue would experience a change in the dominance, scale, and diversity of the view because they are in a moving vehicle and would likely have to turn their head more than 45 degrees in either direction, which would cause the view to be oblique. With the exception of the moving vehicles on Pico Avenue and the SR 710 ramp, viewers in this area with a south-facing view would not experience a change in the features. This viewpoint is rated low for vividness, intactness, and unity, as the Pico Avenue and Pier D Street roadways and the large vacant shoulder area located to the northwest corner of Pico Avenue and Pier D Street tend to be the dominating horizontal features of this view.

Urban Landscape Unit – Viewpoint 4: Viewpoint 4 (Exhibit 2.1.7-5) is a view looking to the west from downtown at the Long Beach Hilton, approximately 1-mi (1.6 km) east of the Gerald Desmond Bridge. The Long Beach Hilton is located at the northeast quadrant of Ocean Boulevard and Shoreline Drive. This area of downtown Long Beach generally has high-rise office towers. The viewers from this area consist of office workers, hotel guests, and tourists with a west-facing view.

The foreground view consists of the Ocean Boulevard and Shoreline Drive intersection, which is visible in the center of the picture. The Ocean Boulevard on-ramp to SR 710, via the Gerald Desmond Bridge, is visible to the center, approximately 0.25-mi (0.4-km) from this foreground view. Also prevalent in the foreground are mature trees that provide canopy to the sides of the adjacent office buildings and the vertical street light poles on Ocean Boulevard and Shoreline Drive. These trees shield a full view of the bridge. The middle ground and background features from this viewpoint consist of the Ocean Boulevard WB ramp to the Gerald Desmond Bridge and the main-span approach of the bridge; however, viewers generally see the more-dominating gray paved roads, the green canopy trees, and patches of grass adjacent to the roads that are in the foreground. The paved roads and massive buildings give them a relatively smooth texture, while the canopy of the mature trees adds a slightly more coarse texture. The passing motorists driving towards or away from Ocean Boulevard would experience a change in the dominance, scale, and diversity of the view because they are in a moving vehicle and would likely have to turn their head more than 45 degrees in either direction, which would cause the view to be oblique; however, hotel guests, tourists, and office workers with a west-facing view would have a more constant and enduring image of the bridge and the surrounding elements. This viewpoint is rated low for vividness, intactness, and unity, as the Ocean Boulevard and Shoreline Drive roadways and the trees in the foreground tend to be the dominating features of this view. These dominating features are scattered throughout this view; however, the National Bank office building located southwest of this view adds a degree of unity.

<u>Open Landscape Unit</u>

The Open Landscape Unit includes the Los Angeles River, the Back Channel, and the public open space along the Los Angeles River on the east side of the project study area. The Gerald Desmond Bridge crosses over the Back Channel area, which also includes Pier C northeast of the project site. The open space area includes City of Long Beach public parks, aquarium, and marina. It is characterized by large areas with limited amounts of hardscape or buildings. Viewpoints 5 and 6 represent the key viewpoint for the Open Landscape Unit that is along the Los Angeles River at the Golden Shore Marine Reserve (Exhibits 2.1.7-6 and 2.1.7-7). This viewpoint is typical of the view from open space areas along the east side of the river that are accessible to the public, located approximately 1-mi (1.6 km) away from the Gerald Desmond Bridge.

Open Landscape Units – Viewpoints 5 and 6: Viewpoints 5 and 6 (Exhibits 2.1.7-6 and 2.1.7-7) are views to the northwest and north from Golden Shore Marine Reserve, respectively. This area is approximately 1-mi (1.6 km) from the Gerald

Desmond Bridge. The viewers from this location are generally visitors at the Golden Shore Marine Reserve, residents at the Golden Shore RV Resort, and office workers at the California State University and College Headquarters.

The gantry cranes, transmission towers, and other industrial features in the background of the photo are common elements from this viewpoint. With the exception of the arch truss on the main span of the Gerald Desmond Bridge, the other elements from this viewpoint are vertical elements that protrude into the skyline. The immediate vicinity of this area generally has more landscaping than the Port. The dominant elements from these viewpoints are the transmission towers and cranes located towards the north side of Viewpoints 5 and 6 (Exhibits 2.1.7-6 and 2.1.7-7).

The foreground view along the Los Angeles River at the Golden Shore Marine Reserve consists of the river, Harbor Scenic Way Drive, and the California United Terminals at Pier E. The middle ground view consists of the Gerald Desmond Bridge and transmission towers. These viewpoints have more vivid colors compared to the other viewpoints throughout the Port. There are patches of landscaping to the north side of Viewpoint 6 (Exhibit 2.1.7-7) towards the RV Resort and within the Golden Shore Marine Reserve. The berms in the foreground appear as a brown coarse texture and are composed of large boulders. Also prevalent in the foreground are the white RVs parked at the RV Resort to the right of the photo (i.e., northwest). Visitors at the Golden Shore Marine Reserve, residents at the Golden Shore RV Resort, and office workers at the California State University and College Headquarters would have a constant and enduring view of the Gerald Desmond Bridge. These viewpoints rate high for vividness. Its intactness is moderate due to encroachment of the visual elements of the Golden Shore RV Resort (101 Golden Shore Avenue). South of this viewpoint, intactness of views toward the river is high. The unity of these viewpoints is high, with the water shoreline and shoreline trail providing a unifying element. The overall visual quality at the Open Landscape Viewpoint is rated as high.

Water approach views from the south may also be considered as within the Open Landscape Unit. Public roadway access south of the bridge ends in the central portion of Pier J, southwest of the bridge. Views of the bridge from the public roadway are obscured by Port facilities and stacked cargo containers. There are unobscured views of the Gerald Desmond Bridge from the south in the Outer and Inner Harbors.

Open Landscape Unit – Viewpoint 7: Viewpoint 7 (Exhibit 2.1.7-8) is a view looking to the south from Pier C, located northeast of the Gerald Desmond Bridge. This key viewpoint represents the Open Landscape Unit that is on the southeast portion of the Back Channel along Pier C. This viewpoint is typical of the view from the open space areas at Pier C, which are accessible to Port workers. Port workers facing south at Pier C would have a view of the Gerald Desmond Bridge in the foreground.

The foreground view from this location consists of container ships near the Back Channel, the Connolly Pacific Company facilities and cranes at Pier D, the Gerald Desmond Bridge, and the LBGS. The Gerald Desmond Bridge is a dominating feature from this viewpoint, located at approximately 0.25-mi (0.4-km) from the wharf of Pier C to the WB approach of the bridge. The arch truss design of the main span tends to be a dominating feature of the bridge, as most elements in this view are either horizontal or vertical masses. The LBGS, located adjacent to the bridge at the WB direction, is the next most visible element on the right side (northwest) of the picture. The rectangular building, along with the circular smoke stacks, competes for the viewer's attention because they are the most massive objects located in the northwest limits of the Gerald Desmond Bridge from this viewpoint. The middle ground view consists of the transmission towers located to the far right (i.e., northwest of the bridge). These transmission towers appear closer than their actual distance of approximately 1-mi (1.6 km) because they are approximately 200 ft (61 m) high. The transmission towers are the tallest elements from this viewpoint. The background view consists of cranes and containers at Pier T. The elements from this viewpoint tend to blend in with the blue sky and water. The light brown color of the LBGS is the main color that stands out from the physical features of this view. The Port workers looking south from the Pier C wharf would have a constant and enduring image of the new bridge and the surrounding elements. This viewpoint is rated moderate for vividness, intactness, and unity. The close proximity of the Gerald Desmond Bridge structure and the LBGS tends to create added unity and intactness, and these features also create striking and distinctive horizontal and vertical patterns.

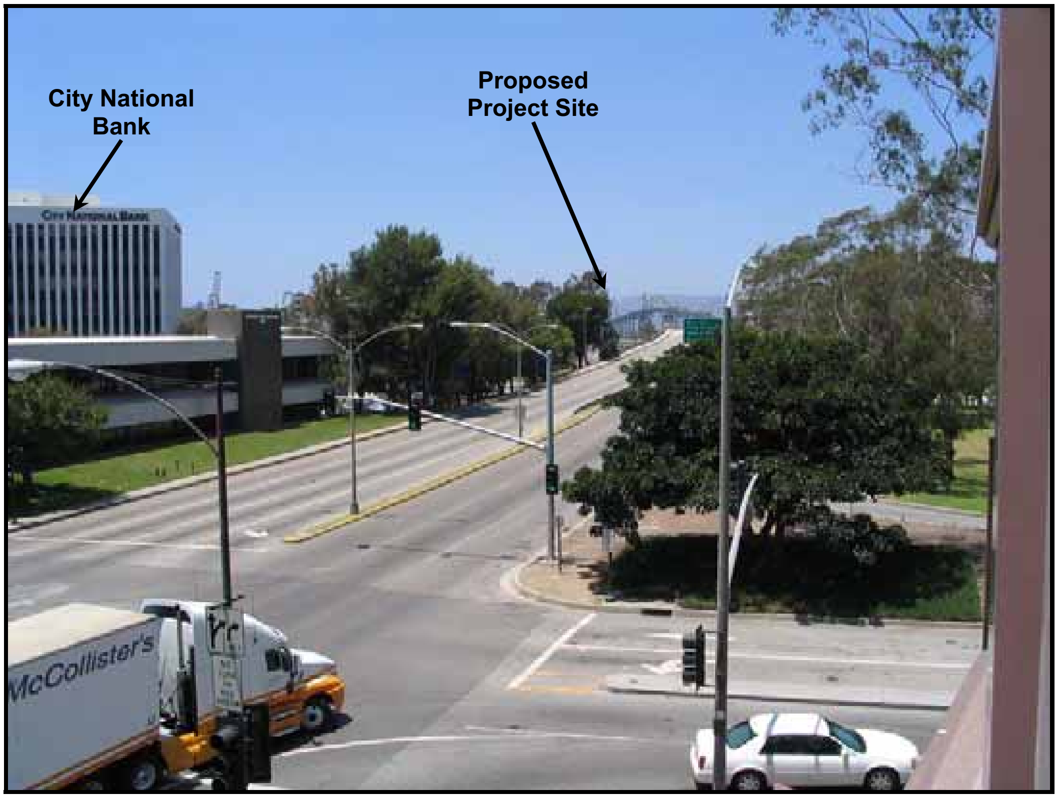

Exhibit 2.1.7-5
Viewpoint 4 – Existing View to the West from Downtown at the Long Beach Hilton Hotel Pool Area

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Exhibit 2.1.7-6
Viewpoint 5 – View to the Northwest from Golden Shore Marine Reserve

Exhibit 2.1.7-7
Viewpoint 6 – Existing View to the Northwest and North from Golden Shore Marine Reserve

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Exhibit 2.1.7-8
Viewpoint 7 – Existing View to the South from the Pier C Wharf

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Views from Area Freeways and Ocean Boulevard

The greatest number of viewers in the viewshed is the passing motorists and truckers on the freeway system. These viewers generally have a moderate to low sensitivity to the visual environment due to their concentration on driving and their focus on their destinations.

SR 710 from the North and Ocean Boulevard from the East – Viewpoints 8 and 9: Viewpoints 8 and 9 (Exhibits 2.1.7-9 and 2.1.7-10) have no or limited views of the Gerald Desmond Bridge from SB SR 710 south of I-405 due to the screening along the west side of the freeway by vegetation, soundwalls, and industrial development. Views southwest to the bridge begin to open up as the Port is entered south of Anaheim Street. In this area, the bridge is well to the west of the SB freeway. Viewpoint 8 (Exhibit 2.1.7-9), a photograph taken on SB SR 710 at Pier C Street 0.75-mi (1.2 km) from the bridge, is representative of views toward the bridge from the southernmost section of SR 710. As the driver approaches the Ocean Boulevard interchange, roadway structures obstruct bridge views.

The viewer types from this viewpoint are passing motorists and truckers on SR 710. The foreground view consists of Long Beach Sportfishing at Queen's Wharf and the Back Channel. The middle ground view is the Gerald Desmond Bridge. The background view is generally not visible from this vantage point, as it is obstructed by the bridge approaches and the buildings in the foreground. The power lines and the white roof of the large building (Long Beach Sportfishing at Queen's Wharf) in the foreground tend to be dominating elements. The square masses of the industrial and commercial buildings in the foreground tend to be repetitive in this view. The passing motorists and truckers from this viewpoint would have a view that is fleeting and oblique, as they are driving either away from or towards the Gerald Desmond Bridge. Vividness is low. Numerous large roadway structures are coming in and out of the driver's and passenger's fields of view. Intactness and unity are low. There are numerous driving decision points and no dominant unifying features until vehicles enter the immediate vicinity of the Gerald Desmond Bridge approach west of Pico Avenue.

Viewpoint 9 (Exhibit 2.1.7-10) is the view from the Pico Avenue on-ramp to WB Ocean Boulevard. The viewer type is passing motorists and truckers. The viewers' expectation from this viewpoint is that of a road that is ascending towards the main span of the bridge.

The foreground view of the bridge and approaches is unobstructed and directly ahead. The bridge and approaches obstruct the middle ground and background views from this ascending Pico Avenue on-ramp viewpoint. The color from this viewpoint tends to be monochromatic, as the road, bridge approach, main span, surrounding buildings, and the light and transmission poles are different shades of gray. Because this area is approximately 0.5-mi (0.8-km) from the main span truss and at an ascending approach, the main span of the bridge appears to be the most dominating element. The other dominant elements in this view are the road, the vertical light poles and transmission lines, and the other vehicles that are in the line of sight. Other than the arch truss of the main span of the bridge, the visual mass tends to be square as the motorists and truckers approach the buildings and other vehicles to the right. The passing motorists and truckers from this viewpoint would have a view that is fleeting and oblique, as they are driving either away from or towards the Gerald Desmond Bridge. Vividness increases to moderate as the Gerald Desmond Bridge is approached. Intactness also increases to moderate, as there are fewer encroaching visual elements west of Pico Avenue. Unity is low to moderate. Outside of the roadway envelope, there is low cohesion of visual elements.

Gerald Desmond Bridge WB – Viewpoint 10: Viewpoint 10 (Exhibit 2.1.7-11) is representative of the view from the WB lanes of the bridge on the downgrade. Passing motorists and truckers are the viewer types. The massive cranes, oil storage tanks, transmission towers, and the SERRF, which is a rectangular building with a smoke stack to the north and northwest, are dominating elements.

The brown oil storage tanks and unpaved brown dirt parcels are the prevailing color from this viewpoint. From the foreground viewpoint of passenger vehicle occupants, the railing on the outside barrier obscures the view perpendicular to the roadway. The oil storage tanks next to the LBGS property are visible adjacent to the railings on the north side of the bridge. Behind the oil storage tanks are two massive SCE transmission towers that cross the Cerritos Channel. Looking in the direction of travel, the hills of the Palos Verdes Peninsula are visible in the background view, while port and industrial facilities occupy the foreground. A portion of the Vincent Thomas Bridge is visible to the far northwest in the background of the picture. The open area in the middle ground is the former Pier S oil production site, which the Port has proposed converting into a marine cargo terminal. Also visible in the middle ground is the vertical mass support towers for the Schuyler Heim Bridge. The passing motorists and truckers from this viewpoint would have a view that is fleeting and oblique, as they are driving either away from or towards the Gerald Desmond Bridge and other objects that are within the line of sight. This viewpoint is rated low-moderate for vividness and low for intactness and unity. There are no shoulders on either side of the bridge that would allow motorists to stop and view the surrounding environment, and the viewing angle of the elements described above require the motorist to turn their head; therefore, the ability of the viewer to perceive the striking and distinctive patterns of the features in this viewpoint becomes more difficult. The intactness and unity are low, as the large areas of vacant land and the scattered vertical masses dominate this view.

Gerald Desmond Bridge EB – Viewpoint 11: Viewpoint 11 (Exhibit 2.1.7-12) is a view from the EB Gerald Desmond Bridge approaching the SR 710/ Pico Avenue interchange. Passing motorists and truckers are the viewer type. The rectangular taller buildings of downtown Long Beach are in the background south of the roadway alignment. At the time that this photograph was taken, temporary construction barriers and visual screening of the work area obscured the view alongside the roadway.

The permanent traffic barrier and bridge railing also obscure the view to the side, but to a lesser degree. For the driver, the need to keep attention on traffic conditions, particularly through the interchange, limits the opportunity to observe the view from this location. Further east on the roadway, the interchange ramps to and from SR 710 are the dominant visual elements. The passing motorists and truckers from this viewpoint would have a view that is fleeting and oblique, as they are driving either away from or towards the Gerald Desmond Bridge and other features, such as the office buildings that are within the line of sight. Vividness is low to moderate. Numerous large roadway structures are coming in and out of the motorist's field of view. Although the downtown Long Beach high-rise buildings add unity, the permanent traffic barrier and the fencing to the south of the roadway block the viewer's ability to see the elements. The downtown Long Beach high-rise buildings, which increase in intactness and unity as one drives towards them, generally provide low visual integrity (i.e., intactness) and coherence (i.e., unity) due to the distance from the Gerald Desmond Bridge.

Terminal Island Freeway (SR 47) SB – Viewpoint 12: Viewpoint 12 (Exhibit 2.1.7-13) shows the view to the southwest near the Terminal Island Freeway intersection with Ocean Boulevard. Passing motorists and truckers are the viewers from this viewpoint. The existing Gerald Desmond Bridge and its west approach are visible beyond the Pier S redevelopment area.

The middle ground view consists of the unpaved lot that is the property of the Long Beach Harbor Department and the LBGS in the background. The other distinct elements in this view are the light brown LBGS exhaust stacks to the north of the bridge, SCE transmission lines crossing the Cerritos Channel to the north, power line poles scattered throughout the view, and the large fuel storage tanks north of the power plant. The passing motorists and truckers on SR 47 have a fleeting and oblique view, as they are driving either away from or towards the Gerald Desmond Bridge and other objects that are within the line of sight. This viewpoint is rated low for vividness, intactness, and unity. One would have to turn at an approximate 90-degree angle towards the Gerald Desmond Bridge and other features adjacent to it while driving on SR 47 to see this view, which makes the visual quality of this viewpoint less distinctive and memorable. It is important to note that there are no shoulders or areas where one would be able to stop and have a stationary view of the bridge from this viewpoint.

2.1.7.3 Environmental Consequences

Evaluation Criteria

The proposed project would have a significant impact if it were to result in any of the following:

- Result in a high degree of contrast to sensitive viewers compared to the existing condition of surrounding areas;
- Have a substantial adverse effect on a scenic vista;
- Substantially degrade the existing character or quality of the site and its surroundings;
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area;
- Obstruct or impair important views from a public roadway or scenic vista;

Exhibit 2.1.7-9
Viewpoint 8 – View to the Southwest from SR 710 at Pier C Street

Exhibit 2.1.7-10
Viewpoint 9 – View to the West on Pico Avenue On-Ramp to Ocean Boulevard

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Exhibit 2.1.7-11
Viewpoint 10 – View to the West from the Gerald Desmond Bridge

Exhibit 2.1.7-12
Viewpoint 11 – View to the East from the Gerald Desmond Bridge

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Exhibit 2.1.7-13
Viewpoint 12 – Existing View to the East from SR 47 North of Ocean Boulevard

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- Result in substantial modification to natural topography through grading or retaining walls, or;
- Result in substantial removal of natural vegetation.

The Port's Methodology for Visual Impact Assessment (POLB, 2005c) and FHWA's Visual Impact Assessment for highway projects (FHWA, 1988) provide guidance to help gauge the potential effects of the project from different viewpoints. For instance, this analysis characterizes the importance of each viewpoint, determining whether it is of frequent use and describing who the users are from each viewpoint, and characterizing whether the existing and the new bridge would be consistent with the surrounding environment.

No Action Alternative

There would be no effects on visual resources under the No Action Alternative.

Construction and Demolition Impacts

North-side Alignment Alternative

During construction and demolition, heavy construction equipment and machinery would be present in the project area. Cranes would be the only equipment that may be visible from the viewpoints previously discussed. All equipment used in construction and demolition of the project would have a minor, temporary effect on views and would be removed upon completion of the project.

South-side Alignment Alternative

Effects during construction and demolition under the South-side Alignment Alternative would be the same as those described under the North-side Alignment Alternative.

Rehabilitation Alternative

During construction, heavy construction equipment and machinery would be present in the project area. Cranes would be the only equipment that may be visible from the viewpoints previously discussed. All equipment used in construction and demolition of the project would have a minor, temporary effect on views and would be removed upon completion of the project.

Operational Impacts

North-side Alignment Alternative

Analysis of Viewshed Effects: A Viewshed Effects Analysis was completed to determine if either the Gerald Desmond Bridge or the replacement bridge would be visible from the San Pedro area. It was concluded that the existing bridge is not visible from any of the viewpoints surveyed. It was also concluded that the replacement bridge would not be visible from the San Pedro Area, because large structures, such as transmission towers, container cranes, and cargo ships, in the foreground of the POLA are above the height of elements that would otherwise be visible in the middle ground and background. Although the two mast towers of the new bridge are higher than the current bridge main span, foreground elements of the POLA would remain at higher elevations.

The North-side Alignment Alternative would alter the existing view of the project area from the City of Long Beach recreation areas along the east bank of the Los Angeles River. This area is located approximately 1-mi (1.6 km) east of the Gerald Desmond Bridge. The higher and longer new bridge structure would be more visible than the existing structure and approach roadways. The new bridge would be viewed against a backdrop of large structures, such as power transmission towers and container cranes. The contemporary design of the bridge, which incorporates the support cables, would be compatible with the existing industrial development.

Viewpoint 6a (Exhibit 2.1.7-14) is a daytime computer simulation of the North-side Alignment Alternative from Viewpoint 6 (Exhibit 2.1.7-7) near the east bank of the Los Angeles River and from the public trail along the river. Viewers from this location are generally visitors at the Golden Shore Marine Reserve, residents at the Golden Shore RV Resort, and office workers at the California State University and College Headquarters.

The new bridge towers would appear similar in height and size to the closer downtown Long Beach buildings near the river. The new bridge would be viewed against the foreground of the river and landscape of the western shore. Compared to the existing view, the replacement bridge would be a stronger visual element against the gantry cranes and power transmission and lighting towers in the port. The bridge towers in the background would increase the vividness of this view. The diversity and continuity of this view would appear similar to the existing bridge, as the two mast towers and the support cables of the new bridge main span would be designed in a manner that forms two contemporary triangular-shaped elements that would be above the height of the horizon. These features would be compatible with the built environment because existing cranes and transmission lines are at similar heights. The proposed bridge would be of a modern architectural design that utilizes colors, materials, and forms that are compatible with the existing industrial development. Visitors at the Golden Shore Marine Reserve, residents at the Golden Shore RV Resort, and office workers at the California State University and College Headquarters would have a constant and enduring view of the new bridge. There would be a positive effect in this scenic vista. The proposed bridge replacement would not block public views. In fact, the vertical masses of the new bridge would be compatible with the existing vertical cranes in the skyline, thereby enhancing the view. This viewpoint is rated high for vividness. Its intactness is moderate due to encroachment of the visual elements of the Golden Shore RV Resort. South of this viewpoint, intactness of views toward the river is high. The unity of these viewpoints is high, with the shoreline and trail providing a unifying element.

The North-side Alignment Alternative would not damage scenic resources. Vegetation removal would be restricted to landscaping plantings in the Ocean Boulevard/SR 710/Pico Avenue interchange areas. The North-side Alignment Alternative would not substantially degrade the existing visual character or quality of the site and its surroundings from SR 47 north of Ocean Boulevard.

Viewpoint 12a (Exhibit 2.1.7-15) is a daytime computer simulation of the new bridge, west approach, and reconstructed Terminal Island interchange from the Terminal Island Freeway north of its intersection with Ocean Boulevard. Passing motorists and truckers are the viewers from this viewpoint. The existing condition from this viewpoint is shown in Viewpoint 12 (Exhibit 2.1.7-13) and is approximately 1-mi (1.6 km) from the Gerald Desmond Bridge.

From this viewpoint, the new bridge, with higher roadways than the existing bridge, and the two towers, along with the support cable, would be more visually prominent than the existing structure. The Terminal Island interchange would be closer to the Terminal Island Freeway and also more prominent from this viewpoint than the existing structure. Compared to the existing view, the new bridge would be a stronger visual element against the smoke stacks of the LBGS, the transmission towers, and the gantry cranes. The two mast towers and the support cables on the new bridge main span would be designed in a manner that forms two contemporary triangular-shaped elements that are architecturally compatible with the vertical smoke stacks of the LBGS, the vertical transmission towers, and the gantry cranes. The towers and diagonal support cables would provide a sense of diversity to the environment, along with the oil storage tanks. The passing motorists and truckers on SR 47 would have a fleeting and oblique view, as they are driving either away from or towards the new bridge and other features that are within the line of sight; however, the viewer would have a longer view of the more massive triangular-shaped towers of the bridge as they are driving either towards or away from the new bridge. The vividness and intactness of this view would increase, and the contemporary design of the new bridge would be aesthetically compatible with the elements in the surrounding environment. The new bridge would not block any public views.

The North-side Alignment Alternative would alter the existing view of the project area from the Pier C area north of the Gerald Desmond Bridge, which is located approximately 0.5-mi (0.8-km) away. This viewpoint is typical of the view from the open space areas at Pier C, which are accessible to south-facing Port workers. Currently, the existing Gerald Desmond Bridge is a dominating feature when facing south at the Pier C wharf. The current bridge span and main span are visible in the foreground during the day. The existing bridge is viewed against a backdrop of large structures, such as the LBGS, transmission towers, cargo ships, and container cranes. The new bridge would be a more-dominating feature from this viewpoint during the daytime because the new bridge would be higher than the old bridge (approximately 50 ft [15 m] higher), and the two mast triangular-shaped towers, along with the support cabling, would be the main features of the bridge.

Viewpoint 7a (Exhibit 2.1.7-16) is a daytime computer simulation of the North-side Alignment Alternative from Viewpoint 7 (Exhibit 2.1.7-8) at the Pier C wharf north of the Gerald Desmond Bridge. The new bridge towers and support cabling would appear larger in height and size than the old Gerald Desmond Bridge.

The bridge would be viewed against the background of the Port's cranes and cargo containers on Pier T to the southwest. The new bridge would also be viewed against a backdrop of large structures, such as the LBGS, transmission towers, cargo ships, and container cranes. Compared to the existing daytime view, the new bridge would be a stronger visual element against the cargo ships, gantry cranes, and transmission towers in the POLA. Although the new bridge appears more massive from this viewpoint, the Port workers looking south from the

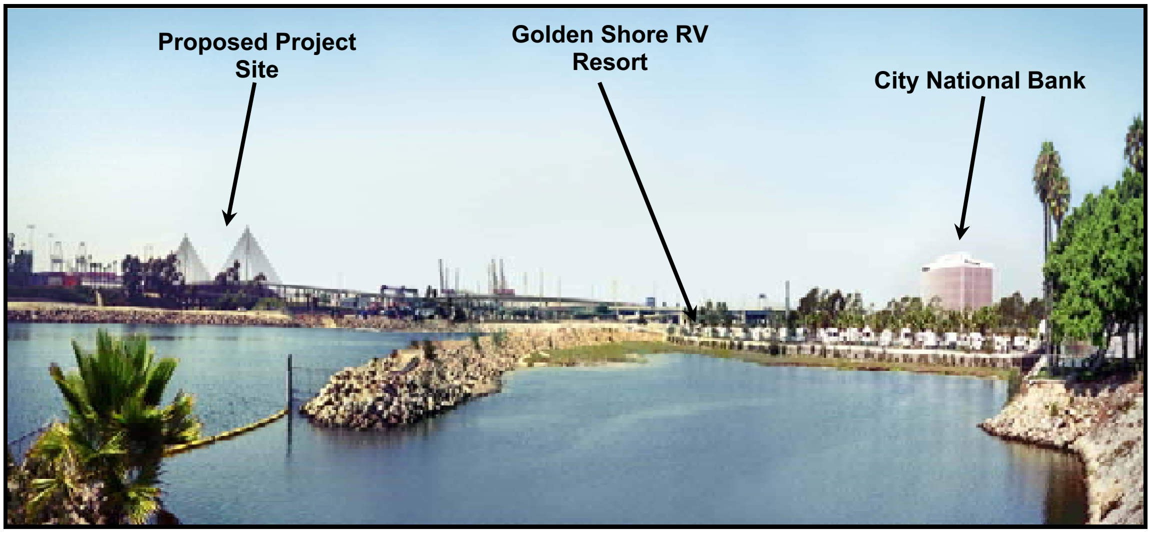

Exhibit 2.1.7-14
Viewpoint 6A – Daytime Simulation of the Proposed Project
(View to Northwest and North from Golden Shore Marine Reserve)

Exhibit 2.1.7-15
Viewpoint 12A– Daytime Simulation of the Proposed Project
(View to the East from SR 47 North of Ocean Boulevard)

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Exhibit 2.1.7-16
Viewpoint 7A – Daytime Simulation of the Proposed Project
(View to the South from the Pier C Wharf)

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Pier C wharf would only experience a slight change when comparing the existing bridge with the new bridge during the day, in terms of the dominance, scale, diversity, and continuity of the view. The vertical towers of the new bridge would appear to be more consistent than the existing arch truss bridge against the vertical smoke stacks and transmission towers in its surroundings. The vertical mast towers of the new bridge are consistent with the surrounding transmission towers and smoke stacks of the LBGS. The bridge towers and supporting cables in the foreground would increase the vividness of this view. There would be a positive effect in this scenic vista. The North-side Alignment Alternative would not damage scenic resources or block views.

Viewpoint 7b (Exhibit 2.1.7-17) is a nighttime computer simulation of the North-side Alignment Alternative from Viewpoint 7 (Exhibit 2.1.7-8) at the Pier C wharf north of the Gerald Desmond Bridge. The new bridge towers and support cabling would appear larger in height and size than the old Gerald Desmond Bridge. This simulation can also be compared to Viewpoint 7a (Exhibit 2.1.7-16), which is a daytime simulation of the same view.

The bridge is viewed against the background of the lighting in Pier T to the southwest. The new bridge would also be viewed against a backdrop of large structures, such as the LBGS, transmission towers, cargo ships, and container cranes. These features would be visible from this viewpoint at night; however, because they do not have their own source of lighting, their visibility tends to fade as one moves further away from the area. Compared to the existing nighttime view, the new bridge would be a stronger visual element against the cargo ships, gantry cranes, and power transmission and lighting sources in the POLA. Although the new bridge appears more massive from this viewpoint, the Port workers looking south from the Pier C wharf would experience a positive change when comparing the existing bridge with the new bridge during the night in terms of the dominance, scale, or diversity of the view. The new bridge would be an aesthetically pleasing architectural structure that would attract the attention of the viewers. The bridge towers in the foreground would increase the vividness of this view. There would be a positive effect in this scenic vista. The North-side Alignment Alternative would not damage scenic resources or block views.

The North-side Alignment Alternative would alter the existing view of the project area from the downtown Long Beach area along Ocean Boulevard east of the Los Angeles River. This area is located approximately 0.5-mi (0.8-km) away from the Gerald Desmond Bridge.

Viewpoint 4a (Exhibit 2.1.7-18) is a daytime computer simulation of the North-side Alignment Alternative from Viewpoint 4 (Exhibit 2.1.7-15) from the Long Beach Hilton, east of the Los Angeles River. The new bridge towers would appear slightly larger in height and size than the existing bridge.

The bridge would be viewed against the foreground of the vertical light poles and tall trees that provide canopies to the adjacent buildings. These trees are the more-dominating features because they are in the foreground. The new bridge would be viewed against a backdrop of the San Pedro hills. The vertical mast towers and support cables of the bridge would increase the vividness of this view. There would be a positive effect in this scenic vista. Compared with the existing view, the new bridge would be a stronger visual element against the elements in the foreground. The two vertical masts of the new Gerald Desmond Bridge towers, along with the support cables, would create continuity with the existing light poles that are in the foreground. The new bridge would be an aesthetically pleasing architectural structure that would attract the attention of the viewers. The passing motorists driving towards or away from Ocean Boulevard would experience a change in the dominance and scale of the view because they would be moving and would likely have to turn their head more than 45 degrees in either direction, which would cause the view to be oblique. In contrast, hotel guests with a west-facing view would have a constant and enduring image of the bridge and the surrounding elements. This daytime viewpoint is rated moderate for vividness, intactness, and unity. The new bridge would not block any public views.

Viewpoint 4b (Exhibit 2.1.7-19) is a nighttime computer simulation of the North-side Alignment Alternative from Viewpoint 4 (Exhibit 2.1.7-15) from the Long Beach Hilton, east of the Los Angeles River. This view can also be compared to Viewpoint 4a (Exhibit 2.1.7-18), which is the daytime version of the same view and simulation. The new bridge towers would appear larger in height and size than the existing bridge.

The bridge is viewed against the foreground of the light poles and tall trees that provide canopies to the adjacent buildings. These trees would obscure a full view of the new bridge. The new bridge would be viewed against a backdrop of scattered lights radiating from the western portion of the bridge. The bridge's mast towers would increase the vividness of this view. There would a positive effect in this scenic vista. Compared with the existing view, the new bridge would be a slightly stronger visual element against the elements in the foreground; however, the two vertical masts of the new towers, along with the support cables, would blend in with the existing light poles that are in the foreground. The passing motorists driving towards or away from Ocean Boulevard would experience a change in the dominance and scale of the view because they would be moving and would likely have to turn their head more than 45 degrees in either direction, which would cause the view to be oblique; however, hotel guests with a west-facing view would have a more constant and enduring image of the bridge and the surrounding elements. This viewpoint is rated low for vividness, intactness, and unity. The new bridge would not block any public views.

Analysis of Light and Glare Effects: Potential light and glare effects resulting from the proposed project are important visual effects that need to be considered. Light effects are those associated with artificial light sources, either from the elimination of existing sources or the creation of new sources. Light effects can include localized effects from single light sources, such as street lamps. Regional light effects occur from changes in the darkness of areas. Poor lighting, or a lack thereof, can also be a factor that affects motorists' safety when traveling on a roadway. Poor lighting can hamper a motorist's sight distance. Glare effects can result from direct glare from motor vehicle headlights shining into the opposite direction lanes or bridge light poles that shine into light-sensitive areas.

The North-side Alignment Alternative would realign freeway and interchange roadways and roadway lighting. The realigned roadways would not contribute to additional sources of light and glare that are in close proximity to light-sensitive properties. Light-sensitive receptors are residents and tourists who would have a direct view of the bridge. Adjacent properties are transportation ROWs and port and industrial facilities that have their own lighting sources. The North-side Alignment Alternative would not create a new source of light or glare that would adversely affect day or nighttime views in the area.

The proposed project would incorporate a context-sensitive design approach in developing the aesthetic lighting plan for the new bridge. The new bridge would be designed in a manner that uses lighting that focuses inward on the bridge to highlight its modern architectural design. The lighting would focus on the support cables of the mast towers and the mast towers, as well as the approach structure. One goal of these design measures would be to minimize potential light and glare effects to the sensitive receptors located east of the project. As discussed earlier, the Gerald Desmond Bridge is located in an area that is primarily made up of port and industrial uses. Most of the viewers in the immediate vicinity (less than 1-mi [1.6 km]) of the bridge during nightfall consist of Port workers, who are not considered sensitive viewers.

In July 2005, the Ports adopted an OffPeak program managed by PierPASS, Inc. This program shifts truck traffic to the Ports during off-peak hours at night and Saturday to relieve congestion in and around the Ports. With implementation of the OffPeak program, more workers are at the Port during night hours, leading to more lighting in and around the Ports; therefore, it is anticipated that there would be more lighting in and around the Ports during nighttime with implementation of the OffPeak program.

Potential sensitive viewers are located at the western portions of downtown Long Beach near Shoreline Drive and Ocean Boulevard, which consist of tourists and visitors to the nearby shops and restaurants. The view of the new bridge in this area would not be anticipated to change drastically from today's view. The new bridge would be obscured by more immediate features, such as high-rise buildings, light poles, and mature trees in the foreground of the downtown Long Beach area. In addition, there would be analysis to determine if the lighting design would have any potential spillover effects on the surrounding communities.

The process of selecting the type of lights to be incorporated into the design would also strive to enhance the nighttime view of the bridge and minimize glare to light-sensitive communities in the vicinity of the bridge. It can be concluded that the proposed landmark bridge design would provide a new source of visual interest and enhance the overall landscape in comparison to the existing, less prominent and deteriorated structure. There are no adverse effects on visual resources resulting from the proposed project. The proposed project would have a beneficial effect, as the new bridge would be considered a gateway into the Port.

Table 2.1.7-1 is a summary of the effects that the proposed project would have on visual resources in the project area.

Exhibit 2.1.7-17
Viewpoint 7B – Nighttime Simulation of the Proposed Project
(View to the South from the Pier C Wharf)

Exhibit 2.1.7-18
Viewpoint 4A – Daytime Simulation of the Proposed Project
(View to the West from Downtown at the Long Beach Hilton)

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Exhibit 2.1.7-19
Viewpoint 4B – Nighttime Simulation of the Proposed Project
(View to the West from Downtown at the Long Beach Hilton)

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Table 2.1.7-1
Summary of Effects upon Visual Resources – North- and South-side Alignment Alternatives

Viewer types affected
Passing motorists, truckers, office workers, Port workers, workers at local businesses with views of the project site, hotel guests, and tourists.
Degree of visual contrast compared to the existing condition
The new bridge would not provide a drastic contrast compared to the existing condition. The new bridge would be: • a higher and longer structure • more visible than the existing structure and approach roadways • similar in height and size to the closer downtown Long Beach buildings near the river • a stronger visual element against the gantry cranes, and power transmission and lighting towers in the Port • of a modern architectural design that utilizes colors, materials, and forms that are compatible with the existing industrial development
Perceived and designated importance of the view to and from the new bridge
The proposed project would have a beneficial effect; the new bridge would be considered the gateway into the Port.
Effects on important views and scenic vistas
The new bridge would alter the existing view of the project area from the City of Long Beach recreation areas along the east bank of the Los Angeles River. This alteration in view would have a positive effect in this scenic vista. The bridge towers and cables in the background would increase the vividness of this view.
Effects to visual character or quality of site and surroundings
The proposed project is located in a heavily urbanized portion of southern California. The immediate vicinity of the project is characterized by Port-related industrial uses.
Consistency of new bridge with surrounding environment
The new bridge would be similar in height and size to the closer downtown Long Beach buildings near the river. The vertical mass of the new bridge would be compatible with the existing vertical cranes in the skyline, thereby enhancing the view. The two mast towers of the new bridge are higher than the current bridge main span, but they are similar in height and size to the closer downtown Long Beach buildings near the river.
New source of substantial light or glare affecting day or nighttime views?
The realigned roadways would not contribute to additional sources of light and glare that are in close proximity to light-sensitive properties.
Substantial modifications to natural topography?
No.
Substantial removal of natural vegetation?
No.
Effects upon views of predominant structures visible to the east from downtown Long Beach and along ocean bluffs
From this angle, the new bridge would provide a positive effect in this scenic vista. The new bridge would appear slightly larger in height and size than the existing bridge; the two vertical masts of the new bridge towers, along with the support cables, would create continuity with the existing light poles that are in the foreground. The new bridge would be an aesthetically pleasing architectural structure that would attract the attention of the viewers.
Effects upon ground-level views along the boundary of Queensway Bay
The new bridge towers would appear similar in height and size to the closer downtown Long Beach buildings near the river.
Effects upon ground-level views along Harbor Scenic Drive from SB lanes south of Anaheim Street
The new bridge would appear slightly larger in size from this viewpoint.
Consistency with Coastal Zone Requirements of the CCC
Consistent. The PMP, which includes replacement of the Gerald Desmond Bridge, has been approved and certified by the CCC to be consistent with Coastal Zone regulations.

<u>South-side Alignment Alternative</u>

From the viewpoints analyzed, the South-side Alignment Alternative would not appear substantially different from the North-side Alignment Alternative. Several visual simulations were prepared for the North-side Alignment Alternative (as discussed above); the South-side Alignment Alternative would render very similar views.

Viewpoint 6 (Exhibit 2.1.7-7) shows the view from the Golden Shore Marine Reserve, in which the South-side Alignment Alternative appears almost identical to the simulated North-side Alignment Alternative (Viewpoint 6a [Exhibit 2.1.7-14]). When compared with the North-side Alignment, the South-side Alignment Alternative would move the new bridge slightly closer to the viewer. This shift would be almost unnoticeable at this viewing distance.

Viewpoint 12 (Exhibit 2.1.7-13) shows the west approach and reconstructed Terminal Island interchange from the Terminal Island Freeway north of its intersection with Ocean Boulevard. The simulation of the North-side Alignment Alternative (Viewpoint 12a [Exhibit 2.1.7-15]) is very similar to what the South-side Alignment Alternative would look like to viewers from this same viewpoint. The South-side Alignment Alternative would shift the new bridge slightly to the right (south) of where the simulation in Exhibit 2.1.7.15 appears. This shift would place the new bridge further away from the LBGS, but it would not block any new structures.

Viewpoint 7 (Exhibit 2.1.7-8) shows a viewpoint at the Pier C wharf north of the Gerald Desmond Bridge. The North-side Alignment Alternative simulation from this angle (Viewpoint 7a [Exhibit 2.1.7-16]) shows that the new bridge towers and support cabling would appear larger in height and size than the old Gerald Desmond Bridge. The South-side Alignment Alternative would appear the same from this viewpoint. Because this view is of the north side of the bridge, the South-side Alternative would shift the new bridge south, making the new bridge appear slightly shorter then the simulation of the North-side Alignment Alternative from this view. This perceived change in height would probably not be noticeable to viewers from this viewpoint.

Viewpoint 4 (Exhibit 2.1.7-5) is a view from the Long Beach Hilton, east of the Los Angeles River. Viewpoint 4a (Exhibit 2.1.7-18) shows a simulation of the North-side Alignment Alternative. Under this alternative, the new bridge towers would appear slightly larger in height and size than the existing bridge. The South-side Alignment Alternative would have a very similar effect on views from this angle. The towers would appear the same height as they do in Exhibit 2.1.7-18 (simulation of the North-side Alignment Alternative), but the South-side Alignment would shift the bridge slightly left (south) of the simulated bridge pictured in the exhibit. This would be a minor visual difference at this viewing distance, and would most likely not be visible to viewers and not interfere with any public views.

Like the North-side Alignment Alternative, the South-side Alignment Alternative would not damage scenic resources or substantially degrade the existing visual character or quality of the site and its surroundings, and the vividness and intactness of affected views would increase. Similar to the North-side Alignment Alternative, the South-side Alignment Alternative would not create a new source of light or glare that would adversely affect day or nighttime views in the area, and it would enhance the overall visual landscape in comparison to the existing bridge.

<u>Rehabilitation Alternative</u>

The bridge would appear identical to the existing Gerald Desmond Bridge under the Rehabilitation Alternative. The Rehabilitation Alternative would seismically upgrade the existing bridge so that it would meet current safety and seismic standards, but it would not visibly change the bridge structure; therefore, it would have no effect on current views.

<u>No Action Alternative</u>

The No Action Alternative would not affect scenic vistas or damage scenic resources. It would not substantially degrade the existing visual character or quality of the site and its surroundings. Nor would it create a new source of light or glare that would adversely affect day or nighttime views in the area.

2.1.7.4 Avoidance, Minimization and/or Mitigation Measures

No measures required.

2.1.8 Cultural Resources

This section evaluates the potential for historical and archaeological resources within the proposed project area and the effects of the bridge replacement project on such resources. The information presented in this section is based upon the Historic Properties Survey Report (HPSR) prepared for the project (Parsons, 2003d).

2.1.8.1 Regulatory Setting

"Cultural resources" as used in this document refers to all historical and archaeological resources, regardless of significance. Laws and regulations dealing with cultural resources include the following:

The National Historic Preservation Act of 1966, as amended (NHPA): The NHPA sets forth national policy and procedures regarding historic properties, defined as districts, sites, buildings, structures, and objects included in or eligible for the National Register of Historic Places (NRHP). Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on such properties and to allow the Advisory Council on Historic Preservation (ACHP) the opportunity to comment on those undertakings, following regulations issued by the ACHP (36 CFR 800).

On January 1, 2004, a Section 106 Programmatic Agreement (PA) between the ACHP, FHWA, SHPO, and Caltrans went into effect for Caltrans projects, both state and local, with FHWA involvement. The PA implements the ACHP's regulations, 36 CFR 800, streamlining the Section 106 process and delegating certain responsibilities to Caltrans. FHWA's responsibilities under the PA have been assigned to Caltrans as part of the Surface Transportation Project Delivery Pilot Program (23 CFR 773) (July 1, 2007).

The Archaeological Resources Protection Act (ARPA): The ARPA applies when a project may involve archaeological resources located on federal or tribal land. ARPA requires that a permit be obtained before excavation of an archaeological resource on such land can take place.

Section 4(f) of the U.S. Department of Transportation Act: Historic properties are also protected under Section 4(f) of the U.S. Department of Transportation Act, which regulates the "use" of land from historic properties by transportation facilities.

NRHP: Established in 1966, the NRHP is the nation's official list of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture. The NRHP recognizes "The quality of significance in American history, architecture, archaeology, 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:

A. That are associated with events that have made significant contribution to the broad patterns of our history; or

B. That are associated with the lives of persons significant in our past; or

C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. That have yielded, or may be likely to yield, information important in prehistory or history (36 CFR Part 60.4)."

To be considered for NRHP eligibility, properties must generally be at least 50 years old prior to the evaluation. Properties that do not meet that age criteria must possess exceptional significance to be considered for listing.

CEQA: Historical resources are considered under CEQA, as well as California PRC Section 5024.1, which established the California Register of Historical Resources (CRHR). PRC Section 5024 requires state agencies to identify and protect state-owned resources that meet NRHP listing criteria. It further specifically requires Caltrans to inventory state-owned structures in its ROWs. PRC Sections 5024(f) and 5024.5 require state agencies to provide notice to and consult with SHPO before altering, transferring, relocating, or demolishing state-owned historical resources that are listed on or are eligible for inclusion in the NRHP or are registered or eligible for registration as California Historical Landmarks. To be eligible for nomination, a historical resource must be significant at the local, state, or national level under one or more of the following criteria:

1. It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States;

2. It is associated with the lives of persons important to local, California, or National History;
3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values; or
4. It has yielded, or has the potential to yield, information important to the prehistory or history of the local areas, California, or the nation.

2.1.8.2 Affected Environment

The Area of Potential Effects (APE) for the proposed project was approved by Caltrans and FHWA on October 8, 2002, and October 1, 2002, respectively. The APE for the proposed project is located in the Port at the southern end of SR 710 in Los Angeles County. The project is specifically centered along Ocean Boulevard from the intersection of the Terminal Island Freeway at the western end to the easterly end of the bridge over the Los Angeles River.

The entire project area is located within the boundaries of Terminal Island and the Port. Terminal Island and the surrounding Port have undergone extensive alterations and construction since the original Port was planned and founded. The current landscape is an artificial structure consisting of ballast and introduced materials to form a base, then filled with soils transported from the mainland.

The following cultural resource studies (Parsons, 2003d) were completed for this project:

- HPSR, April 2003
- Historic Resources Evaluation Report (HRER), April 2003
- Archaeological Survey Report, October 2002

Methods used to support the studies performed for this project are described below.

- A records search to identify known or potential locations that may contain archaeological resources was conducted at the South Central Coastal Information Center, California State University, Fullerton in September 2002.
- Field surveys of the APE were conducted in August 2002.
- The NRHP (http://www.nr.nps.gov/), accessed on September 10, 2002, lists no properties located on Terminal Island.
- The Historic Properties Data File for Los Angeles County, August 13, 2002, lists no properties within the project area.
- The California Points of Historical Interest, 1992, of the Office of Historic Preservation, Department of Parks and Recreation, lists no properties within a 0.5-mi (0.8-km) radius.
- The California Historical Landmarks, 2000, of the Office of Historic Preservation, Department of Parks and Recreation, lists no properties located on Terminal Island.

Native American Consultation

Letters were mailed to the Native American Heritage Commission (NAHC) on September 24, 2002. The NAHC supplied a list of Native American individuals, groups, tribes, and entities with a potential interest in the proposed project. Letters were sent to the individuals identified by the NAHC on September 30, 2002. To date, no contact has been received from any of the potentially interested Native American parties (see Appendix B-1 of the HPSR for more information regarding coordination).

Archaeological Resources

No known archaeological resources were identified within the APE. The present formation of Terminal Island and the surrounding areas does not support the location of any archaeological deposits.

No further archaeological work should be necessary, unless the project plans are modified to include areas outside of the APE. If cultural materials are discovered during construction, then all earth-moving activity within and around the immediate discovery area will be diverted until a qualified archaeologist can assess the nature and significance of the find.

If human remains are discovered, State Health and Safety Code Section 7050.5 states that further disturbances and activities shall cease in any area or nearby area suspected to overlie remains, and the County Coroner must be contacted. Pursuant to PRC Section 5097.98, if the remains are thought to be Native American, the coroner will notify the NAHC who will then notify the Most Likely Descendent (MLD). At this time, the person who discovered the remains will contact POLB so that they may work with the MLD on the respectful treatment and disposition of the remains. Further provisions of PRC 5097.98 are to be followed as applicable.

Historic Architectural Resources

A field survey was conducted on August 23, 2002, to identify historic architectural resources within the APE. The APE includes a minimum of one parcel adjacent to the existing and potential public ROW that would be required for construction of the project alternatives. An HPSR was completed for the APE and examined 13 properties for historical significance. Only the LBGS (former Edison Power Plant No. 3 and transmission towers) appeared to meet significance criteria for inclusion in the NRHP (Criteria A and D), as well as the CRHR (Criteria 1 and 4). All other properties, including the Gerald Desmond Bridge, were determined ineligible for listing on the NRHP. The SHPO concurred with the HPSR findings on July 21, 2003 (see Appendix C).

Former Edison Power Plant No. 3 (Exhibit 2.1.8-1) and the transmission towers (Exhibit 2.1.8-2) are potentially eligible for the NRHP under Criteria A and D, owing to their importance in the industrial development of the Long Beach Harbor and the Los Angeles area, and for the plant's remaining steam-electric generating technology from the early 1900s; however, two of the three original plant buildings (Plants No. 1 and No. 2) were demolished prior to this evaluation, compromising the integrity of the resource's original setting. Furthermore, the remaining plant has been completely resurfaced, compromising any architectural significance that the facility may have had.

Further discussion and analysis regarding the LBGS can be found under separate cover in the HPSR.

2.1.8.3 Environmental Consequences

Evaluation Criteria

Title 36 CFR Part 800 defines adverse effects on historic properties as follows:

Section 800.5(1), Criteria of Adverse Effect – An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

Adverse effects on historic properties include, but are not limited to:

1. Physical destruction of or damage to all or part of the property;
2. Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the NRHP;
3. Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
4. Neglect of a property resulting in its deterioration or destruction; and
5. Transfer, lease, or sale of the property (36 CFR Part 800.9 [b]).

Under 36 CFR Part 800.9 (c), there are "effects of an undertaking that would otherwise be found to be adverse [but] may be considered… not adverse for the purpose of these regulations."

1. When the historic property is of value only for its potential contribution to archaeological, historical, or architectural research, and when such value can be substantially preserved through the conduct of appropriate research, and such research is conducted in accordance with applicable professional standards and guidelines;
2. When the undertaking is limited to the rehabilitation of buildings and structures and is conducted in a manner that preserves the historical and architectural value of affected historic property through conformance with the Secretary's "Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings;" or
3. When the undertaking is limited to the transfer, lease, or sale of a historic property, and adequate restrictions or conditions are included to ensure preservation of the property's significant historic features.

No Action Alternative

The No Action Alternative would not result in impacts to cultural resources and would have no adverse effect on historic properties.

North-side Alignment Alternative

This alternative would locate the new bridge closer than the existing bridge to the NRHP-eligible former SCE Power Plant No. 3, and it would require a sliver of the property near the channel (0.58-acre [0.23-ha] for footing and aerial easements). Although the North-side Alignment Alternative would require a sliver ROW acquisition, it would not physically affect the building. Additionally, new transmission towers would be constructed on both sides of the Cerritos Channel, adjacent to the existing towers, which are part of the historic resource. The existing towers would remain intact, and the transmission lines would be relocated to the new towers (see Section 2.1.4 [Utilities] for more information).

As described above, Power Plant No. 3, which was built in 1927 (Exhibit 2.1.8-1), and the steel lattice, high-tension transmission towers, which were built in 1912 and 1924 (Exhibit 2.1.8-2) on either side of the Cerritos Channel, were determined eligible for listing in the NRHP. That finding was made by consensus through the Section 106 process. The eligibility of the resources is under Criteria A and D; therefore, they are listed in the CRHR under Criteria 1 and 4. The significance of these resources is for their important role in industrial development of the Long Beach Harbor and Los Angeles area, and for the plant's remaining steam-electric generating technology from the early 1900s. The SHPO concurrence letter officially agreed with the FHWA determination that building the new bridge and "construction of…new high-voltage transmission towers adjacent to the existing towers, which will be left standing…," would have no adverse effect on historic resources (see Appendix C).

Section 4(f): NRHP-eligible resources are also eligible for consideration under Section 4(f). These resources consist of the electrical steam-electric generating equipment and technology within the Power Plant No. 3 building and the high-voltage transmission towers. As previously discussed, the SHPO concurred with FHWA that construction of the North- or South-side Alignment Alternatives would not have an adverse effect on historic properties, per Section 106 of the NHPA; therefore, construction of the North- or South-side Alignment Alternatives would not result in a use under Section 4(f).

South-side Alignment Alternative

This alternative would be located south of the existing bridge, further away from the historic power plant; however, as with the North-side Alignment Alternative, it would require construction of new high-voltage transmission towers and lines adjacent to the historic towers to provide additional vertical clearance for ships.

The SHPO concurrence letter officially agreed with the FHWA determination that building the new bridge and "construction of…new high-voltage transmission towers adjacent to the existing towers, which will be left standing…," would have no adverse effect on historic resources (see Appendix C).

Rehabilitation Alternative

The Rehabilitation Alternative would include improvements to the existing bridge only. The Gerald Desmond Bridge was determined ineligible for inclusion on the NRHP during the Section 106 Process (see Appendix C). Additionally, the Rehabilitation Alternative would not physically alter or damage the historic Edison Power Plant or require relocation of the associated transmission lines that cross the Cerritos Channel. This alternative would not change the character of the property's use or setting or introduce visual, atmospheric, or audible elements that would diminish the historic features. The Rehabilitation Alternative would have no adverse effect on historic resources.

2.1.8.4 Avoidance, Minimization, and/or Mitigation Measures

No measures required.

Exhibit 2.1.8-1
Photograph of Edison Power Plant No. 3

Exhibit 2.1.8.-2
Photograph of Transmission Towers

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Section 2.2
Physical Environment

2.2 PHYSICAL ENVIRONMENT

2.2.1 Water Resources and Hydrology

This section analyzes potential impacts to groundwater, surface water, flooding, designated beneficial uses, and water quality associated with the proposed Gerald Desmond Bridge Replacement Project. Analysis is based on the *Water Resources and Hydrology Technical Study* completed in February 2006 and updated in July 2008.

2.2.1.1 Regulatory Setting

Federal Regulations

Clean Water Act

The primary federal law governing water quality is the Clean Water Act (CWA) of 1972. This Act provides for the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters. The CWA emphasizes technology-based (end-of-pipe) control strategies and requires discharge permits to use public resources for waste discharge. The Act also limits the amount of pollutants that may be discharged and requires wastewater to be treated with the best treatment technology economically achievable regardless of receiving water conditions.

The 1987 amendments to the CWA included Section 402(p), which establishes a framework for regulating municipal and industrial storm water discharges. The amendment also provides a framework for regulating storm water runoff from construction sites. On November 16, 1990, EPA published final regulations that established requirements for storm water permits.

In 1998, Section 303(d) was amended to the CWA, requiring the state to identify and maintain a list of water bodies that do not meet water quality standards and also to implement a Total Maximum Daily Load (TMDL) program for impaired water bodies. The list of water bodies that do not meet water quality standards is referred to as the CWA Section 303(d) List of Water Quality Limited Segments.

Executive Order 11988: Floodplain Management

EO 11988 (Floodplain Management) of 1977, directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains that may cause short- or long-term adverse impacts, unless it is the only practicable alternative. FHWA requirements for compliance are outlined in 23 CFR 650 Subpart A. To comply, the following must be analyzed:

- The practicability of alternatives to any longitudinal encroachments
- Risks of the action
- Impacts on natural and beneficial floodplain values
- Support of incompatible floodplain development
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values impacted by the project

State Regulations

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act) is the basic water quality control law for California. The Act authorizes the state to implement the provisions of the CWA. The Porter-Cologne Act establishes a regulatory program to protect the water quality of the state and the beneficial uses of state waters. Under this act, the State Water Resources Control Board (SWRCB) provides policy guidance and review for the Regional Water Quality Control Board (RWQCB), and the RWQCB implements and enforces the provisions of the Act.

Establishment of the National Pollutant Discharge Elimination System (NPDES) regulations in 1987, under Section 402(p) of the CWA, required that EPA delegate the responsibility of the NPDES program to the State. The SWRCB was given the responsibility to enforce the regulations of the NPDES program and did so in the form of the *NPDES Permit for General Construction Activities* (Order No. 99-08-DWQ), which was adopted in 1992 and amended in August of 1999 and 2001. On December 2, 2002, SWRCB approved the "*Modification of Water Quality Order 99-08-DWQ State Water Resources Control Board (SWRCB) NPDES General Permit for Construction Activity (One to Five Acres).*" The Permit requires that all owners of land within the State with construction activities resulting in one or more acres of soil disturbance (e.g., clearing, grubbing, grading, trenching, stockpile, utility relocation, temporary haul roads), apply for the General Permit. The purpose of the Permit is to ensure that the landowners:

1. Eliminate or reduce non-storm water discharges to storm drains and receiving waters of the U.S.;

2. Develop and implement a Storm Water Pollution Prevention Plan (SWPPP);
3. Inspect the Water Pollution Controls (WPCs) specified in the SWPPP; and
4. Monitor storm water runoff from construction sites to ensure that the BMPs specified in the SWPPP are effective.

California Coastal Act

Section 307 of the CZMA requires that all federal agencies or licensees with activities directly affecting the coastal zone, or with development projects within that zone, comply with state coastal acts to ensure that those activities or projects are consistent with the CZMA to the maximum extent practicable, with the enforceable polices of approved State management programs. The term "coastal zone" means the coastal waters (including the lands therein and thereunder) and the adjacent shorelands (including the waters therein and thereunder) strongly influenced by each other and in proximity to the shorelines of the several coastal states, and it includes islands, transitional and intertidal areas, salt marshes, wetlands, and beaches. In this case, the state coastal act is the California Coastal Act of 1976, which is the primary law that governs the decisions of the CCC. The Act outlines, among other things, standards for development within the Coastal Zone. The Coastal Act is umbrella legislation designed to encourage local governments to create Local Coastal Plans (LCPs) to govern decisions that determine the short- and long-term conservation and use of coastal resources. These LCPs can be thought of as the equivalent of General Plans for areas within the coastal zone. LCPs must be consistent with the policies of the Coastal Act, and they protect public access and coastal resources. Until the CCC certifies an LCP, the CCC makes the final decisions on all development within a jurisdiction (city or county) within the Coastal Zone. Once an LCP is certified for a jurisdiction, decisions are handled locally, but they can be appealed to the CCC.

1994 Water Quality Control Plan for the Los Angeles Basin (4)

The proposed project is located within the jurisdiction of the Los Angeles RWQCB (Region 4). All projects within the Los Angeles Region are subject to the requirements of the Los Angeles RWQCB. The Los Angeles RWQCB has prepared the *1994 Water Quality Control Plan for the Los Angeles Basin (4)* to help preserve and enhance water quality and to protect the beneficial uses of state waters. The Plan designates beneficial uses for surface and groundwaters, and it sets qualitative and quantitative objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's antidegradation policy. The Plan also describes implementation programs to protect the beneficial uses of all waters in the Region and surveillance and monitoring activities to evaluate the effectiveness of the Basin Plan (RWQCB, 1994).

Caltrans Statewide Storm Water Management Plan (SWMP) (June 2007)

The Caltrans SWMP addresses discharges of storm water and authorized non-storm water to waters of the United States, as defined by EPA, and waters of the state of California, as defined by the Porter-Cologne Act. The SWMP describes the Caltrans program and addresses storm water pollution control related to Caltrans activities, including planning, design, construction, maintenance, and operation of roadways and facilities. The SWMP provisions control pollutants to the Maximum Extent Practicable (MEP) as required by the federal CWA. The SWMP is intended to address anticipated requirements for the Caltrans Statewide Permit and the State Construction General Permit Order No. 99-08-DWQ (Construction General Permit). Additionally, the SWMP includes additional program activities requested by SWRCB to track program activities and measure compliance.

Local Regulations

Port of Long Beach Port Master Plan

The Port developed the PMP to ensure that short-term and long-range preferred-use plans are consistent with local, state, and federal laws and regulations. The first PMP for the Port was finalized in June 1978. The purpose of the PMP is to provide a planning tool to guide future port development and to ensure that projects and developments in the Harbor District are consistent with requirements of the California Coastal Act. The PMP is designed to better promote and safely accommodate foreign and domestic waterborne commerce, navigation, and fisheries in the national, state, and local public interest. The PMP also provides additional public recreation facilities within the Port consistent with sound and compatible port planning.

Currently, the Port has a Master Storm Water Program that requires all projects within the Port to implement structural and operational BMPs; however, any proposed construction and operational activities with the potential to affect storm water runoff would require Caltrans approval. All proposed activities would adhere to Caltrans NPDES policies and procedures.

Permit Requirements

Caltrans Statewide NPDES Storm Water Permit, Order No. 99-06 DWQ, NPDES No. CAS000003 and NPDES General Permit for Storm Water Discharges Associated with Construction Activity (General Permit), Order No. 99-08-DWQ, NPDES No. CAS000002

Caltrans has a statewide NPDES permit that covers all Caltrans work and projects within the state. All projects within Caltrans jurisdiction must conform to the requirements of the Caltrans Statewide NPDES Storm Water Permit, Order No. 99-06-DWQ, NPDES No. CAS000003, adopted by SWRCB on July 15, 1999. This permit allows Caltrans to operate, maintain, and construct on state ROW without applying for individual General Permits for each construction project. The permit requires Caltrans to adhere to the provisions of the Statewide General NPDES Permit for Construction Activities, Order No. 99-08-DWQ, NPDES No. CAS000002. The permit also requires Caltrans to have a site-specific SWPPP prepared for all projects with one or more acres of soil disturbance, and a Notice of Construction (NOC) to be filed with RWQCB at least 30 days prior to any soil-disturbing activities. For any local agency project with construction activity within Caltrans ROW and a total disturbed soil area of one or more acres, the local agency must submit a Notice of Intent (NOI) to SWRCB. In addition, all projects are subject to the BMPs specified in the Caltrans SWMP. The provisions and requirements of the permit are enforced by RWQCBs. Because the proposed project would disturb more than 1-acre (0.4-ha) of soil, the project would gain coverage under the General NPDES Permit for storm water discharges associated with construction activities; therefore, an SWPPP would be required and an NOI must be filed with SWRCB for this project.

The objectives of the General Permit are: (1) to identify pollutant sources that may affect the quality of discharges of storm water associated with construction activity from the project site; and (2) to identify, construct, and implement storm water pollution preventive measures and BMPs to reduce pollutants in storm water discharges from the construction site during construction and after construction is completed. Appropriate BMPs will be obtained from the Caltrans *Project Planning and Design Guide* (2007b), and the Caltrans *Construction Site Best Management Practices (BMPs) Manual* (2003). The Port is required to ensure that a SWPPP and Sampling and Analysis Plan (SAP) are prepared prior to construction activities. The SWPPP shall include the following: erosion and sediment control; non-storm water management; post-construction storm water management; waste management and disposal; maintenance, inspection, and repair of BMPs; employee training to perform inspections of the BMPs at the construction site; and an SAP for contaminated storm water runoff. The SWPPP must describe structural and non-structural BMPs to minimize or eliminate the potential for spills and leakage of construction materials and erosion of disturbed areas by water and wind.

Dewatering Permit

All projects requiring discharges of groundwater from construction and project dewatering to surface waters in coastal watersheds of Los Angeles and Ventura Counties must comply with Order No. R4-2003-0111 (NPDES No. CAG994004). If this project requires dewatering, and it is allowed by RWQCB, then compliance with this Order is necessary.

2.2.1.2 Affected Environment

The Long Beach Harbor consists of the Outer Harbor (south of the Pier T Mole), the Middle Harbor (between the Pier T Mole and Terminal Island), the Inner Harbor (including the Back Channel between Terminal Island and the Mainland to the east), and Cerritos Channel (between Terminal Island and the Mainland to the north). The Gerald Desmond Bridge Replacement Project is located over the Back Channel and connects the city of Long Beach to the east with Terminal Island (See Exhibit 1-1). A summary of the water quality parameters of the Back Channel and Cerritos Channel areas is presented in this section.

Groundwater

The project crosses seawater, and shallow groundwater in the project area is hydraulically separated from inland aquifers by seawater in the Inner Harbor and Cerritos Channel. The groundwater in the area is compromised by seawater intrusion; as a result, the Los Angeles RWQCB (Region 4) has not designated beneficial uses for the groundwater in the harbor area. Shallow groundwater in this area is below sea level due to dewatering operations from the LBGS north of the project area.

The proposed project site is located within the southern portion of the West Coast Groundwater Basin, which extends from the Ballona Escarpment and Baldwin Hills in the northwest, to the San

Gabriel River in the southeast. The shallowest water-bearing zone beneath Terminal Island is in the surficial deposits, comprising the man-made fills and near surface native soils (upper Recent deposits). Regional groundwater is generally encountered in these sediments at depths between ground level and 25 feet bgs. Beneath the surficial deposits, four major aquifers have been reported in the southern portion of the West Coast Basin in the vicinity of the proposed project site. They are, with increasing depth: the Gaspur Aquifer, the Gage Aquifer, the Lynwood Aquifer, and the Silverado Aquifer (CA DWR, 1961).

Shallow groundwater in the western end of the project site beneath the Terminal Island East interchange has been determined to contain volatile organic compounds (VOCs), primarily benzene, from the former Long Beach Naval Shipyard (LBNSY) south of the project area (Bechtel, 1997). Benzene contamination was detected in the uppermost groundwater (to a depth of 37 ft (11 m) bgs) at a maximum concentration of 840 micrograms per liter (µg/L) and within the deepest groundwater (69 ft to 109 ft [21 m to 32 m] bgs) at a concentration of 450 µg/L. One groundwater sampling point was drilled to monitor three groundwater zones in an area located within the Seaside Boulevard ramp loop, approximately 190 ft (60 m) north of the former LBNSY boundary. Benzene contamination was not detected within the upper coarse-grained water-bearing interval (37 ft to 50 ft [11 m to 15 m] bgs), but it was detected at concentrations of 190 µg/L and 1,400 µg/L within the fine-grain water-bearing interval (50 ft to 69 ft [15 m to 21 m] bgs) and the deepest groundwater, respectively. Exhibit 2.2.1-1 shows the approximate limits of groundwater contamination from the former LBNSY.

A groundwater investigation was conducted in the proposed project area in 1997 for the Ocean Boulevard Storm Drain and Pump Station projects (Woodward-Clyde, 1997). Eleven shallow Hydropunch® borings (approximately 7 ft [2 m] bgs) were installed within the western portion of the proposed project area along the north side of Ocean Boulevard between Henry Ford Avenue and the Back Channel (Exhibit 2.2.1-1). Six groundwater samples collected from six borings were selected for laboratory analytical testing. Three of these sample locations (HP-OB01, HP-OB02, and HP-OB03) are located in the area of Henry Ford Avenue and the Terminal Island Freeway (just west of the project area) (Exhibit 2.2.1-1). Sample locations HP-OB07 and HP-OB08 are located near the Terminal Island East gate, and sample location HP-OB05 is located midway between HP-OB03 and HP-OB07 (Exhibit 2.2.1-1). These samples were tested for 19 constituents outlined by RWQCB in Order Number 97-045 for obtaining a General Construction Dewatering NPDES permit. Groundwater analytical results were reported below the NPDES effluent discharge limits for all constituents tested, with the exception of arsenic, chromium, surfactants, turbidity, settleable solids, and suspended solids. Results that exceeded NPDES discharge limits are shown in Table 2.2.1-1.

To further investigate the benzene plume known to exist beneath Terminal Island, an Expanded Groundwater Investigation and Risk Assessment of the Terminal Island Deep Benzene Plume (HLA, 2000) was prepared. This report helped to further delineate the lateral and vertical extent of the benzene plume in relationship to the POLB property. The 2000 investigation concluded that data from the Bechtel investigation (Bechtel, 1998), the Woodward-Clyde investigation (Woodward-Clyde, 1998), and the HLA investigation show that the Gaspur Aquifer flows in a northerly gradient. While the overall gradient is to the north, there appeared to be a cone of depression that has formed around Dry Dock No. 1. Active hydrostatic relief wells were installed at Dry Dock No. 1 between 1973 and 1975. The source of benzene contamination may have existed before Dry Dock No. 1 wells began pumping; therefore, any benzene plume that may have existed would have moved to the north. Once the wells were installed and activated, the plume of benzene may have been reversed or possibly split so that it was moving in two directions (HLA, 2000).

As discussed, extensive soil and groundwater investigations have been performed at the former LBNSY site, and after all of these investigations, the source of the benzene plume is still being disputed by the potential responsible parties.

A *Final Feasibility Study Report, Installation Restoration Program, Sites 9, 12, and 13, Former Long Beach Naval Ship Yard* (Bechtel, 2001) was prepared to identify and evaluate potential remedial action alternatives for VOC-contaminated groundwater and soil at various locations; however, no conclusions with regard to the Gerald Desmond Bridge and the benzene plume can be made from this document because the deep benzene study was separated from Site 9. Site 9 is located within the project limits, approximately 300 ft (91 m) south of West Seaside Boulevard and 600 ft (183 m) west of the intersection of Weaver Street and Corvette Street.

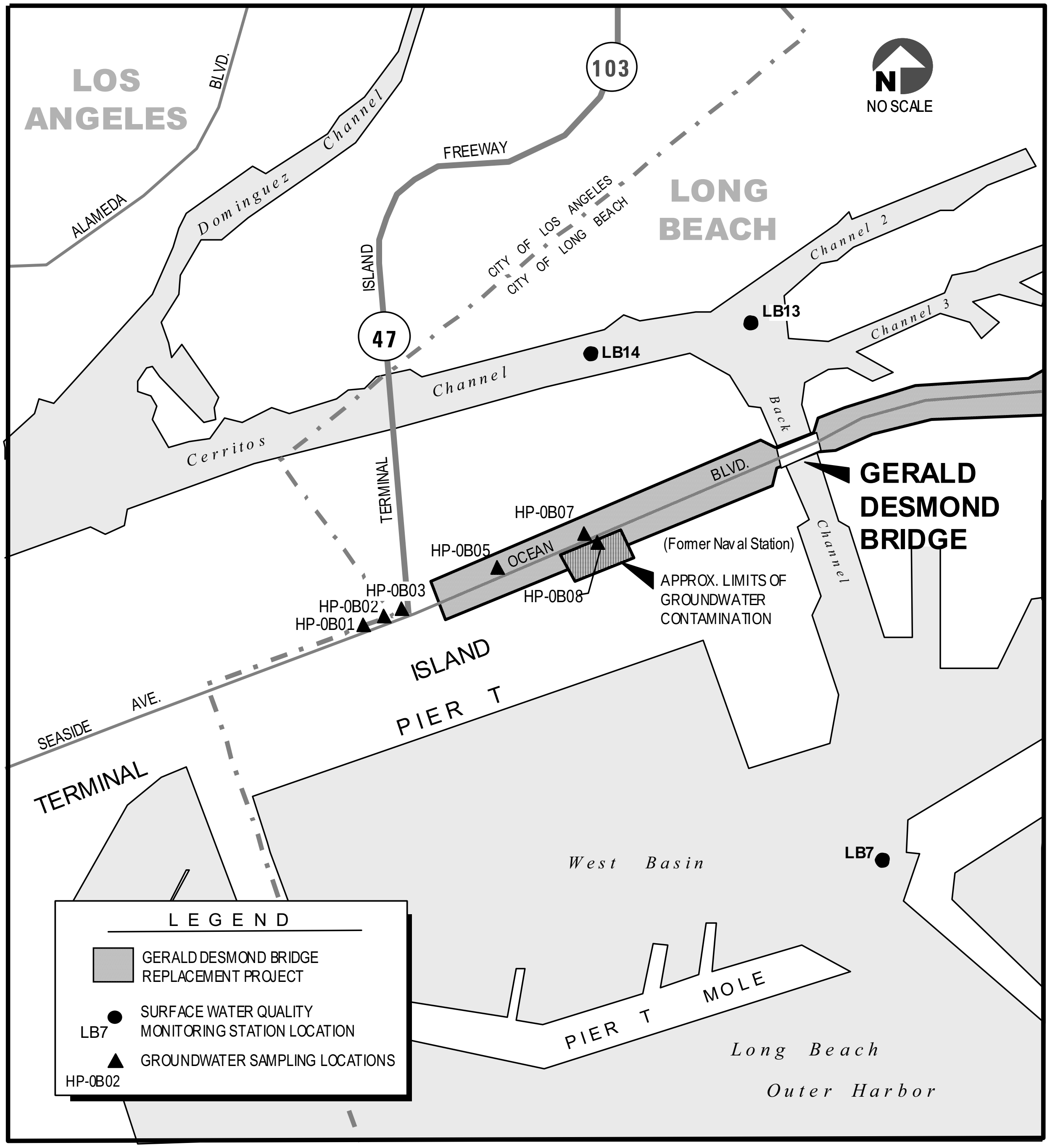

Exhibit 2.2.1-1
Groundwater and Surface Water Sampling Locations in the Vicinity of the Gerald Desmond Bridge Replacement Project

Table 2.2.1-1
1997 Groundwater Constituents with Levels Exceeding NPDES Discharge Limit

Sample Location	Arsenic (µg/L)	Chromium (µg/L)	Surfactants (mg/L)	Turbidity (NTU)	Settleable Solids (mg/L)	Total Suspended Solids (mg/L)
HP-OB01	ND	380	0.55	3,000	>40	7,000
HP-OB02	140	770	0.46	1,300	>40	4,300
HP-OB03	550	560	0.51	9,000	>40	180,000
HP-OB05	ND	150	0.68	1,800	5.5	2,300
HP-OB07	840	190	1.2	1,700	10	1,600
HP-OB08	ND	440	1.3	1,800	23	2,400
NPDES Daily Maximum	**50**	**50**	**0.5**	**150**	**0.3**	**150**

µg/L: micrograms per liter
mg/L: milligrams per liter
NTU: Nephelometric turbidity units
Source: Woodward Clyde, 1997.

Surface Water

Surface water in the project area primarily consists of water from the Pacific Ocean, incoming freshwater from the Dominguez Channel, and surface runoff from Port lands during precipitation events. The Dominguez Channel drains into the Los Angeles Harbor and the Cerritos Channel west of the project area (see Exhibit 1-1). A portion of the eastern section of the project area drains to the Los Angeles River Estuary (Queensway Bay).

The project lies within the Dominguez Channel Watershed and the Los Angeles Harbor Watershed, and it abuts the Los Angeles River Watershed. The project is located in the Los Angeles-San Gabriel Hydrologic Unit Sub-Area 405.12. There is one TMDL in effect for the Dominguez Channel watershed, which is for trash. The Los Angeles Harbor has one TMDL in effect for bacteria. There are three TMDLs in effect for the Los Angeles River Watershed, which are trash, nitrogen compounds and related effects, and metals. More information regarding TMDLs is provided in Section 2.2.1.1.

The receiving water bodies of the project are Back Channel, Channel No. 3, and the Los Angeles River Estuary (Queensway Bay). The Los Angeles River Estuary (Queensway Bay) is the only receiving water body on the 303 (d) List of Water Quality Limited Segments, and it is listed for the following pollutants: Chlordane (sediment), dichloro-diphenyl-trichloroethane (DDT) (sediment), lead (Pb) (sediment), polychlorinated biphenyls (PCBs) (sediment), sediment toxicity, trash, and zinc (sediment).

Additionally, there are several other water bodies in the project vicinity, including Cerritos Channel, East Basin, West Basin, and the Inner Harbor Turning Basin. Of these water bodies, West Basin and Cerritos Channel are the only two on the 303 (d) List of Water Quality Limited Segments.

Marine water quality within the Ports has been well studied. Recent studies indicate that the water quality within Long Beach Harbor is generally good, and the Port is currently meeting or exceeding the California Ocean Plan 2005 Water Quality Objectives. As results show, water quality in the inner and middle areas of the harbor is poorer than in the outer harbor.

Water quality parameters that are routinely sampled because they can affect biological communities are temperature, salinity, pH, dissolved oxygen, and water clarity. A water quality study was conducted for the Ports in 2002 entitled *The Ports of Long Beach and Los Angeles Year 2000 Biological Baseline Study of San Pedro Bay* (MEC, 2002). Water samples were collected quarterly during 2000 from 28 monitoring locations throughout both harbors with depths ranging from 13 ft to 77 ft (4 m to 23 m).

Three monitoring locations are in proximity to the Gerald Desmond Bridge. These are designated as LB7, LB13, and LB14, and they are shown on Exhibit 2.2.1-1. The depth of water at these locations is approximately 79 ft (24 m), 65 ft (20 m), and 59 ft (18 m), respectively. Water quality samples were collected quarterly during 2000 at the surface, mid-depth, and bottom. Table 2.2.1-2 summarizes the water quality data for these monitoring locations.

The dissolved oxygen (DO) concentrations in surface, mid-depth, and bottom waters within the study area were consistent with typical values for estuarine and near-coastal waters (MEC, 2002). Annual mean DO concentrations for LB7, LB13, and LB14 ranged from 6.90 to 7.62 milligrams per liter (mg/L), 6.03 to 6.56 mg/L, and 5.89 to 6.40 mg/L for surface, mid-depth, and bottom depth waters, respectively (Table 2.2.1-2). The highest DO concentrations occurred at the surface and decreased with depth, with the lowest concentrations in near-bottom waters. The DO concentrations met the water quality objective of 5 mg/L set forth for harbor waters.

The pH conditions within the study area were within normal ranges for coastal waters (MEC, 2002). Annual pH values for surface, mid-depth, and bottom waters at LB7, LB13, and LB14 ranged from 7.93 to 8.04, 7.92 to 7.97, and 7.88 to 7.93, respectively (Table 2.2.1-2). Changes with depth in pH at these stations typically were minimal. This range was within the water quality objective of 6.5 to 8.5 set forth for harbor waters.

Salinity in the harbor is influenced by the influx of outer ocean waters, evaporation, precipitation, freshwater runoff, and wastewater discharges. Salinity conditions within the study area were within normal ranges for estuarine and near-coastal waters (MEC, 2002). Annual mean salinity values for surface, mid-depth, and bottom waters at LB7, LB13, and LB14 ranged from 33.09 to 33.36 parts per thousand (ppt), 33.35 to 33.46 ppt, and 33.33 to 33.51 ppt, respectively (Table 2.2.1-2). Salinity typically increased with water depth, although the range in salinities at each of these three stations was relatively small (less than 1-ppt).

Water temperatures measured within the study area were within the expected range for estuarine and near-coastal waters (MEC, 2002). Annual mean temperatures in surface, mid-depth, and bottom waters at LB7, LB13, and LB14 ranged from 17.30 to 17.60 degrees Celsius (°C), 15.31 to 16.52 °C, and 14.44 to 15.45 °C, respectively (Table 2.2.1-2). Water temperatures were highest in the surface waters and decreased with depth, with the lowest temperatures in near-bottom waters.

Transmissivity (i.e., water clarity) values measured during this study generally were within ranges expected for coastal ports and harbors (MEC, 2002). Transmissivity can be affected by suspended materials from runoff, dredging activities, shipping operations, and biological factors such as plankton blooms. Annual mean values for light transmittance in surface, mid-depth, and bottom waters ranged from 63.37 percent to 66.66 percent, 55.17 percent to 60.69 percent, and 33.82 percent to 45.24 percent, respectively (Table 2.2.1-2). Water clarity in near-bottom waters was lower than that of surface and mid-depth waters.

In addition to the *Ports of Long Beach and Los Angeles Year 2000 Biological Baseline Study of San Pedro Bay* (MEC, 2002), a more recent water quality study was prepared by Weston Solutions, Inc., titled, *Characterization of Water Quality for Inner, Middle, and Outer Harbor Water Bodies in the Port of Long Beach* (Weston, 2006). This report summarized the results of 20 conductivity, temperature, and depth (CTD) casts (samples) that were conducted throughout the Inner, Middle, and Outer Harbor. Additionally, a midwater sample at each station was taken and analyzed for 160 different chemical constituents.

To summarize the results of the *Characterization of Water Quality for Inner, Middle, and Outer Harbor Water Bodies in the Port of Long Beach* (Weston, 2006), all observed samples revealed typical water conditions consistent with other water quality data taken within the Port. Two areas were seen to have altered the representative background marine conditions due to the proximity of the Los Angles River; however, both of these scenarios are typical within the Port, and the recorded values observed at all stations fell within a range that has been seen in past surveys (Weston, 2006). The water quality sampling stations that are in closest proximity to the proposed project are the seven sites located in the Inner Harbor and one site located in the Los Angeles River. Table 2.2.1-3 summarizes the results from these samples.

<u>Beneficial Uses</u>

Beneficial uses for surface waters in the Long Beach Harbor are designated by RWQCB and are identified in the *Water Quality Control Plan for Los Angeles Region* (Basin Plan) (RWQCB, 1994)[6]. Existing designated beneficial uses for the Long Beach Harbor include Navigation; Water Contact

[6] A previous Bays and Estuaries Plan was adopted in 1991, but it was rescinded in 1994 after it was challenged in court. The Bays and Estuaries Policy adopted in 1974 is still in effect.

Table 2.2.1-2
Mean Values of Surface Water Quality in the Long Beach Harbor in the Vicinity of the Proposed Gerald Desmond Bridge Replacement Project (January-November 2000)

Parameter	LB7	LB13	LB14
Dissolved Oxygen (mg/L)			
Surface	7.6	7.1	6.9
Mid-depth	6.6	6.3	6.0
Bottom	6.2	6.4	5.8
pH (pH units)			
Surface	8.04	7.93	7.93
Mid-depth	7.97	7.92	7.92
Bottom	7.93	7.92	7.88
Salinity (ppt)			
Surface	33.4	33.0	33.1
Mid-depth	33.5	33.4	33.4
Bottom	33.5	33.3	33.4
Temperature (°C)			
Surface	17.3	17.5	17.6
Mid-depth	15.3	16.2	16.5
Bottom	14.4	15.2	15.5
Transmissivity (%)			
Surface	63.37	64.90	66.66
Mid-depth	55.17	60.69	57.81
Bottom	33.82	43.48	45.24

mg/L – milligrams per liter; ppt – parts per thousand; °C – degrees Celsius; % – percent
Source: MEC, 2002.

Table 2.2.1-3
Mean Values of Surface Water Quality Parameters for the Inner Harbor of the Port of Long Beach (October 2006)

Parameter	Average	Range
Dissolved Oxygen (mg/L)		
Surface	6.7	5.6-7.5
Bottom	6.6	5.9-7.4
pH (pH units)		
Surface	8.0	7.6-8.4
Bottom	7.8	7.4-8.2
Salinity (PSU)		
Surface	32.6	28.1-33.3
Bottom	33.0	32.6-33.4
Temperature (°C)		
Surface	17.8	16.0-19.5
Bottom	16.2	14.7-17.2
Transmissivity (%)		
Surface	45%	N/A
Bottom	68%	N/A

mg/L – milligrams per liter; PSU – practical salinity units; °C – degrees Celsius; % – percent
Source: Weston, 2006

Recreation; Non-contact Water Recreation; Commercial and Sport Fishing; Marine Habitat; and Rare, Threatened, and Endangered Species. A potential beneficial use for the Long Beach Harbor is shellfish harvesting.

To maintain these beneficial uses, RWQCB has set forth Water Quality Objectives, which are described in the Basin Plan (RWQCB, 1994). Water Quality Objectives are intended to: (1) protect the public health and welfare; and (2) maintain or enhance water quality in relation to the designated existing and potential beneficial uses of the water. At present, two numeric objectives are set for Long Beach Harbor: DO and pH. The mean annual DO concentrations shall be 5 mg/L or greater, with no single determination less than 5 mg/L. The pH in the Long Beach Harbor shall not be less than 6.5 or higher than 8.5 (RWQCB, 1994).

Hydrology and Floodplain

The Dominguez Channel is the major drainage that flows into the Los Angeles-Long Beach Harbor complex. Sediment and contaminants are transported into the harbor with the flows from the Dominguez Channel.

The Dominguez Channel is an 8.5-mi-long (13.7-km) structure that drains an 80-square-mile (207-square-kilometer) area west of the Los Angeles River basin. The channel flows into the Consolidated Slip and subsequently into the East Basin of Los Angeles Harbor and Cerritos Channel. The Dominguez Channel historically transported untreated industrial wastes into Los Angeles Harbor, but such discharges have been significantly reduced through regulation by RWQCB.

Within the project area, the Federal Emergency Management Agency (FEMA) has identified three flood zones on the Flood Insurance Rate Map (FIRM) for this area, which are shown in Exhibit 2.2.1-2. The three flood zones are defined as:

Zone A – Flood insurance rate zone that corresponds to the 1-percent annual chance floodplains that are determined in the Flood Insurance Study by approximate methods of analysis.

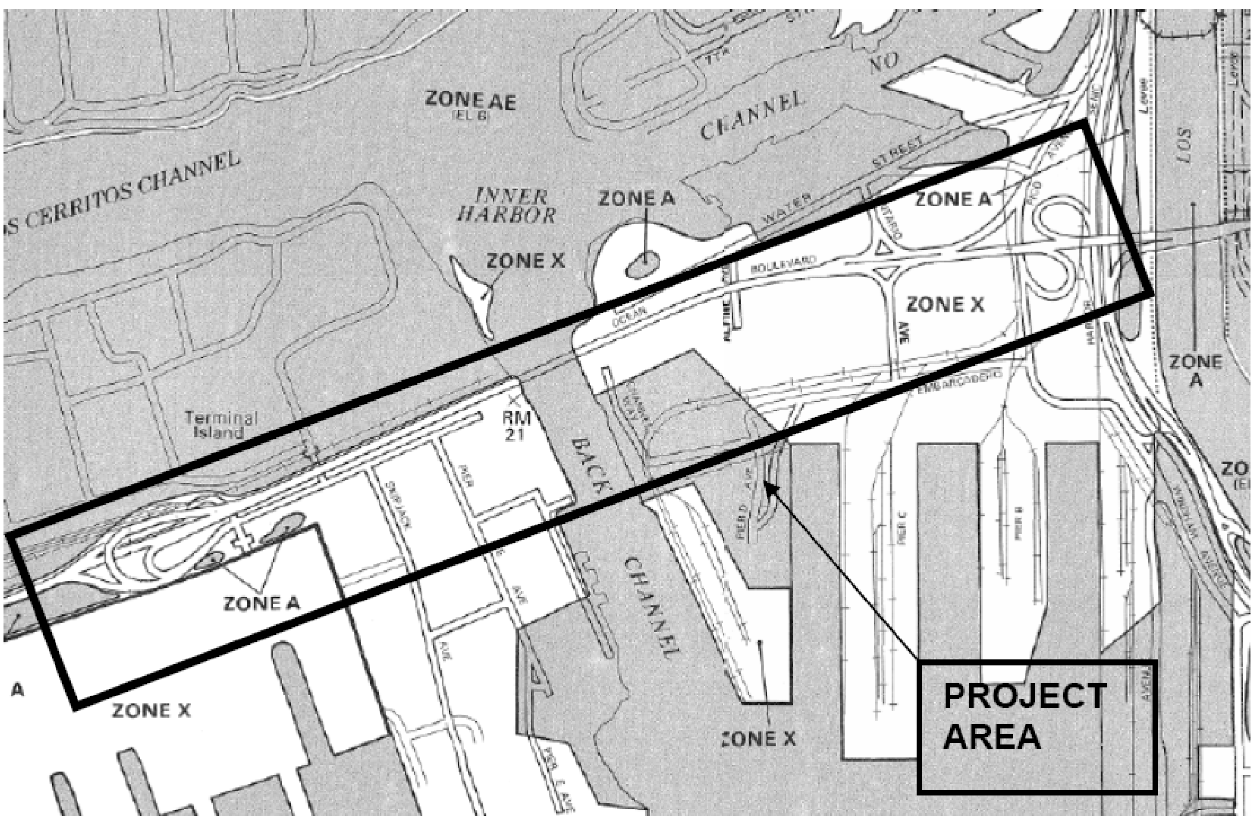

Exhibit 2.2.1-2
FEMA FIRM Map Number 0601360020C

Zone AE – Flood insurance rate zone that corresponds to the 1-percent annual chance floodplains that are determined in the Flood Insurance Study by detailed methods of analysis.

Zone X – Flood insurance rate zone that corresponds to areas outside the 1-percent annual chance floodplain, areas of 1-percent annual chance sheet flow flooding where average depths are less than 1 ft (0.3-m), areas of 1-percent annual chance stream flooding where the contributing drainage area is less than 1 square mi, (0.3 square km) or areas protected from the 1-percent annual chance flood by levees.

To summarize the information shown in Exhibit 2.2.1-2, the area north of Ocean Boulevard on Terminal Island is within the base floodplain, which in this case is a 100-year floodplain. The area south of Ocean Boulevard and the land to the east of the bridge is outside of the base floodplain. The base floodplain is defined as the area subject to flooding by the flood or tide having a 1-percent chance of being exceeded in any given year.

2.2.1.3 Environmental Consequences

Evaluation Criteria

Construction and operational impacts to surface waters were assessed with regard to potential degradation of water quality and changes in surface water flow. Effects on future water quality, with and without implementation of the project alternatives, were estimated based on the potential for runoff to reach surface water resources and types of pollutants anticipated. Construction and operational impacts to groundwater resources were assessed with regard to potential degradation of groundwater quality and changes in groundwater supplies. Floodplain and hydrology impacts were assessed with regard to potential impacts to natural and beneficial floodplain values, whether flows would be impeded or redirected, or if the proposed alternative would result in a substantial risk of loss, injury, or death involving flooding.

No Action Alternative

Surface Water Quality: The No Action Alternative would have no effect on water quality or water resources associated with construction or demolition activities. Consequently, there would be no Disturbed Soil Areas (DSAs) associated with the No Action Alternative.

There would continue to be operational impacts to surface waters associated with the No Action Alternative because storm water would continue to flow from the roadway, untreated, into surrounding Port waters. Currently, there are no existing treatment BMPs in the project vicinity, and under the No Action Alternative, this would continue to be the case. As identified in the North-side, South-side, and Rehabilitation Alternative sections, implementation of these alternatives would result in increased treatment of storm water runoff within the project limits, as opposed to the No Action Alternative.

Groundwater Resources: The No Action Alternative would have no effect on groundwater resources associated with construction, demolition, or operational activities.

Floodplain and Hydrology: The No Action Alternative would have no effects to the designated floodplain or area hydrology associated with construction, demolition, or operational activities.

Construction and Demolition Impacts

North-side Alignment Alternative

Surface Water Quality: The North-side Alignment Alternative would result in an estimated total DSA of 38 acres (15 ha). No construction activities on the proposed or existing bridge would occur within the waters of the channel. All construction activities would be conducted above the channel. During construction, construction materials would be stored on the land adjacent to the east and west bridge accesses and on the bridge itself. Accidental spills or leaks of construction materials, fuels, solvents, paints, and concrete wash water over or near the channel could discharge into the channel, resulting in water quality impacts. Storm water runoff could also transport spilled or leaked materials into the channel. This could result in a temporary adverse effect on water quality in the Long Beach Harbor. Construction areas and staging areas would involve disturbed ground surfaces that would be susceptible to erosion by storm water runoff. Sediment-laden storm water runoff could increase turbidity and decrease DO concentrations in the Back Channel, resulting in a temporary adverse effect on water quality; however, temporary adverse effects to surface water are not anticipated, because a site-specific SWPPP would be implemented, and the selection of appropriate construction site BMPs would ensure no water quality standards or Waste Discharge Requirements (WDRs) would be violated. With implementation of these measures, the potential for adverse effects on surface water would be minimized.

As mentioned in the project description, the proposed project would replace the existing bridge with a 200-ft (61-m) vertical clearance (above MHWL) bridge. This would necessitate relocating the existing power and transmission lines that cross the Cerritos Channel, approximately 300 ft (91.4 m) north of the bridge, with an approximate vertical clearance of 153 ft (46.6 m) above the MHWL, because the higher bridge would result in the transmission lines being the only vertical navigation constraint. Under the recommended relocation scenario (see Exhibit 2.1.4-1), new towers would be installed adjacent to the existing towers on Piers A and S to accommodate a 200-ft (61-m) vertical clearance for all SCE lines. The SWPPP would include construction areas associated with relocation of the SCE transmission lines, and it would identify BMPs designed to prevent pollutants and sediment from entering receiving water bodies. Relocation of the SCE transmission lines would have no adverse effects on surface water quality.

Appropriate BMPs would be obtained from the *Caltrans Storm Water Quality Handbook, Construction Site Best Management Practices Manual* (Caltrans, 2003). The Port is required to ensure that an SWPPP and SAP are prepared and implemented prior to construction activities. The SWPPP would include the following: erosion and sediment control; non-storm water management; post-construction storm water management; waste management and disposal; maintenance, inspection and repair of BMPs; employee training to perform inspections of the BMPS at the construction site; and a SAP for contaminated storm water runoff. The SWPPP must describe structural and non-structural BMPs to minimize or eliminate the potential for spills and leakage of construction materials and erosion of disturbed areas by water and wind. Implementation of an SWPPP during construction of the North-side Alignment Alternative would minimize the potential for adverse effects on surface water quality.

During demolition of the existing bridge, there is the potential for debris to fall from the bridge into the Back Channel. The existing bridge may have ACM in the form of expansion joint compound and LBP coatings that would be disturbed by demolition. Asbestos and lead-containing materials and other debris falling into the channel could result in a temporary adverse effect on water quality; however, construction special provisions for the North-side Alignment Alternative would require the use of debris netting to capture any material or debris that could fall from the bridge during construction and demolition. Use of debris netting during construction and demolition would minimize the potential adverse effect from debris falling in surface water.

The following special BMPs, where applicable, would be implemented to prevent debris from falling and depositing into the Back Channel:

- Limit demolition and construction located over the channel during precipitation events.
- Employ nonshattering methods for demolition activities (e.g., wrecking balls would not be acceptable).
- Place platforms under/adjacent to the bridge structures to collect debris.
- Secure all materials on the bridge structures to prevent discharges into the channel via wind.
- Use attachments on equipment, such as backhoes, to catch debris from small demolition operations.
- Stockpile accumulated debris and waste generated from demolition away from the channel.
- Use drip pans during equipment operation, maintenance, cleaning, fueling, and storage for spill prevention. Place drip pans under all vehicles and equipment placed on the bridge structures when expected to be idle for more than 1 hour.
- Ensure that equipment used for this project is leak-free.
- Direct water from concrete curing and finishing operations away from inlets and watercourses to temporary collection facilities so that concrete wastes would be disposed of properly.

As stated above, with implementation of construction special provisions, an SWPPP, construction site BMPs, and adherence to NPDES permit requirements, no adverse impacts would occur to surface water quality during construction of the North-side Alignment Alternative or demolition of the existing bridge.

Groundwater Resources: Benzene-contaminated groundwater was detected south of the project area. It should be noted that the Remedial Investigation Report (Bechtel, 1997) was the most recent report that provided site-specific sampling data to help determine the approximate limits of groundwater contamination; however, the limited sampling locations in the report prevent a conclusive determination from being made as to the extent to which the plume may have migrated. Additionally, because the Remedial Investigation Report (Bechtel, 1997) is more than 10 years old, the current location and condition of the plume is not known. Exhibit 2.2.1-1 shows the groundwater and surface water sampling locations in the vicinity of the Gerald Desmond Bridge Replacement Project.

During construction of the North-side Alignment Alternative, excavation activities are anticipated to encounter groundwater, and dewatering would be necessary. Dewatering groundwater in the project area is a concern because this can cause the contaminated groundwater plume to migrate to non-contaminated areas. All dewatering activities would be in compliance with Los Angeles RWQCB regulatory requirements, including an individual dewatering permit or waste discharge permit, if applicable. Information regarding potential regulatory permits is provided in Section 2.2.1.1. Prior to commencement of dewatering activities, RWQCB would be contacted immediately to provide a recommendation on how to handle the disposal of the dewatering flows. Any dewatering activities, including those that may contact contaminated groundwater, shall be treated to remove pollutants to meet Los Angeles RWQCB discharge requirements, or hauled offsite and properly disposed of.

Bridge pile installation would be conducted by driving piles in lieu of pre-drilling to avoid or minimize the need for additional dewatering. Additionally, the groundwater in this area is likely to be contaminated from seawater intrusion, and it is not an identified drinking water source. Because the groundwater would not be used for any purposes related to the proposed project, groundwater supplies would not be affected. Because proper procedures and regulations regarding dewatering activities would be followed, no temporary adverse impacts to the groundwater or the benzene plume resulting from construction of the North-side Alignment Alternative are anticipated.

Floodplain and Hydrology: Construction and demolition activities associated with the North-side Alignment Alternative would not impede or redirect flows; therefore, they would not result in any adverse effects to the area hydrology or floodplain.

South-side Alignment Alternative

Surface Water Quality: The potential for construction and demolition impacts to surface water quality for the South-side Alignment Alternative would be similar to the North-side Alignment Alternative. The South-side Alignment Alternative would also result in approximately 38 acres (15 ha) of DSA. No construction activities on the proposed or existing bridge would occur within waters of the Back Channel. All construction activities would be conducted above the channel. All construction BMPs and special BMPs identified for the North-side Alignment Alternative would be implemented for the South-side Alignment Alternative. With implementation of construction special provisions, an SWPPP, construction site BMPs, and adherence to NPDES permit requirements, no adverse impacts would occur to surface water quality during construction of the South-side Alignment Alternative.

Groundwater Resources: As described in Section 2.2.1.2, several studies have been conducted regarding the source and location of the benzene plume in the project area; however, the limited sampling locations prevent a conclusive determination from being made as to the extent to which the plume may have migrated. Therefore, there is no basis for determining whether the North-side Alignment Alternative or the South-side Alignment Alternative would have greater potential to impact groundwater resources. As with the North-side Alignment Alternative, excavation activities are anticipated to encounter groundwater, and dewatering would be necessary. As described for the North-side Alignment Alternative, all dewatering activities would be in compliance with Los Angeles RWQCB regulatory requirements. Any dewatering activities, including those that may contact contaminated groundwater, shall be treated to remove pollutants to meet Los Angeles RWQCB discharge requirements, or hauled offsite and properly disposed of.

Bridge pile installation would be conducted by driving piles in lieu of pre-drilling to avoid or minimize the need for additional dewatering. Additionally, the groundwater in this area is likely to be contaminated from seawater intrusion, and it is not an identified drinking water source. Because the groundwater would not be used for any purposes related to the proposed project, groundwater supplies would not be affected. Because proper procedures and regulations regarding dewatering activities would be followed, no temporary adverse impacts to the groundwater or the benzene plume resulting from construction of the South-side Alignment Alternative are anticipated.

Floodplain and Hydrology: Construction and demolition activities associated with the South-side Alignment Alternative would not impede or redirect flows; therefore, they would not result in any adverse effects to the area hydrology or floodplain.

Rehabilitation Alternative

Surface Water Quality: The Rehabilitation Alternative would involve replacement of the bridge deck, replacement of all expansion joints, replacement of the sway bracings for the main span, painting of all steel members, and seismic retrofit of foundations, columns, bent caps, abutments, and superstructure. Retrofit of the foundations and construction of the necessary treatment BMPs are the only construction activities associated with the Rehabilitation Alternative that would result in soil disturbance. The amount of DSA necessary to retrofit the foundations would be less than 1-acre (0.4-ha). Although the Rehabilitation Alternative would require a DSA of less than 1-acre (0.4-ha), excluding construction of proposed treatment BMPs, it is likely that an SWPPP would have to be prepared because a portion of land within the project limits drains to a 303 (d) listed water body – the Los Angeles River; however, with a small DSA and implementation of an SWPPP, the Rehabilitation Alternative would not result in adverse effects to surface water quality associated with construction or demolition activities.

Groundwater Resources: The Rehabilitation Alternative would require retrofitting the foundations, which would entail soil excavation and pile driving the steel casings. Although excavation activities may encounter groundwater, installation of the steel casings would be conducted by pile driving in lieu of pre-drilling to avoid or minimize the need for additional dewatering. The potential for groundwater dewatering is a concern in this area, and it is discussed above, under construction and demolition impacts for the North-side and South-side Alignment Alternatives. All dewatering activities would be in compliance with Los Angeles RWQCB regulatory requirements. Any dewatering activities, including those that may contact contaminated groundwater, shall be treated to remove pollutants to meet Los Angeles RWQCB discharge requirements, or hauled offsite and properly disposed of. Groundwater would not be used for any purposes related to the Rehabilitation Alternative; therefore, no temporary adverse impacts to groundwater resources would result from construction activities associated with the Rehabilitation Alternative.

Floodplain and Hydrology: With the Rehabilitation Alternative, there would be no construction or demolition impacts that would impede or redirect flows; therefore, this alternative would not result in any adverse effects to the area hydrology or floodplain.

Operational Impacts

North-side Alignment Alternative

Surface Water Quality: Once constructed, the North-side Alignment Alternative would increase the volume of surface runoff because of the addition of impervious surface area. Within the project limits, the amount of existing impervious surface is 36.09 acres (14.6 ha). The North-side Alignment Alternative would require conversion of 11.46 acres (4.63 ha) of unpaved area to impervious surfaces; therefore, the North-side Alignment Alternative would result in a net increase of 11.46 acres (4.63 ha) of impervious surface compared to the No Action Alternative. The new bridge would be designed so that storm water runoff would flow along gutters towards the ends of the bridge and discharge into proposed treatment BMPs, which at this stage are identified as biofiltration swales and media filters, prior to entering the storm drainage system. Existing drainage patterns would not be altered in the project area. As previously described, the increase in impervious surface area associated with the proposed project would increase the amount of runoff that would be discharged to the existing storm drain system; however, this increase is not substantial enough to require construction of new storm drainage facilities or expansion of existing facilities at the Port. With implementation of the proposed treatment BMPs, storage capacity for runoff would be provided, and the flow velocity in pre- and post-project conditions would be similar. Although the amount of runoff volume would increase, with implementation of the proposed treatment BMPs, the release time would be increased because runoff would be designed to reside in the proposed device for a particular length of time. Ultimately, this would result in a decreased flow rate; therefore, with operations of the North-side Alignment Alternative, there would be no exceedance of the capacity of the existing storm water drainage systems, and there would be no adverse effects on the storm water drainage system.

Based on preliminary design, there are eight potential locations for treatment BMPs for the North-side Alignment Alternative, which are shown on Exhibit 2.2.1-3. Out of these eight potential locations, six sites are proposed to be outfitted with media filters, and two sites are proposed to be outfitted with biofiltration swales. It should be noted that the applicability of each of the Caltrans-approved treatment BMPs was analyzed for this project, and media filters and biofiltration swales were identified as the most feasible treatment BMPs to implement, based on the removal of targeted design constituents (TDCs), site constraints, and design criteria. Examples of a typical biolfiltration swale and a media filter are shown in Exhibits 2.2.1-4 and 2.2.1-5.

The six locations where media filters are proposed for the North-side Alignment Alternative are identified as Locations 1, 2, 5, 6, 7, and 8 on Exhibit 2.2.1-3. Location 1 is inside the loop of the proposed on-ramp from Pier T Avenue to the EB direction of the proposed North-side Alignment Alternative replacement bridge. Location 2 is located adjacent to the EB approach structures, southwest of the LBGS. Location 5 is adjacent to the south side of the EB bridge approach structure, immediately before the split between the Pico Boulevard off-ramp and the connector to NB SR 710. Location 6 is adjacent to the south side of the EB approach structure, after Ocean Boulevard. Location 7 is approximately 200 ft (61 m) northeast of Location 6. Location 8 is on the inside shoulder of the proposed on-ramp from SB Pico Boulevard to the WB approach structure.

There are two locations where biofiltration swales are proposed, which are identified as Locations 3 and 4 on Exhibit 2.2.1-3. Locations 3 and 4 abut the Back Channel, and they are proposed under the southern portion of the cable-stayed structures. Location 3 is on the west bank of the Back Channel, while Location 4 is on the east bank.

With implementation of these treatment BMPs, operation of the North-side Alignment Alternative would not have an adverse effect on water quality.

Operation of the new bridge would be covered under the Caltrans Statewide Storm Water Permit (NPDES No. CAS000003). This includes the maintenance of each of the Caltrans-approved treatment BMPs that would be implemented as part of this project. Bridge maintenance activities may include work such as repairing damage or deterioration in various bridge components; removing debris from piers, bearing seats, and abutments; repairing expansion joints; cleaning and painting structural steel; and sealing concrete surfaces. All maintenance activities would employ BMPs specified in the Caltrans Statewide SWMP (2007c) to eliminate or minimize the potential for pollutants to be picked up by storm water runoff and transported offsite.

Groundwater Resources: Because the proposed treatment BMPs would not infiltrate any runoff into the ground, groundwater would not be affected or used for any purposes related to operation of the North-side Alignment Alternative; therefore, no adverse impacts to groundwater resources would result from operation of the North-side Alignment Alternative.

Floodplain and Hydrology: The North-side Alignment Alternative would require new bridge structures. These structures would be located outside of the channel but within the base floodplain. Placement of the structures within the base floodplain is considered an “encroachment” as defined by EO 11988: Floodplain Management; however, construction of the North-side Alignment Alternative would not result in a “significant encroachment” per 23 CFR 650 Subpart A. A project would be considered to result in a “significant encroachment” if it would result in one or more of the following:

- A significant potential for interruption or termination of a transportation facility, which is needed for emergency vehicles or provides a community's only evacuation route.
- A significant risk *(to life or property)*, or
- A significant adverse impact on natural and beneficial floodplain values.

The project would be designed to not impede or redirect flood flows. The bridge would be placed on piers. There are no levees or dams in the vicinity that would be subject to failure and expose people or structures associated with the proposed project to a significant risk of loss, injury, or death involving flooding. There would be no adverse effects to natural or beneficial floodplain values; therefore, the floodplain would not be adversely affected by operation of the North-side Alignment Alternative. Additionally, the North-side Alignment Alternative would not result in the impendence or redirection of flows; therefore, it would not result in any adverse effects to the area hydrology.

South-side Alignment Alternative

Surface Water Quality: As with the North-side Alignment Alternative, the South-side Alignment

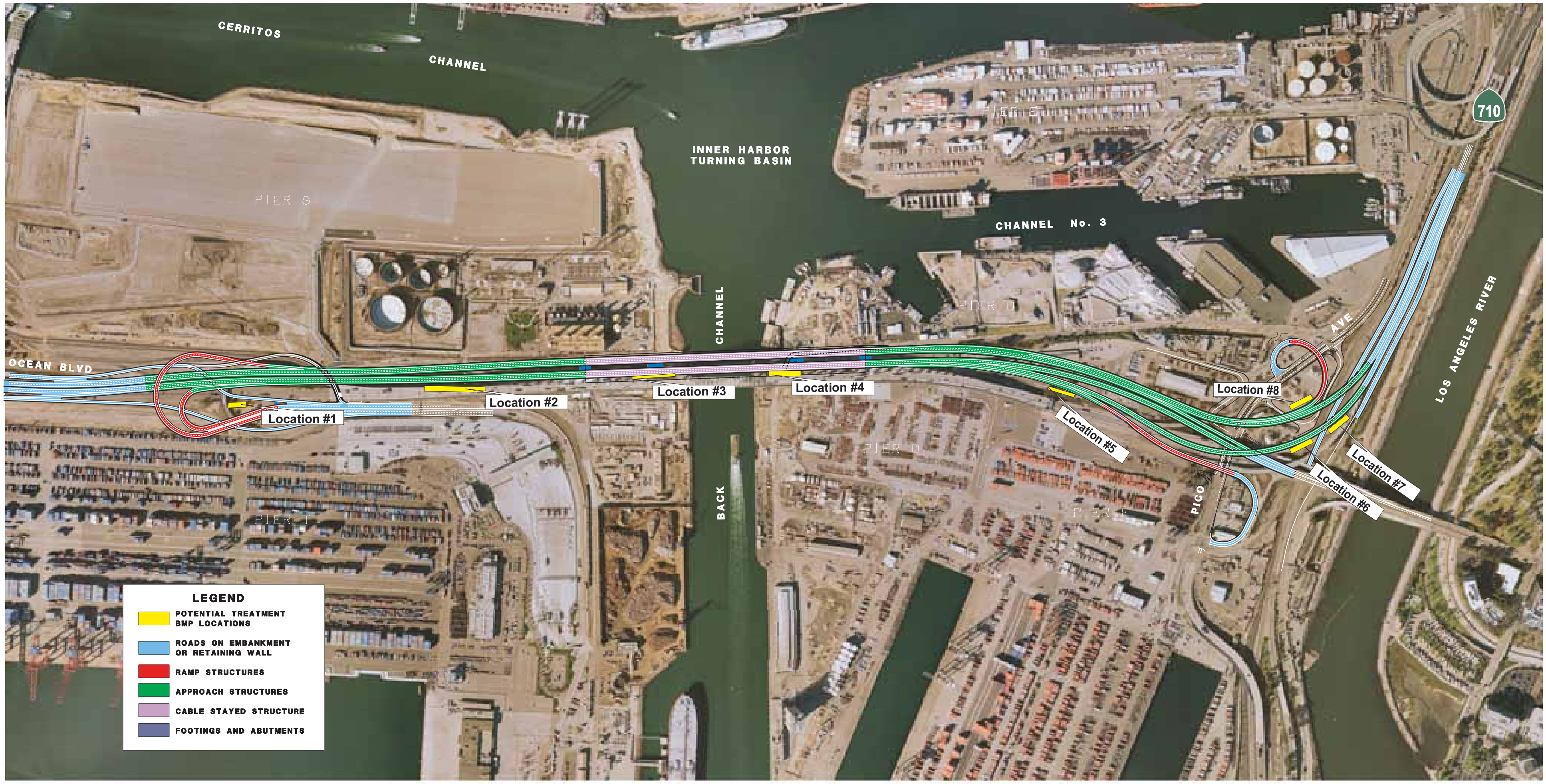

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EXHIBIT 2.2.1-3

MARK	DATE	BY	REVISIONS

DRAWN DMP DATE 03/28/08
DESIGNED ______ P.E. NO. ______
PROJ. MGR. ______ P.E. NO. ______
SECT. HEAD ______ P.E. NO. C-

ASS'T CHIEF HARBOR ENGR. P.E. NO. C-25677 DATE ______
CHIEF HARBOR ENGINEER P.E. NO. C-43065 DATE ______

Port of LONG BEACH

GERALD DESMOND BRIDGE REPLACEMENT PROJECT
NORTH-SIDE BRIDGE REPLACEMENT ALIGNMENT POTENTIAL TREATMENT BMP LOCATIONS

SCALE ______ SHEET ______ OF ______
SPECIFICATION NUMBER ______
DRAWING NUMBER ______

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Exhibit 2.2.1-4 Typical Biofiltration Swale

Exhibit 2.2.1-5 Typical Media Filter (Austin Sand Filter)

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Alternative is anticipated to increase the volume of surface runoff because of the addition of impervious surface area. The increase in surface runoff would be similar to the North-side Alignment Alternative, as the South-side Alignment Alternative would also require conversion of an additional 11.46 acres (4.63 ha) of unpaved area to impervious surfaces. Storm water runoff would be treated in the same manner as the North-side Alignment Alternative, and the same treatment BMPs are proposed, as shown in Exhibit 2.2.1-6. As described with the North-side Alignment Alternative, with implementation of treatment BMPs, there would be no exceedance of the capacity of the existing storm water drainage systems, and there would be no adverse effects on the storm water drainage system associated with operation of the South-side Alignment Alternative.

Preliminary design indicates that as with the North-side Alignment Alternative, there are eight potential locations for treatment BMPs for the South-side Alignment Alternative, which are shown on Exhibit 2.2.1-6. Out of these eight potential locations, six sites are proposed to be outfitted with media filters, and two sites are proposed to be outfitted with biofiltration swales. Although six media filters and two biofiltration swales are the proposed treatment BMPs for both the North-side and South-side Alignment Alternatives, some of the locations of these treatment BMPs will change based on the alternative selected. Proposed BMP Locations 6, 7, and 8 would remain the same for both the North-side and South-side Alignment Alternatives, while Locations 1, 2, 3, 4, 5, and 6 would change. The six locations where media filters are proposed for the South-side Alignment Alternative are identified as Locations 1, 2, 5, 6, 7, and 8 on Exhibit 2.2.1-6. Location 1 is inside the loop of the proposed on-ramp from Pier T Avenue to the EB direction of the proposed South-side Alignment Alternative replacement bridge. Location 2 is adjacent to the EB approach structures, southwest of the LBGS. Location 5 is adjacent to the north side of the WB bridge approach structure. Location 6 is adjacent to the north side of the EB approach structure, after Ocean Boulevard. Location 7 is approximately 200 ft (61 m) northeast of Location 6. Location 8 is on the inside shoulder of the proposed on-ramp from SB Pico Boulevard to the WB approach structure.

There are two locations where biofiltration swales are proposed, which are identified as Locations 3 and 4 on Exhibit 2.2.1-6. Locations 3 and 4 abut the Back Channel, and they are proposed under the northern portion of the cable-stayed structures. Location 3 is on the west bank of the Back Channel, while Location 4 is on the east bank.

With implementation of these treatment BMPs, operation of the South-side Alignment Alternative would not have an adverse effect on water quality.

Groundwater Resources: Because the proposed treatment BMPs would not infiltrate any runoff into the ground, groundwater would not be affected or used for any purposes related to operation of the South-side Alignment Alternative; therefore, no adverse impacts to groundwater resources would result from operation of the South-side Alignment Alternative.

Floodplain and Hydrology: The South-side Alignment Alternative would require new bridge structures, similar to those of the North-side Alignment Alternative. All structures would be located outside of the channel; however, unlike the bridge structures for the North-side Alignment Alternative, all structures necessary for the South-side Alignment Alternative would be located outside of the base floodplain. This is because the boundary of the base floodplain is north of the existing Gerald Desmond Bridge to the south, and moving the bridge further south would locate the bridge further from the base floodplain zone.

The bridge would be placed on piers. There are no levees or dams in the vicinity that would be subject to failure and expose people or structures associated with the proposed project to a significant risk of loss, injury, or death involving flooding. There would be no adverse effects to natural or beneficial floodplain values; therefore, the floodplain would not be adversely affected by operation of the South-side Alignment Alternative. Additionally, the South-side Alignment Alternative would not result in the impendence or redirection of flows; therefore, it would not result in any adverse effects to the area hydrology.

<u>Rehabilitation Alternative</u>

Surface Water Quality: Because the Rehabilitation Alternative would require compliance with NPDES regulatory requirements, treatment BMPs would be a necessary component of this alternative. Storm water runoff would be treated in a similar manner as the North-side and South-side Alignment Alternatives, and most of the same treatment BMPs are proposed, as shown in Exhibit 2.2.1-7. Because the Rehabilitation Alternative would not add any additional impervious surfaces, no new runoff would be generated, and there would be no exceedance of the capacity of the existing storm water drainage system. There would be no adverse effects on the storm water drainage system associated with operation of the Rehabilitation Alternative.

Preliminary design indicates that there are five potential locations for treatment BMPs for the Rehabilitation Alternative, which are shown on Exhibit 2.2.1-7. Out of these five potential locations, three sites are proposed to be outfitted with media filters, and two sites are proposed to be outfitted with biofiltration swales. The three locations where media filters are proposed for the Rehabilitation Alternative are identified as Locations 1, 2, and 5 on Exhibit 2.2.1-7. Location 1 is inside the loop of the existing WB off-ramp to Pier T. Location 2 is adjacent to the WB shoulder of Ocean Boulevard, southwest of the LBGS. Location 5 is adjacent to the north side of the WB bridge approach structure.

There are two locations where biofiltration swales are proposed, which are identified as Locations 3 and 4 on Exhibit 2.2.1-7. Locations 3 and 4 abut the Back Channel, and Location 3 is on the west bank of the Back Channel, while Location 4 is on the east bank.

With implementation of these treatment BMPs, operation of the Rehabilitation Alternative would not have an adverse effect on water quality.

Groundwater Resources: Groundwater would not be affected or used for any purposes related to the Rehabilitation Alternative; therefore, no adverse impacts to groundwater resources would result from operations associated with the Rehabilitation Alternative.

Floodplain and Hydrology: Operations associated with the Rehabilitation Alternative would not impede or redirect flows; therefore, they would not result in any adverse effects to the area hydrology or floodplain.

2.2.1.4 Avoidance, Minimization and/or Mitigation Measures

With implementation of the above-mentioned treatment BMPs, construction special provisions, and construction site BMPs, and by adhering to NPDES guidelines, no adverse effects would occur to water resources or hydrology during construction or operation of the new bridge or rehabilitation of the old bridge; therefore, no mitigation measures are required.

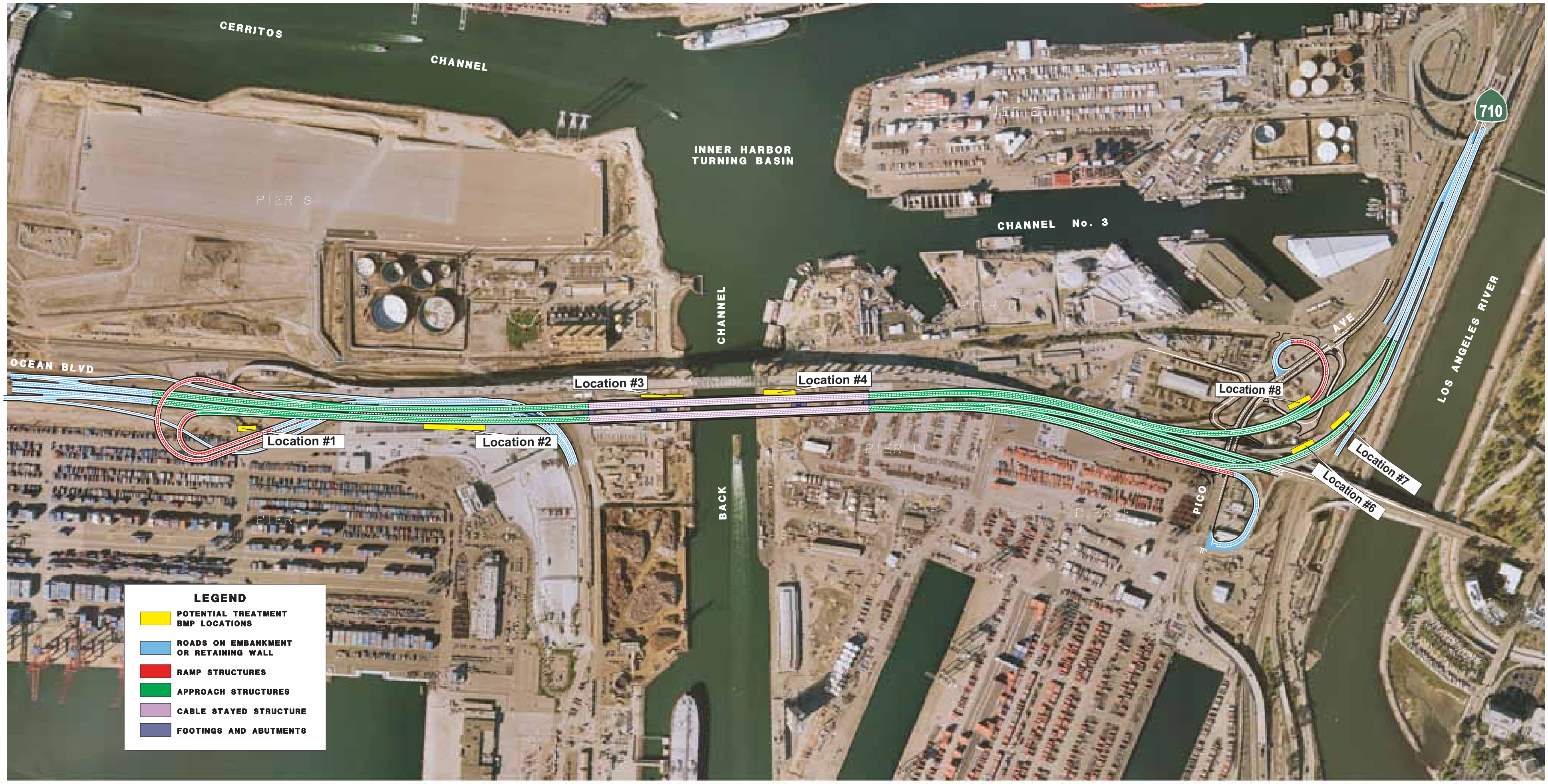

EXHIBIT 2.2.1-6

1:8000

GERALD DESMOND BRIDGE REPLACEMENT PROJECT

SOUTH-SIDE BRIDGE REPLACEMENT ALIGNMENT
POTENTIAL TREATMENT BMP LOCATIONS

DRAWN DMP DATE 03/28/08
DESIGNED ______ P.E. NO. ______
PROJ. MGR. ______ P.E. NO. ______
SECT. HEAD ______ P.E. NO. C-______

ASS'T CHIEF HARBOR ENGR. P.E. NO. C-25677 DATE ______
CHIEF HARBOR ENGINEER P.E. NO. C-43065 DATE ______

MARK | DATE | BY | REVISIONS

SCALE ______ SHEET ______ OF ______
SPECIFICATION NUMBER ______
DRAWING NUMBER ______

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PENTBL: N:\STD\MS\PLOT_DRV\PTG.TBL
USER: p0033148

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EXHIBIT 2.2.1-7

MARK	DATE	BY	REVISIONS

DRAWN DMP DATE 03/28/08
DESIGNED P.E. NO.
PROJ. MGR. P.E. NO.
SECT. HEAD P.E. NO. C

ASS'T CHIEF HARBOR ENGR. P.E. NO. C-25677 DATE
CHIEF HARBOR ENGINEER P.E. NO. C-43065 DATE

Port of LONG BEACH

GERALD DESMOND BRIDGE REPLACEMENT PROJECT

REHABILITATION ALTERNATIVE

SCALE
SHEET OF
SPECIFICATION NUMBER
DRAWING NUMBER

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2.2.2 Geologic Resources

This section assesses potential impacts from faulting and seismicity, soil and sediment, liquefaction, subsidence, and tsunami and seiche associated with implementation of the proposed project. This assessment is based on information provided in the *Seismic Ground Motion Study Report for Gerald Desmond Replacement Bridge Project* (EMI, 2005) and *Port Wide Ground Motion Study for Port of Long Beach* (EMI, 2006).

2.2.2.1 Regulatory Setting

For geologic and topographic features, the key federal law is the Historic Sites Act of 1935, which establishes a national registry of natural landmarks and protects “outstanding examples of major geological features.” Topographic and geologic features are also protected by CEQA.

This section also discusses geology, soils, and seismic concerns as they relate to public safety and project design. Earthquakes are a prime consideration in the design and retrofit of structures. Caltrans Office of Earthquake Engineering is responsible for assessing the seismic hazard for bridge projects. The current policy is to use the anticipated MCE, from young faults in and near California for ordinary standard bridges (Caltrans, 2004). Caltrans, with the support of an external Seismic Advisory Board, has developed a set of seismic performance criteria for new major long-span bridges (ATC, 1996). In these criteria, safety-evaluation and functional-evaluation design earthquakes are defined. The safety-evaluation earthquake (SEE) may be defined probabilistically as an earthquake with a 1,000- to 2,000-year return period, and the probabilistic safety-evaluation ground motion must be determined on a site-specific basis. The functional-evaluation earthquake (FEE) is intended to represent an event that has a reasonable probability of not being exceeded during the life of the bridge.

2.2.2.2 Affected Environment

During the 1800s, the shoreline in the project area consisted of a tidal estuary at the mouth of the Los Angeles River. An offshore sandbar called Rattlesnake Island protected this estuary. Development of the various harbor facilities through dredging and construction of landfills has resulted in substantial alteration of the original shoreline. Rattlesnake Island was broadened to become Terminal Island. Wilmington Slough was dredged to form the West Basin of the Los Angeles Harbor. The Los Angeles River was diverted to the east side of Long Beach Harbor to control the severe silting that occurred whenever the river flooded.

Between 5,000 and 20,000 ft (1,520 and 6,100 m) of poorly to moderately consolidated marine sediment and unconsolidated alluvium underlie the coastal plain between the Newport-Inglewood Fault and San Pedro Bay. The marine sedimentary rocks range in age from middle Miocene to Pliocene (14 million to 2 million years ago). The unconsolidated alluvium ranges in age from Pleistocene to Holocene (2 million years ago to the present). In the project area, sedimentary rocks consist of the Pliocene Repetto Siltstone, and the Malaga Mudstone and Valmonte Diatomite of the Miocene Monterey Formation. The Catalina Schist underlies these sedimentary rocks. The Catalina Schist is exposed only in the Palos Verdes Hills, but it is encountered in numerous oil wells at depths of 5,000 to 14,000 ft (1,520 to 4,270 m) below sea level.

Faulting and Seismicity

The southern California area is seismically active; however, seismicity in the Los Angeles Basin does not clearly correlate to surface faults. There is no concentration or clustering of earthquakes in the site region except along the Newport-Inglewood Structural Zone (NISZ) where a series of aftershocks from the 1933 event are located. It has been suggested that as much as 40 percent of the tectonic strain in southern California is not released on known faults (Ward, 1994).

The largest historical earthquake within the Los Angeles Basin was the 1933 Long Beach earthquake of Magnitude (M) 6.4 and Local Magnitude (ML) 6.3. The 1971 San Fernando (ML 6.4, M 6.7) earthquake occurred outside of the basin along the northern margin of the San Fernando Valley within a zone of mapped surface faults. The more recent 1987 Whittier earthquake (ML 5.9, M 5.9) and the 1994 Northridge (ML 6.4, M 6.7) earthquake occurred under the San Gabriel Valley and the San Fernando Valley, respectively, but they were not associated with surface faults.

The Long Beach earthquake was generally believed to have been associated with the NISZ (Benioff, 1938). This association was based on abundant ground failures along the trend, but no unequivocal surface rupture was identified. Hauksson and Gross (Hauksson and Gross, 1991) re-evaluated the seismic history and relocated the 1933 earthquake to a depth of approximately 6.2 mi (10 km) below the Huntington Beach-Newport Beach city boundary.

The following sections describe the principal active faults in the Los Angeles region that might contribute to ground shaking in the POLB area. Exhibit 2.2.2-1 shows the locations of these faults. This information is provided from a regional perspective for understanding the nature of the faults.

Palos Verdes Fault

The Palos Verdes fault extends through the POLA from the east side of the Palos Verdes Peninsula southeasterly to the Lasuen Knoll area offshore and northwesterly into the Santa Monica Bay (SMB), for a total length of approximately 62 mi (100 km) (Exhibit 2.2.2-1).

The Palos Verdes fault is predominantly a strike-slip fault, but it has a small vertical component (approximately 10 percent to 15 percent). The slip rate of the Palos Verdes fault is based primarily on the geophysical and geological studies in the outer harbor of the POLA by McNeilan *et al.* (1996). McNeilan *et al.* estimated a long-term horizontal slip rate of between 0.078 and 0.137 inches per year (in/yr) (2.0 and 3.5 millimeters per year [mm/yr]) with a range of approximately 0.09 to 0.117 in/yr (2.3 to 3.0 mm/yr) for the middle- to late-Holocene time period. Such a slip rate makes the Palos Verdes fault one of the most active faults in the Los Angeles region.

There are virtually no direct data to constrain the recurrence interval for large earthquakes on the Palos Verdes fault. There have been no significant earthquakes on the fault since the arrival of the Franciscan missionaries in the 1700s. Using the empirical data of Wells and Coppersmith (1994) to indirectly make judgments on how long it would take to store up enough strain to generate an M 6.8 to 7.4 earthquake, it appears that recurrence intervals for such earthquakes on the Palos Verdes fault would range from a few hundred to a few thousand years. For example, fault rupture scenarios evaluated by McNeilan *et al.* ranged from 180 to 630 years for an M 6.8 event, 400 to 440 years for an M 7.1 event, 1,000 to 1,100 years for an M 7.2 event, and 830 to 1,820 years for an M 7.4 event. Other scenarios may be just as likely and would yield similar ranges.

Newport-Inglewood Structural Zone

The NISZ consists of the northwest-southeast trending series of faults and folds forming an alignment of hills in the western Los Angeles Basin extending from the Baldwin Hills on the north to Newport Beach on the south (Exhibit 2.2.2-1).

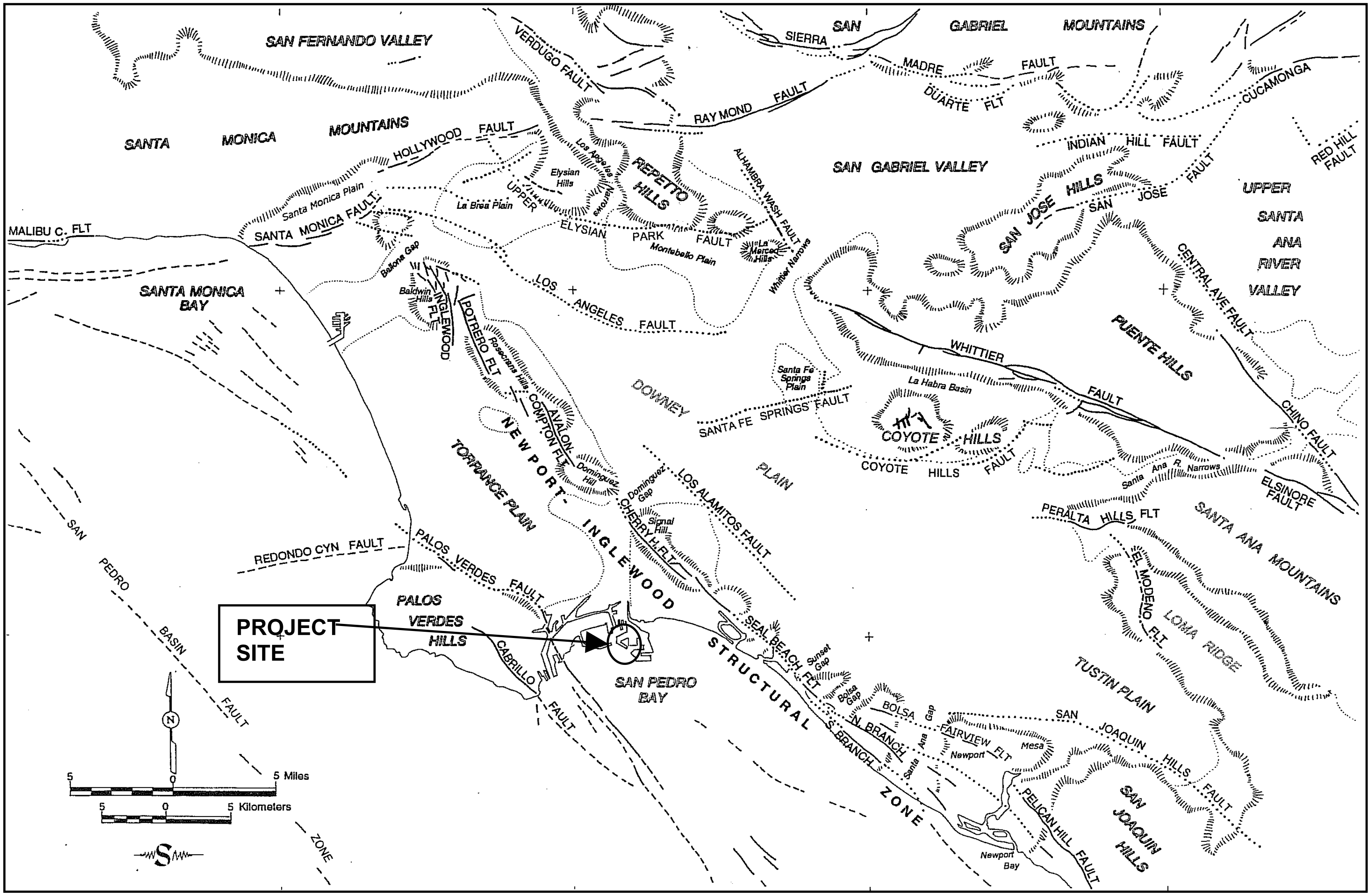
The maximum earthquake used for the NISZ in local geotechnical investigations has generally been M 7.0. This may be relatively small for a feature as long as the SMB zone, but the magnitude is based on the concept that the zone consists of shorter discontinuous faults, or segments, that behave independently. The fault was the source of the 1993 Long Beach earthquake of M 6.3, but as with the Palos Verdes fault, the history of earthquakes on the NISZ is incomplete, so it is difficult to estimate a maximum earthquake. Empirical fault-length/earthquake-magnitude relations (Wells and Coppersmith, 1994) suggest an MCE of approximately 7.0.

The recurrence interval for the maximum earthquake on the NISZ is very long, on the order of a thousand years or more (Schell, 1991; Freeman *et al.,* 1992; Shlemon *et al.,* 1995; Grant *et al.,* 1997).

Although there is quite a wide range of slip rates proposed by various published sources, most of them are of uncertain validity because they are based on short-term, local, vertical components rather than regional horizontal slip. Grant *et al.* (1997) inferred a minimum rate of 0.013 to 0.02 in/yr (0.34 to 0.55 mm/yr), but Shlemon *et al.* estimated a rate of 0.059 to 0.098 in/yr (1.5 to 2.5 mm/yr). The southern segment of the SMB system comprising the Rose Canyon fault in the San Diego area has a slip rate of approximately 0.043 to 0.059 in/yr (1.1 to 1.5 mm/yr) (Lindvall and Rockwell, 1995). The northern part of the NISZ is commonly considered to have a much lower rate, on the order of 0.004 in/yr (0.1 mm/yr). Most seismic hazard studies have used a long-term rate of 0.02 in/yr (0.5 mm/yr) based on offset of Pliocene fold structures and strata (Schell, 1991; Freeman *et al.,* 1992).

Cabrillo Fault

The Cabrillo fault forms a prominent northeast facing scarp in the 100,000 year-old terrace in the San Pedro-Point Fermin area (refer to Exhibit 2.2.2-1). The fault dips approximately 50 degrees to 70 degrees easterly with a vertical displacement of approximately 100 to 200 ft (30 to 61 m) (Woodring *et al.,* 1946). The fault trends northwesterly inland for approximately 4.3 mi (7 km) (Woodring *et al.,* 1946; Dibblee, 1999). Southerly from Cabrillo Beach, the fault extends offshore for a distance of approximately 6.8 mi (11 km) where it appears to merge with the Palos Verdes fault



Source: Earth Mechanics, Inc., 2005.

Exhibit 2.2.2-1
Los Angeles Regional Faults Map

(Vedder *et al.,* 1986; Fischer *et al.,* 1987). The offshore fault is shown as a zone of disruption up to 1,640 ft (500 m) wide.

The fault is considered to be predominantly a strike-slip fault due to its association with the Palos Verdes fault, but it may also have a normal component of displacement. Based on empirical fault-length/earthquake-magnitude relationships (Wells and Coppersmith, 1994), the fault could be capable of approximately an M ~ 6.25 to 6.5 earthquake. Fischer *et al.* (1987) estimated a vertical slip rate of 0.016 to 0.027 in/yr (0.4 to 0.7 mm/yr), which is greater than the Palos Verdes fault estimates. Most studies suggest that the Cabrillo fault is a minor feature, and Ward and Valensise (1994) estimated a slip rate of 0.004 in/yr (0.1 mm/yr) estimated a slip rate of 0.004 in/yr (0.1 mm/yr).

Sierra Madre Fault

Based on worldwide empirical fault-length/ earthquake-magnitude relationships (Wells and Coppersmith, 1994), the Sierra Madre fault is capable of producing earthquakes in the 7.0 to 7.5 magnitude range (Dolan *et al.,* 1995). If the fault ruptures one of the segments independently, then earthquakes of M 7.0 are more likely; if more than one segment ruptures together, then larger earthquakes are possible.

Approximately 12.4 mi (20 km) of the westernmost part of the Sierra Madre fault ruptured the ground surface during the 1971 San Fernando earthquake (M 6.7). Geological studies (trenching) of the 1971 rupture suggested that a previous rupture had occurred on this fault within the prior few hundred years (Bonilla, 1973).

Some geological studies have indicated that the average rate of displacement for the Sierra Madre fault may be as high as approximately 0.117 to 0.156 in/yr (3 to 4 mm/year) (Southern California Earthquake Center, n.d.); however, recent paleoseismological studies suggested an average slip rate of only 0.023 in/yr (0.6 mm/yr) (Rubin *et al.,* 1998). This lower rate is based on only one locality within a very long and complex branching fault system; therefore, this rate may not be representative of the entire fault zone. Paleoseismological studies by Tucker and Dolan (2001) on the eastern part of the fault near Azusa revealed a similar minimum slip rate of 0.023 to 0.035 in/yr (0.6 to 0.9 mm/yr).

Malibu Coast, Santa Monica, Hollywood Fault System (Southern Frontal Fault System)

The fault system consists of the Santa Monica and Hollywood faults and smaller segments, such as the Malibu Coast and Potrero faults. Continuation of the fault to the west of Santa Monica is uncertain, and the fault system may be related to the Dume-Anacapa fault zone in the offshore area south of Malibu. Together, these faults form the southern boundary fault of the Santa Monica Mountains.

Documented slip rates are less than 0.039 in/yr (1.0 mm/yr), but this estimate suffers from lack of data on the lateral slip (Dolan *et al.,* 1997). The California Geological Survey assumes a slip rate up to approximately 0.039 in/yr plus or minus 0.02 in/yr (1.0 mm/yr plus or minus 0.5 mm/yr) (California Geological Survey, 2003).

The great length of the fault system suggests that it is capable of generating a large earthquake (M~7.5), but the discontinuous nature of faulting suggests that faults may behave independently and perhaps a smaller maximum earthquake (M~6.5 to 7.0) is more appropriate. Dolan *et al.* (1997) postulated an M 6.6 event for the Hollywood fault. The earthquake recurrence interval is very long and could be on the order of a few thousand years (Dolan *et al.,* 1997).

San Pedro Basin Fault

The fault trends southeasterly from near the base of the Malibu-Santa Monica shelf, past the subsea Redondo Knoll, to approximately Avalon Knoll east of Catalina Island, a distance of approximately 43 to 50 mi (70 to 80 km). The fault is expressed as a complicated association of folds, flower structures, and tensional (normal) structures. The fault dips steeply to nearly vertical, which, along with the structural expression, indicates it is a strike slip fault (Fisher *et al.,* 2003). Southeast of the Palos Verdes Peninsula, this fault coincides with the western limit of a dense distribution of small-magnitude (M 3 to 5) earthquakes.

The slip rate is unknown, but the similarity of geomorphology, structures, and length to the NISZ suggest that they are similar features; therefore, they could have similar slip rates of approximately 0.039 in/yr (1 mm/yr) and similar maximum earthquakes. Fault-length/earthquake-magnitude relationships (Wells and Coppersmith, 1994) indicate a maximum earthquake of approximately M 7.0 to 7.2, but the feature is highly segmented, indicating smaller magnitudes (M~ 6.5-7.0) may be more likely.

Elysian Park Fold and Thrust Belt

The Elysian Park Fold and Thrust Belt (EPFT) was initially identified by Davis *et al.* (1989), who postulated that the Los Angeles area is underlain by a deep master detachment fault and that most of the folds and faults in the region result from slip along the detachment, causing folding and blind thrust faulting at bends and kinks in the detachment fault. Shaw and Suppe (1996) further developed and refined the detachment/blind thrust model.

The detachment/blind thrust model was initially embraced primarily because the 1987 Whittier Narrows earthquake occurred in proximity to one of the postulated thrust ramps beneath the EPFT. Subsequent work has highly modified the original model (e.g., Shaw and Suppe, 1996; Oskin and Sieh, 1998; Bullard and Lettis, 1993; Shaw and Shearer, 1999; Shaw *et al.,* 2002).

Shaw and Suppe (1996) postulated a slip rate of 0.066 plus or minus 0.016 in/yr (1.7 plus or minus 0.4 mm/yr) for the Elysian Park thrust. Estimates of earthquake magnitudes associated with these thrust faults range from 6.6 to 7.3 depending on the size (area) of the individual segments and whether they rupture independently or together. Recurrence interval estimates range from 340 to 1,000 years. Oskin *et al.* (2000) model the Upper Elysian Park thrust as extending from the Hollywood fault to the Alhambra Wash fault with a slip rate of 0.031 to 0.086 in/yr (0.8 to 2.2 mm/yr) and M 6.2 to 6.7 earthquakes with a recurrence interval in the range of 500 to 1300 years. The California Geological Survey, following the lead of Oskin *et al.* (2000), modeled the Upper Elysian Park thrust as a feature approximately 11.2 mi (18 km) long and dipping 50 degrees northeasterly, with a slip rate estimate of approximately 0.051 plus or minus 0.016 in/yr (1.3 plus or minus 0.4 mm/yr).

Puente Hills Fault System

The Puente Hills Thrust fault system (PHT) is the name currently given to a series of northerly dipping subsurface thrust faults (blind thrusts) extending approximately 24.8 to 30 mi (40 to 45 km) along the eastern margin of the Los Angeles Basin.

Shaw and Shearer (1999) proposed that the Puente Hills fault system was capable of generating approximately M 6.5 to 7.0 earthquakes and had a slip rate of between 0.02 to 0.078 in/yr (0.5 to 2.0 mm/yr). The 0.02-in/yr (0.5-mm/yr) rate was derived by dividing the postulated slip by the age of strata (i.e., Quaternary ~1.6 million years), whereas the 0.078-in/yr (2.0-mm/yr) slip rate was derived by assuming that all of the unaccounted-for, geodetically determined, crustal shortening of ~0.312 to 0.371 in/yr (~ 8 to 9.5 mm/yr) across the Los Angeles Basin is occurring on the Puente Hills fault system.

Using empirical data on rupture area, magnitude, and coseismic displacement, Shaw *et al.* (2002) estimated earthquakes of M 6.5 to 6.6 and multi-segment rupture of M 7.1. The recurrence intervals for these events are on the order of 400 to 1,320 years for single events and 780 to 2600 years for M 7.1 events. Paleoseismological studies using trenching and borings in the Santa Fe Springs area identified four buried folds that they interpreted to be a result of M = 7.0± earthquakes within the past 11,000 years (Dolan *et al.,* 2003).

THUMS-Huntington Beach Fault

The THUMS-Huntington Beach (THB) fault has been interpreted in many different ways. It has been interpreted as a high-angle normal fault and an oblique right-lateral normal fault (Truex, 1974; Clarke *et al.,* 1987; Wright, 1991).

In the area between Long Beach and Huntington Beach, several offshore geophysical (seismic-reflection) investigations for numerous oil and engineering projects (e.g., pipelines, offshore power plant, drilling islands) have documented several near-surface faults, but these are short, small displacement, discontinuous, random features that do not appear to align such that they could be considered representative of a major regional active fault.

If the THB fault is projected dipping downward to the east, it would intersect the NISZ at approximately 5 to 5.5 mi (8 to 9 km) depth, raising the issue of whether it cuts off the NISZ or whether the NISZ cuts off the THB. The high degree of young deformation on the NISZ and its historical seismic activity indicate that the NISZ is more active; therefore, it favors the latter interpretation.

Compton-Los Alamitos Thrust Ramp

The Compton-Los Alamitos (CLA) thrust model was developed by Shaw and Suppe (1996) following the lead of Davis *et al.* (1989). The feature comprises a thrust ramp and several overlying folds, which are postulated to result from slip on the deep detachment and interconnected thrust ramps.

Folded Pliocene and Quaternary strata indicate slip rates of 0.055 in/yr (1.4 mm/yr). Assuming that slip is released in large earthquakes, Shaw and Suppe (1996) estimate earthquake magnitudes of 6.3 to 6.8 on individual ramp segments, and M 6.9 to 7.3 if segments rupture together. Recurrence intervals are estimated from empirical earthquake-magnitude/fault-displacement relationships (Wells and Coppersmith, 1994). Estimates of earthquake recurrence intervals range from 380 years for single segments to 1,300 years for multiple segment ruptures.

Los Alamitos Fault

The Los Alamitos fault is a northwest-southeast trending subsurface fault along the northeast side of the NISZ. The fault is not well known because it is not exposed at the surface. The fault extends upward from the basement rocks to an elevation of approximately -300 ft (mean sea level [MSL]), and is subparallel to the NISZ from at least Seal Beach to Rosecrans. The fault is shown as a dotted feature (i.e., buried fault) on the state fault map of Jennings (1994) who assigned it an age of late Quaternary. The Los Angeles County Seismic Safety Element (1990) shows it as potentially active. The fault is shown on the Caltrans seismic hazard map with a maximum earthquake magnitude of 6.0 (Mualchin, 1996).

Although there is no documented surface faulting or even late-Quaternary displacement, the fault should be considered a potential source of small- or moderate-magnitude earthquakes, similar to other buried faults in the Los Angeles Basin. For seismic design purposes, an M 6.0 to 6.5 earthquake is appropriate for the maximum earthquake based on the fault's length according to the empirical fault-length/earthquake-magnitude relationships of Wells and Coppersmith (1994).

Other Faults

There are several minor unnamed faults on the offshore San Pedro shelf. These features were detected by various geophysical surveys for local pipelines. These features are too small and discontinuous to represent a seismic hazard; therefore, they are not significant for seismic design. An example of this type of feature is the Navy Mole Fault.

Soil and Sediment

In the natural regime, the site area was within the delta of the Los Angeles River and its tributaries, and it was characterized by meandering channels, marshes, tidal channels, and islands. Since the early part of the 20th century, the area has been dredged and filled extensively to form the wharves and shipping channels of the Ports. Although modified extensively, the configuration of many of the channels and wharves still reflect the approximate configuration of the natural channels and islands. For example, Terminal Island was a long narrow sand spit (bay-mouth bar) under natural conditions, which has since been widened with fill. Gerald Desmond Bridge crosses a channel between Terminal Island and the "mainland" of Long Beach.

The site area is underlain by alternating beds of nonindurated (unconsolidated) sands, silts, and clays, with local gravel beds. These are generally considered to be part of the Holocene-latest Pleistocene-age Gaspur Aquifer. The Gaspur deposits fill one of the deep stream channels eroded during the lowered sea level during the Pleistocene ice ages. The Gaspur is approximately 150 to 200 ft (45 to 61 m) thick in the site area. Since approximately 5,000 years ago, when the rising sea level stabilized somewhat near the present level, the site area has alternated between beach, lagoon, and estuary environments in the delta of the Los Angeles River. The site is near the boundary between the natural island and the fill placed to enlarge Terminal Island.

Although quite variable in composition, the sediments underlying the site can be grouped into four general units:

- Unit I: upper unit of loose to dense silty sands and soft to very stiff sandy silts,
- Unit II: a compact to very dense sand unit,
- Unit III: a soft to stiff clayey silt and clay unit, and
- Unit IV: lower sand and silty sand unit.

Unit I is within approximately the upper 20 ft (6 m) and may be fill. The sands of Unit II, from approximately 20 ft (6 m) to 50 ft (15 m) deep, probably represent natural near-shore bay and beach sands deposited within the past few thousand years. The fine-grained deposits of Unit III are from approximately 40 to 50 ft (12 to 15 m) deep to approximately 60 to 70 ft (18 to 21 m) deep, and probably represent lagoon or estuary deposits. The deposits of Unit IV below are primarily sands and silty sands, probably representing stream channel and some bay deposits. This likely represents the early Holocene Gaspur Formation and possibly the Upper

Pleistocene Lakewood Formation at the greatest depths. Bedding was not well developed, but where visible, it is essentially horizontal. Differentiating the young (Holocene) sediments from the Lakewood or San Pedro formations is difficult in boreholes because of their similar origin and characteristics. Except for density, which is generally greater in the older Lakewood and San Pedro formations, the units can only be confidently differentiated by analysis of their fossils.

Liquefaction

Liquefaction susceptibility provides an indication of the possible loss of strength and stiffness of saturated cohesionless soils during a moderate to great earthquake. Physical properties of soil, such as grain size distribution, plasticity index, state of compaction, cementation due to aging effects, and groundwater conditions, influence the degree of resistance to liquefaction.

Saturated portions of the sandy soils of the upper stratum at the project site are potentially susceptible to liquefaction. The liquefiable zone is widespread beneath the main span and both approaches. Beneath the west approach, liquefaction is expected to occur in layers generally up to approximately 13 ft (4 m) thick between the water table near El. -7 ft (-2 m) and El. 46 ft (14 m). Beneath the east approach, where the ground and water table is higher, the liquefiable zone rises higher between the water table near El. 0 and El. -20 ft (-6 m), and grows to approximately 28 ft (8.5 m) in thickness. In the two pylon areas (bridge towers) for the proposed bridge, the liquefaction zone increases to approximately 13 to 20 ft (4 to 6 m) in thickness adjacent to the channel. The materials predominantly represent man-made fills and some natural beach sand.

In addition, localized liquefaction may also occur in discontinuous thin sand lenses embedded in the underlying clay and silt unit of a lower soil stratum down to approximately El. -65 ft (-20 m) at both sides of the channel. These individual lenses predominantly consist of loose to medium dense silty sands with thicknesses of typically less than 5 ft (1.5 m) and limited horizontal extent (exact locations of these pockets of soil cannot be determined).

Subsidence

Subsidence is the sinking of the ground surface, typically caused by extracting fluids from the subsurface. Subsidence has been well documented in the Los Angeles-Long Beach Harbors. Between 1928 and 1965, approximately 29 ft (9 m) of cumulative subsidence was recorded near the eastern end of Terminal Island. A maximum annual rate of subsidence of 2.4 ft (0.7-m) was recorded in 1951, approximately 9 months after the Wilmington Oil Field had attained its peak primary production rate of oil and gas (Mayuga, 1970). Due to the close correlation of the zone of subsidence with areas of oil extraction within the Wilmington Oil Field, it was suggested that the oil production caused reduced subsurface fluid pressure, which in turn induced compaction of the oil-producing zones. This compaction at depth was reflected at the surface by land subsidence. By 1951, subsidence covered an elliptical area of approximately 20 square miles (sq mi) (52 square kilometers [sq km]).

Various oil companies started pilot water injection operations in 1953, 1954, and 1956. The City of Long Beach Department of Oil Properties instituted the first major water injection program in 1958. Since 1958, injection of water into oil-depleted zones has curtailed subsidence, and rebound of much of the subsided area has actually been initiated. By 1967, the area of subsidence had been reduced from 20 to 4 sq mi (52 to 10 sq km), with the subsidence rates decreasing to 1.2 in/yr (30 mm/yr) (Mayuga, 1970). In 1980, the DOGGR, the City of Long Beach, and several oil companies initiated an extensive program to greatly increase water injection. Consequently, if a balance of fluid withdrawal and injection is maintained, regional subsidence should not present further problems in the area.

Surface subsidence could also result from a subsurface slope failure adjacent to a ship channel or slip. Although the existing risk is low, the risk of this type of slope failure increases during seismic events.

Tsunami and Seiche

A tsunami is an ocean wave generated by the rapid displacement of a large volume of seawater, resulting from either submarine faulting or large-scale submarine landslides. These waves may travel thousands of miles across the ocean at speeds of hundreds of mph and reach heights of 10 to 100 ft (3 to 30 m) as they approach the shoreline, where they can cause extensive damage to unprotected coastal areas.

A study of potential tsunami activity was conducted by Moffatt and Nichol (2007) for POLB and POLA. The report concluded that (1) a large, locally generated tsunami could have a wave height of approximately 21 ft (7 m) but would only occur once every 10,000 years, and (2) the maximum tsunami wave height in the port would be approximately 2.5 ft (0.75-m). This is lower than the historic tsunami wave heights discussed below due to subsequent Port development.

Historically, California has suffered very little damage from tsunamis. Between 1812 and the present, the only tsunami damage in the Los Angeles area resulted from waves generated by the 1964 Gulf of Alaska and 1960 Chilean earthquakes. The maximum crest-to-trough wave height in the Long Beach - Los Angeles Harbor for the tsunami generated by the Alaska earthquake was approximately 5 ft (1.5 m) and by the Chilean earthquake was approximately 3 ft (1 m). Wave heights in San Pedro Bay associated with other historic tsunamis have generally been less than 3 ft (1 m). The location of the Palos Verdes Hills adjacent to the harbor, and the presence of a harbor breakwater, greatly reduces the potential for damage within the project area from tsunamis.

A seiche is a standing-wave oscillation in an enclosed or semi-enclosed body of water that is potentially destructive to structures along the shore of the water body. Seiches can be generated by earthquakes or by mass movement of soil or rock into the water body. Most of the damage to boats and harbor facilities associated with the tsunami caused by the 1960 Chilean earthquake resulted from a seiche within the Cerritos Channel.

2.2.2.3 Environmental Consequences

Evaluation Criteria

The criteria used in this study to estimate fault activity are described in the Alquist-Priolo Special Studies Zone act of 1972, which addresses only surface fault-rupture hazards. The legislative guidelines to determine fault activity status are based on the age of the youngest geologic unit offset by the fault.

The Seismic Hazards Map Act of 1990 (PRC Sections 2690 and following as Division 2, Chapter 7.8) as supported by the Seismic Hazards Mapping Regulations (CCR, Title 14, Division 2, Chapter 8, Article 10) are intended for the purpose of protecting public safety from the effects of strong ground shaking, liquefaction, landslides or other ground failures, or other hazards caused by earthquakes. Special Publication 117, Guidelines for Evaluating and Mitigating Seismic Hazards in California (CDMG, 1997) constitutes the guidelines for evaluating seismic hazards other than surface fault-rupture, and for recommending mitigation measures as required by PRC Section 2695(a).

No Action Alternative

Under the No Action Alternative, the existing bridge would continue to be used to meet local and regional transportation needs. The bridge was built in 1966 and partially seismically upgraded in 1995 at select columns, such as Piers 15 and 16, which support the main steel truss span. Major seismic deficiencies remain, including lap splices at the base of columns and insufficient confinement reinforcement. These deficiencies substantially reduce the Gerald Desmond Bridge's ability to withstand a MCE without incurring significant damage to the columns and the overall bridge integrity. A major seismic event would likely result in loss of service and bridge demolition.

Construction/Demolition Impacts

<u>North-side Alignment Alternative</u>

The proposed bridge construction project would not adversely affect the geologic environment or geologic processes because:

- Construction would not alter the regional stress regime; thus, it could not possibly trigger an earthquake,
- Construction would not alter the geotechnical properties of harbor sediment or cause regional vibration; thus, it could not possibly cause liquefaction.
- Construction would not alter the regional stress regime; thus, it could not possibly cause seismic ground shaking.
- Construction would not alter the regional tectonic regime; thus, it could not possibly trigger a tsunami.

<u>South-side Alignment Alternative</u>

This alternative would be located on the south side of the Gerald Desmond Bridge. Construction and demolition effects on geologic resources and seismic performance during operation would be the same as the North-side Alignment Alternative.

<u>Rehabilitation Alternative</u>

Rehabilitation of the Gerald Desmond Bridge would consist of improvements to the existing structure and approaches as discussed in Section 1.6.2. This alternative would not adversely affect the geologic environment or geologic processes because:

- Rehabilitation would not alter the regional stress regime; thus, it could not possibly trigger an earthquake,
- Rehabilitation would not alter the geotechnical properties of harbor sediment or cause regional vibration; thus it could not possibly cause liquefaction.
- Rehabilitation would not alter the regional stress regime; thus, it could not possibly cause seismic ground shaking,
- Rehabilitation would not alter the regional tectonic regime; thus, it could not possibly trigger a tsunami,

Operational Impacts

North-side Alignment Alternative

Operation of the proposed bridge would not affect the probability of the occurrence of geologic hazards discussed in Section 2.2.2.2. This geologic resource impact evaluation indicates that the proposed project has a potential to be exposed to geotechnical impacts or constraints; however, the new bridge structure and foundation would be designed and built to handle seismic loads and to meet current seismic standards. Thus, the proposed bridge would be able to withstand the SEE, which represents a rare earthquake event.

Strong Ground Motion. The intensity of ground shaking at a specific location depends on several factors, including earthquake magnitude, distance from the source epicenter to the site, activity rate, and site response characteristics, particularly near-surface geologic materials. The faults and fault zones described in Section 2.2.2.2 can contribute to seismic risk associated with strong ground motion at the proposed bridge site. All of the faults are considered in the seismic hazard evaluation. Ground shaking generally causes the most widespread effects, not only because it can propagate considerable distances from an earthquake source, but also because it can trigger secondary effects. These secondary effects include liquefaction and lateral expansion, and slope failure with resultant structural damage to buildings and foundations. The proposed bridge would be designed and built to withstand the SEE, which includes the secondary effects described above. Designing the project to withstand the SEE minimizes the risk for bridge failure and reduces the potential for loss of life or property damage associated with bridge failure.

Fault Displacement Surface Rupture. Many recent seismic hazard studies have been conducted within the region, and the project site is reasonably well documented regarding local and nearby faults. Some of these local faults include the THUMS Huntington Beach and the Cabrillo faults, in addition to the Palos Verdes fault. Based on past fault mapping studies, it is generally felt that there are no known faults that would cause ground surface fault rupture hazards at the bridge site.

Liquefaction. The Port, as a whole, has a high potential for soil liquefaction due to the presence of a high groundwater table, man-made fills, and the potential for significant ground shaking associated with a moderate to major earthquake. To minimize the potential adverse effects of liquefaction to the proposed project, the foundation designs for the bridge would incorporate soil-structure interaction features. Large-diameter ductile piles would be used to withstand lateral loading from liquefied soil, and the piles would be driven into deep soil strata to resist downdrag force from shallow liquefied soils.

Extensive preliminary design studies have been conducted for the proposed cable-stayed bridge and concrete approach spans resulting in a report entitled *Preliminary Engineering Bridge Report* dated June 2006 (Parsons, 2006b). This report summarizes various studies, including ground motion, fault displacement surface rupture, liquefaction, and preliminary geotechnical investigations consisting of 21 soil borings to depths ranging from 50 to 195 ft (15 to 59 m). Additional soil investigation would be conducted in the final design. In addition, the Port, Caltrans, and the consultant team developed a Design Criteria Document for the bridge, which provides detailed guidance for the preliminary and final designs of the bridge foundations and all structural components. The foundation design would be developed using the latest analytical methods and applicable codes to ensure that liquefaction issues are fully addressed within the design. The proposed “Shear-Link” design for the bridge towers has been proposed for this project because of its capability to handle seismic loads. The two pylons (or towers) of the main bridge will be designed with shear links. These smaller horizontal elements connect the two halves of each tower to stiffen the pylon system, preventing excessive sway in a major earthquake, while also protecting the main vertical load-carrying members from damage. The links act as "structural fuses" that are designed and detailed to yield and dissipate energy in a seismic event. After a large earthquake, the damaged links can be quickly replaced without significant delays or significant repair to the overall structure. Ground shaking, surface rupture, and liquefaction would not adversely affect the proposed bridge project.

The geographical and morphological setting of the proposed bridge site is protected from tsunami, because the bridge site is not directly exposed to the open ocean. Tsunami modeling only predicts a maximum wave of a couple of feet in height (Moffatt and Nichol, 2007). The morphological setting of the proposed bridge site is protected from seiche because the proposed bridge structures and approaches are elevated and located at higher elevations outside of the harbor; therefore, the potential for tsunami or seiche at the site is not substantial and would not adversely affect the proposed bridge replacement project.

South-side Alignment Alternative

This alternative would have the same operational effects on geologic resources and seismic performance as the North-side Alignment Alternative.

Rehabilitation Alternative

The Rehabilitation Alternative would withstand the MCE based on the “No Collapse” design criteria (see Section 1.6.2.); however, the “No Collapse” criteria imply that even though the bridge would survive the MCE without collapse and loss of life, there would still be a high probability of it being condemned after an MCE. Condemnation of the Gerald Desmond Bridge would adversely affect Port operations and local/regional transportation and goods movement.

2.2.2.4 Avoidance, Minimization and/or Mitigation Measures

No measures are required.

2.2.3 Hazardous Materials/Wastes

Hazardous materials are generally substances that, by their nature and reactivity, have the capacity for causing harm or health hazards during normal exposure or an accidental release or mishap, and they are characterized as being toxic, corrosive, flammable, reactive, an irritant, or a strong sensitizer. The term "hazardous substances" encompasses chemicals regulated by United States Department of Transportation (DOT) "hazardous materials" regulations and EPA "hazardous waste" regulations, including emergency response. Hazardous wastes require special handling and disposal due to their potential to damage public health and the environment. A designation of "acutely" or "extremely" hazardous refers to specific listed chemicals and quantities.

Activities and operations that use or manage hazardous or potentially hazardous substances could create a harmful situation if release of these substances occurred. Individual circumstances, including the type of substance, quantity used or managed, and the nature of the activities and operations, affect the probable frequency and severity of consequences from a hazardous release or exposure. Federal, state, and local laws regulate the use and management of hazardous or potentially hazardous substances.

This section discusses human health hazards due to exposure to existing and potential future sources of hazardous materials and wastes due to project construction and operation.

2.2.3.1 Regulatory Setting

Hazardous materials and hazardous wastes are regulated by state and federal laws. These include not only specific statutes governing hazardous waste, but also a variety of laws regulating air and water quality, human health, and land use.

The primary federal laws regulating hazardous wastes/materials are the Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). The purpose of CERCLA, often referred to as Superfund, is to clean up contaminated sites so that public health and welfare are not compromised. RCRA provides for "cradle to grave" regulation of hazardous wastes. Other federal laws include:

- Community Environmental Response Facilitation Act (CERFA) of 1992
- CWA
- Clean Air Act (CAA)
- Safe Drinking Water Act
- Occupational Safety & Health Act (OSHA)
- Atomic Energy Act
- Toxic Substances Control Act (TSCA)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

In addition to the statutes listed above, EO 12088, Federal Compliance with Pollution Control, mandates that necessary actions be taken to prevent and control environmental pollution when federal activities or federal facilities are involved.

Hazardous waste in California is regulated primarily under the authority of RCRA, and the California Health and Safety Code. Other California laws that affect hazardous waste are specific to handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning.

Worker health and safety and public safety are key issues when dealing with hazardous materials that may affect human health and the environment. Proper disposal of hazardous material is vital if it is disturbed during project construction.

2.2.3.2 Affected Environment

Evaluation Criteria

The proposed project may result in an adverse effect, if it would:

- Create a significant hazard to the public or environment through the routine transport, storage, use, or disposal of hazardous materials
- Create a significant hazard to the public through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment
- Be located within 0.25-mi (0.4-km) of a site that emits hazardous emissions or handles hazardous or acutely hazardous materials, substances, or wastes
- Be located on a site that is known to contain hazardous materials and, as a result, could create a significant hazard to the public or the environment

An ISA of the Gerald Desmond Bridge and adjacent areas (Diaz Yourman & Associates, 2008) was performed using guidelines of the

American Society for Testing and Materials (ASTM) Designation E 1527, "Standard Practice for Environmental Project Site Assessments: Phase I Environmental Property Assessment Process" and the Caltrans Project Development Procedures Manual. The scope of the ISA included site reconnaissance; historical research related to use, storage, disposal, or release of hazardous materials or petroleum hydrocarbons; review of property records, public records, aerial photographs, and interviews; review of environmental databases and regulatory agency information available to the public for the property and neighboring properties; and report of findings.

Subsequent to preparation of the ISA, groundwater documentation was reviewed to assess the extent of a benzene plume in the vicinity of the proposed project. This groundwater documentation was a literature review that compiled relevant analyses that had been performed in the vicinity of the project; it is included as Appendix B of the ISA. The environmental setting described herein is based on the findings of the ISA and the groundwater documentation.

Surrounding Uses

Activities in the area are dominated by storage and transportation of cargo. Areas beyond the project consist of marine piers, ship building and maintenance, ship fueling, and cargo transfer. The project area is described in more detail below.

North Side of Ocean Boulevard, West of the Gerald Desmond Bridge. The below-sea-level LBGS property, which is a power-generating facility, is located north of the project near the bridge. An aboveground storage tank (AST) petroleum tank farm operated by Pacific Pipeline Systems is adjacent to the west side of the power plant. There are approximately 15 active oil wells operating on or adjacent to the north side of the project between the bridge and the power plant. A railroad ROW is located adjacent to the north side of the project alignment, adjacent to the Ocean Boulevard/Seaside Boulevard interchange, which crosses under the elevated Ocean Boulevard structure and curves south to serve the container terminal on the south side of the project (Pier T). Northwest of the project, there is a large area recently filled and graded that is currently under construction as a container terminal (Pier S).

North Side of Ocean Boulevard, East of the Gerald Desmond Bridge. There are industrial facilities north of the project corridor within the area between the bridge and Harbor Scenic Drive. The areas nearest the project corridor consist primarily of asphalt-paved yards, which extend beneath the Ocean Boulevard support structure and are utilized by the Port and Tidelands Oil Production Company. There is one active oil well adjacent to the WB ramp from SB Pico Avenue. A truck fueling station, truck maintenance shop, truck scales, and a petroleum pump station are on Pico Avenue north of Ocean Boulevard. The Union Pacific Railroad (UPRR) ROW crosses beneath Ocean Boulevard east of Pico Avenue, and an oil field (Pacific Energy Resources) occupies a narrow strip of land between the railroad and the Los Angeles River levee.

South Side of Ocean Boulevard, West of the Gerald Desmond Bridge. The area adjacent to the south side of the project corridor west of the roadway ramps consists of a strip of vacant land within approximately 200 ft (30 m) of pavement. The southern margin of the strip is occupied by oil well operations. Seaside Boulevard and interchange access ramps for Ocean Boulevard are adjacent to the south side of Ocean Boulevard and the bridge. The entire area south of Seaside Boulevard and the oil well operations (Pier T, formerly part of LBNSY) has been developed into the concrete paved TTI container storage and transfer facilities. The area beneath the elevated Ocean Boulevard roadway is occupied by vacant land, access roads to the north, and the railroad crossing, except near the bridge. Near the bridge, an asphalt concrete paved yard, used by Weyerhaeuser Company for building materials storage, occupies the area beneath the elevated roadway and extends several hundred feet to the south. A small oil field facility is beneath the bridge between the Weyerhaeuser Company yard and the Back Channel. A water pumping station facility is also adjacent to the west end of the Weyerhaeuser yard beneath the south side of the bridge.

South Side of Ocean Boulevard, East of the Gerald Desmond Bridge. The entire area south of the project corridor, between the east side of the bridge and Pico Avenue, is occupied by a container storage facility, California United Terminals, at Piers D and E. The east side of Pico Avenue is occupied by the International Seafarer's Center, a clinic, and a commercial building that is currently being used by the Harbor Police. There is a railroad parallel to the east side of Harbor Scenic Drive and oil wells east of the railroad next to the Los Angeles River levee.

West End of the Project. Ocean Boulevard extends west of the project. The Intersection of Ocean Boulevard with SR 47 is located outside of the project limits to the west.

East End of the Project. The Los Angeles River and levees are located at the east end of the project.

Environmental Data Base Review

The purpose of the environmental database review is to obtain and review public records to identify activities at the project site or surrounding properties that could indicate significant potential for recognized environmental conditions (RECs) impacting the project. Environmental Data Resources, Inc. (EDR), completed the database search for the study area.

The database study area extends 0.25-mi (0.4-km) around the outer margin of the project area. Sites beyond this distance are considered unlikely to have the potential to impact the project.

Hazardous Waste Site Facilities Located within 0.25-mi (0.4-km) of the Proposed Project Site

Federal NPL, CORRACTS, ROD, CERCLIS, and CERCLIS-NFRAP Sites

The National Priority List (NPL) is the EPA database of uncontrolled or abandoned hazardous waste sites identified for priority remedial actions under the Superfund program. Facilities that have had a release of hazardous waste or constituents to the environment, for which EPA is requiring corrective action, are tracked in the Corrective Action Tracking System (CORRACTS) database. Record of Decision (ROD) documents mandate a permanent remedy at NPL (Superfund) sites and contain technical and health information to aid the cleanup. The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list contains sites that either are proposed to be or are on the NPL and sites that are in the screening and assessment phase for possible inclusion on the NPL. No Further Remedial Action Planned (NFRAP) sites included under the CERCLIS listing may be sites where following an initial investigation, no contamination was found; contamination was removed quickly; or the contamination was not serious enough to require federal Superfund action or NPL consideration.

No NPL or CORRACTS sites were listed in the database within 0.25-mi (0.4-km) of the project at the time that the ISA was prepared.

Two identical CERCLIS and ROD listings were identified within the study radius of 0.25-mi (0.4-km) of the project. Both sites are located within the Former LBNSY. One site is listed as U.S. Navy Naval Station Long Beach, located adjacent to the south side of the western end of the project. The former federal facility is described in the database as CERCLIS Remedial Investigation/Feasibility Study (RI/FS) and ROD completed in September 2002. The second site is listed as Naval Shipyard Long Beach, located south of the project beyond Seaside Boulevard. The Naval Shipyard Long Beach was assigned a ROD status under CERCLIS completed June 30, 2005.

Four CERCLIS-NFRAP sites were listed on the database within the study radius. All four of these sites are at locations that do not have the potential to impact the project due to hydrologic conditions.

Federal RCRIS, TSD, and RCRIS Generator

Regulated hazardous waste activity is tracked under the Resource Conservation and Recovery Information System (RCRIS). Facilities that treat, store, or dispose of (TSD) hazardous waste are listed in the RCRIS-TSD database. Facilities that generate at least 1,000 kilograms per month (kg/mo) of nonacutely hazardous waste, or 1 kg/mo of acutely hazardous waste, are tracked in the RCRIS-LgGen (large generator) database, while those that generate less than 1,000 kg/mo of nonacutely hazardous waste are tracked in the RCRIS-SmGen (small generator) database.

One TSD facility was identified within the 0.25-mi (0.4-km) study radius. The facility is the LBGS power plant facility. The facility received three RCRA TSD notices of violation that were reported as corrected in 1995. The proposed project encroaches upon the facility; therefore, soils within the facility could contain hazardous materials constituents.

Eight sites within the 0.25-mi (0.4-km) search radius were identified in the RCRIS-LgGen database as large-quantity hazardous waste generators. Five of these sites are at locations that do not have the potential to impact the project. Three of the sites are located adjacent to the project.

- AERA Energy, LLC, 7th Street Terminal located at 1725 Pier D Street, northeast of the Gerald Desmond Bridge.
- LBGS, currently a peaker plant, located at 2655 West Seaside Boulevard, north of the western end of the project.
- Pacific Pipeline Systems, LLC, tank farm adjacent to the west side of LBGS at 2865 Seaside Boulevard.

No RCRA violations were listed for these sites; therefore, they are not considered an environmental concern to the project.

Thirty-two (32) sites within the 0.25-mi (0.4-km) search radius were identified in the RCRIS-SmGen database as small-quantity hazardous waste generators. Twenty-five (25) of these sites are not located within or adjacent to the project site and are not considered potential environmental concerns. Seven of the sites are located adjacent to or within the project limits north of Ocean Boulevard on Pico Avenue, West Broadway, and Pier D Avenue. The remaining site is at the LBGS. All sites, except for the LBGS, are listed as no violations found and are not a REC to the project due to RCRA SmGen listing. The LBGS site did have three notices of violation reported as corrected in 1995. The project encroaches upon the facility; therefore, soils within the facility could contain hazardous material constituents.

Federal ERNS Incidents

The Emergency Response and Notification System (ERNS) is a national database containing records of oil and hazardous substance releases to the air, water, and ground reported to EPA, USCG, the National Response Center, and DOT since 1986. The California Hazardous Material Incident Reporting System (CHMIRS) contains information on reported hazardous materials incidents, such as accidental spills or releases, provided by California Office of Emergency Services. Releases of hazardous substances to the air, water, and ground reported as ERNS and CHMIRS incidents are generally temporary events that are mitigated as much as possible at the time of the event. More serious events requiring investigation and cleanup beyond the initial emergency response commonly become sites listed on other investigation and cleanup databases.

One hundred sixty-five (154) ERNS incidents and 59 CHMIRS incidents were identified on the databases within the 0.25-mi (0.4-km) study radius. Numerous ERNS and CHMIRS sites are at locations adjacent to or within the proposed project area north and south of Ocean Boulevard. Some incidents are on the east side of the Port Back Channel in the vicinity of Pico Avenue, West Broadway, and Pier D Avenue, and others are located on the west side in relation to the LBGS, the Pacific Pipelines Systems tank farm, and oil pipeline facilities in that area.

Generally, these areas are considered "potential recognized environmental conditions" due to past oil field and marine terminal operations activities.

State ENVIROSTOR, SLIC and CORTESE Databases

The California Environmental Protection Agency, Department of Toxic Substance Control (DTSC), maintains the Site Mitigation and Brownfield Reuse Program (ENVIROSTOR) database of sites that have known contamination or sites for which there may be reasons to investigate further. California RWQCB maintains a Cal-Sites list of sites previously investigated or currently under investigation that could be actually or potentially contaminated and present a possible threat to human health and the environment. The State Office of Environmental Protection, Office of Hazardous Materials, produces the CORTESE Hazardous Waste and Substances Site List (CORTESE) database of hazardous substance release sites compiled from various other state agencies.

Seven Spills, Leaks, Investigation, and Cleanup (SLIC) sites were identified in the database within the 0.25-mi (0.4-km) study radius. Of these, two sites are located near the project: Tideland Oil Production Company facilities at 606 Pico Avenue and 696 South Pico Avenue. The database indicates there have been releases of total petroleum hydrocarbons (TPH) related to oil production. The site at 606 Pico Avenue pertains to the oil well field east of Harbor Scenic Drive north of Ocean Boulevard, and the site at 696 South Pico Avenue is located at the Tidelands Oil facility 0.25-mi (0.4-km) southwest of the project. The site at 606 Pico Avenue has been cleaned up. The site at 696 South Pico Avenue is listed as remediation underway. Neither of these cases appears to have the potential to impact the project; however, TPH from oil production has the potential to impact soil throughout the general project area.

Two ENVIROSTOR sites were identified in the 0.25-mi (0.4-km) study radius. Neither has the potential to impact the project due to locations nearly 0.25-mile beyond the western end of the project area.

Fourteen (14) CORTESE sites within 0.25-mi (0.4-km) of the project were identified by the database search. All of the CORTESE sites are listed due to leaking underground storage tank (LUST) cases described below.

State UST, LUST, and AST Sites

The state underground storage tank (UST) database is an inventory of regulated USTs, and the AST database is a listing of ASTs. The LUST database is a listing of confirmed or suspected releases from regulated USTs that have been reported to the SWRCB. The SWRCB California

Facility Index Database (CA FID) contains active and inactive UST locations. In addition, the Historic UST (HIST UST) list and the Statewide Evaluation and Environmental Planning System (SWEEPS) UST lists of historical UST records are provided by EDR.

Seventy-two (72) USTs were listed in the database within approximately 0.25-mi (0.4-km) of the project. Registered USTs that have not reported a release are generally not considered an environmental concern unless they are immediately adjacent to an excavation area for the project; however, based on addresses given in the databases, the following UST, historic USTs and SWEEPS locations were evaluated for their potential to be affected by the project.

- International Seafarer's Center 120 Pico Avenue – One 6,000 gallon fuel UST was installed in 1969. No further information was available. Phase II investigations should include determination of the disposition of this reported UST as it is within or adjacent to the proposed South-Side Alignment Alternative.
- Shell Beta Pump Station, 170 Pico Avenue (currently Pacific Energy) – The former UST was removed in 1991 and was reported as not having contamination.
- POLB Maintenance, 1400 W. Broadway – A Business Emergency Plan (BEP) in the Long Beach Fire Department (LBFD) file indicates that the facility retains a 5,000-gallon gasoline UST and one 2,000-gallon diesel fuel UST within the central area of the facility. A previous BEP from 1994 and 2000 also refers to a 1,500- or 2,000-gallon diesel fuel UST at an unidentified location.
- Forest Terminals, 180 N. Pico Avenue (currently Quick Stop Commercial Oil Lube) – Records for this facility indicate that two previous 2,000-gallon USTs installed in 1984 were removed in 1991, with soil sampling indicating no evidence of contamination.
- POLB, 100 Alpine (assumed to be part of POLB) – LBFD files had no record of this address. The address appears to coincide with the POLB Maintenance facility at 1400 W. Broadway, which was previously discussed.
- "Not Reported" 1900 Water Street (previous name of Pier D Street, POLB) – LBFD records indicate that a permit was issued to remove two fuel USTs in 1968. The permit was signed off by a fire department inspector, but there was no further information in the file regarding removal of these USTs.
- SCE Generating Station, 2665 West Seaside Boulevard – This UST is addressed below as a LUST case.
- "Gas and Oil" auto service station indicated on historic Sanborn maps at 1100 Third Street – Located on the southwest corner of the intersection of Pico Avenue and Third Street, one block north of Broadway. The LBFD had no record of this address. The site is currently a paved parking lot used by the nearby truck scale business. Phase II investigations should include determination of the disposition of this reported UST as it is within the proposed northern alignment alternative.

Four AST sites were identified in the database at the following locations:

- Shell Beta Pump Station, 170 Pico Avenue – Located just northwest of the intersection of Harbor Scenic Drive and Ocean Boulevard.
- Long Beach Pump Station, 2665 Seaside Boulevard (the same address as former SCE LBGS power plant).
- GP Gypsum, Inc. – Located on the north side of Pier D Street, outside of the project impact area.
- Marine Terminal 1, 300 Pier T Avenue – Located south of the Weyerhaeuser storage yard west of the Back Channel and outside of the project impact area.
- Pacific Pipeline Systems, LLC – A large AST tank farm north of the western portion of the project area adjacent to the LBGS. All of these large ASTs are north of the western portion of the project at a much lower elevation, and they are not likely to be an environmental concern.

Sixteen (16) LUSTs were listed in the database within approximately 0.25-mi (0.4-km) of the project. Nine of these sites are at locations that do not have the potential to impact the project due to the distances from the project and hydrologic conditions. Regarding the other seven sites, hazardous materials files for the LUST addresses listed on the database were reviewed at the LBFD, Fire Prevention Bureau. Table 2.2.3-1 describes LUST sites identified in the database and results of the LBFD file review.

Table 2.2.3-1
Leaking Underground Storage Tanks within 0.25-Mile of the Project Site

Site Name and Address	Location	Discussion
Tidelands Oil Production Co. 696 South Pico Avenue Long Beach, CA	Approximately 300 ft (100 m) west of northern end of project	Database case type listed as "soil only" and status as "leak being confirmed." LBFD file review indicated that the case was erroneously identified as a UST site and is actually an AST site; no further UST action is required.
Tidelands Oil Production Co. 705 South Pico Avenue Long Beach, CA	Approximately 300 ft (100 m) west of northern end of project	Database case type listed as "soil only" and status as "signed off, with remediation complete or unnecessary." LBFD file review indicated that the case has low potential for project impact.
Connolly-Pacific Co. 1925 West Pier D Street Long Beach, CA	Approximately 200 ft (60 m) north of Ocean Boulevard, 600 ft (180 m) east of the Gerald Desmond Bridge	Database listed as diesel tank, groundwater impacted, and pollution characterization in 2000. The LBFD file indicates that two USTs were removed in 1998, and samples indicated that petroleum hydrocarbons were not detected in soil beneath the USTs and trace concentrations of methyl tributyl ethylene (MTBE) were detected in groundwater. The case has low potential to impact the project due to the low localized concentrations and distance from the project.
Power Systems Associates 1125 Pier E Street West Long Beach, CA	Approximately 600 ft (180 m) south of Ocean Boulevard near Pico Avenue	The database lists the case as "oil and grease, soil only from a UST, removed in 1993." There is no record of USTs in the LBFD file, and the site is indicated as vacant and out of business. There is low potential for project impact due to distance and soil-only status.
Hampton Tedder Electric 1120 Pier E Street West Long Beach, CA	Approximately 600 ft (180 m) south of Ocean Boulevard near Pico Avenue	The database lists the case as "soil only, pollution characterization in 1987, with no current information." There was no LBFD file available. There is low potential for project impact due to distance and soil-only status.
California United Terminals Mechanical Building C 1200 Pier D, Suite C Long Beach, CA	Adjacent to ROW south side, west of SR 710, one block east of Oak Street	The database indicates the case status as "signed off, remediation complete or unnecessary," and case closed in 1986. LBFD file review did not provide any additional information. The case has low potential for project impact due to the age and the closed status.
LBGS 2665 Seaside Boulevard Long Beach, CA	Central area of the power plant, north of Ocean Boulevard, west of Gerald Desmond Bridge	The database indicates the case status as "groundwater impacted by gasoline, and remediation plan developed in 2000." The LBFD file indicates that fuel hydrocarbons were detected in the groundwater during removal of a 1,000-gallon UST in 1999. The case has low potential to impact the project due to the below-sea-level elevation of the power plant and low groundwater elevation relative to the project.

Source: Diaz Yourman & Associates, 2008.

State Toxic Pits and Landfill Sites

The Solid Waste and Landfill (SWLF) database is a collection of known regulated and unregulated landfill, transfer, or incinerator facilities. The toxic pits database is a list of sites identified by SWRCB as pond cleanup sites.

No SWLF or toxic pits sites were identified within 0.25-mi (0.4-km) of the project.

ASTM Supplemental Lists

The environmental database report includes several proprietary databases and additional non-ASTM California databases that may contain sites that impact the project. These databases include California DTSC DEED Restrictions, Los Angeles County Site Mitigation, manufactured gas plants (MGPs), dry cleaners, historic auto stations, and voluntary cleanup program (VCP) sites.

One site, the LBGS, was reported on the DTSC DEED Restrictions database for land-use restrictions used to protect the public from unsafe exposures to hazardous substances and waste.

The existence and location of MGP or "Coal Gas" are provided by the environmental database report. One former MGP site was identified within the search radius of 0.25-mi (0.4-km), identified as "West Ocean and Seaside" located southeast of Ocean Boulevard and Harbor Scenic Drive. Based on an environmental report regarding this site, the MGP does not appear to have the potential to impact the project.

Site Reconnaissance

Visual Observation

A visual reconnaissance of the project site was conducted on November 5, 2007, and on March 14, 2008. The area beneath the elevated portion of Ocean Boulevard west of the bridge was a vacant paved area, a building materials storage area for Weyerhaeuser, and an oil well facility in a small area next to the west side of the Back Channel. Seaside Boulevard is located adjacent to the south side of Ocean Boulevard, and a large, open, paved container terminal (Pier T) is south of Seaside Boulevard. The strip of land adjacent to the north side of Ocean Boulevard west of the bridge was approximately 20 ft (6 m) bgs of the area directly beneath Ocean Boulevard. The depressed area contains pipelines, oil wells, ASTs, and the LBGS power plant. A large, recently filled and graded, unpaved pad under construction for a proposed marine terminal is to the northwest of the western portion of the project area.

The land area adjacent to the eastern portion of the project between the bridge and Pico Avenue on the south side consists of a large paved shipping container storage facility with Pier D Avenue crossing beneath the bridge near the Back Channel. The International Seafarer's Center and a clinic are on the east side of Pico Avenue, south of Ocean Boulevard. A railroad, Harbor Scenic Drive, a narrow strip of land with oil wells, and the levee of the Los Angeles River channel are east of the buildings.

West Broadway Avenue, Pier D Avenue, and paved yards for industrial facilities are adjacent to the north side of Ocean Boulevard east of the bridge. Several active pumping oil wells were observed adjacent to the north side of Ocean Boulevard. A petroleum pumping station with an AST, the railroad tracks, Harbor Scenic Drive, and a narrow strip of land with oil wells and the levee of the Los Angeles River channel are east of the buildings.

UST and AST

A group of fuel USTs with approximately six pump dispenser islands is located at Port Petroleum Inc., east of Pico Avenue and north of Ocean Boulevard. One AST was observed within the project ROW identified as the Shell Beta Pump Station located northwest of the intersection of Harbor Scenic Drive and Ocean Boulevard. Two ASTs were observed within the Pacific Energy Resources oil field, adjacent to the Los Angeles River levee, immediately north of the Ocean Boulevard bridge over the river. At least six ASTs were observed within the Pacific Pipeline System tank farm located adjacent to the east side of the LBGS, north of Ocean Boulevard on the west side of the Back Channel.

Hazardous Materials

During the site reconnaissance, areas in close proximity to the project corridor that were visually observed to be storing aboveground hazardous materials consisted mainly of the industrial facilities north of Ocean Boulevard between the Gerald Desmond Bridge and Harbor Scenic Drive.

- Fire Boat Station #20
- Connolly Pacific
- Port Maintenance Yard
- Tidelands Oil Production Co. (Topko Yard)
- COLB Harbor Department
- THUMS Long Beach Co.
- Quick Stop Oil and Lube

Additionally, a truck maintenance service and the Shell Beta Pump Station, located on the east side of Pico Avenue, northwest of the intersection of Harbor Scenic Drive and Ocean Boulevard, had hazardous materials placards. The truck maintenance facility also had a storage shed containing ASTs for vehicle maintenance fluid products and waste oil.

Also, LBGS stores RCRA hazardous materials and has had LUSTs (Table 2.2.3-1). The entire LBGS facility is approximately 10 to 16 ft (3 to 5 m) below sea level and is continuously dewatered, causing inward flow of groundwater towards the facility; therefore, it is hydraulically downgradient and has low potential to impact the project.

There was no evidence of obvious environmental concerns associated with these hazardous materials storage areas observed from public access viewpoints.

PCB-Containing Equipment

Older electrical transformers may contain oil with PCBs. Some overhead pole-mounted transformers were observed. The pole-mounted transformers are owned and maintained by the local power company and were not considered an environmental concern for the project. There were pad-mounted transformers observed at the Shell Beta Pump Station, 170 Pico Avenue, northwest of the intersection of Harbor Scenic Drive and Ocean Boulevard and at a water pump station located adjacent to the east end of the Weyerhaeuser storage yard. Pad-mounted transformers were observed on the east side of Pier D Avenue immediately south of the street underpass beneath the bridge. No evidence of leaks was observed at these transformer locations. The LBGS power plant is located adjacent to the project north of Ocean Boulevard and west of the bridge. Power plants are commonly associated with potential PCB contamination from transformer oil. Soil and groundwater within the LBGS facility may contain PCBs.

Preliminary ACM and LBP Evaluation

The bridge and appurtenances may have ACM in the form of expansion joint compound. According to Port officials, the bridge structure is likely to have LBP coatings that would be disturbed by demolition.

Building and bridge structures within the project corridor may contain ACM and/or LBP. All buildings and bridge structures should be screened for ACM and LBP prior to demolition.

Existing yellow striping on pavement may contain lead or other heavy metals. Removal of this yellow pavement marking may produce debris containing heavy metals.

Prior Use History

Prior uses of the project area were investigated as part of the ISA. Oil wells (see Section 2.1.4 [Utilities and Service Systems]) and one area of REC related to previous soil and groundwater contamination (see following groundwater documentation) appear to have the potential to directly impact the project. Groundwater in the western end of the project beneath the Seaside Boulevard interchange has been impacted by VOCs, primarily benzene, from the former LBNSY installation restoration (IR) Site 9, south of the project area (see Exhibit 2.2.1-1 in Section 2.2.1 [Water Resources and Hydrology]). Based on the LBNSY environmental report for IR Site 9, groundwater is expected at approximately 17 ft (5 m) below MLLW. The lithologic description of water-bearing units beneath the area indicates a lens of the upper Gaspur aquifer (as described by DWR Bulletin 104) was encountered at an elevation of approximately 60 ft (18 m) below MLLW, and it extends to more than 120 ft (36 m) below MLLW. A sample from that water-bearing zone reportedly contained a benzene concentration of 1,400 μg/L at the time of the investigation (Bechtel, 1997b).

Generally, the project corridor and Terminal Island in its entirety have a history as an oil field since the 1930s. Since the early 1900s, dredged fill has been placed in the project area to raise the ground elevation. Due to the oil field history and gradual buildup of earth fill, it is likely that localized zones of soil impacted by former oil field activities may be encountered. As indicated by the state oil field map of Terminal Island, it is possible that abandoned oil wells could be encountered during construction for the project.

Other than the former LBNSY IR Site 9 in the southwestern area of the project, laboratory analysis of groundwater samples for hazardous constituents taken from various investigations throughout the project corridor have not detected substantial groundwater contamination; however, due to the history of the area as an oil field, industrial facilities, and the former LBNSY, shallow groundwater anywhere along the project may have localized concentrations of chemical constituents that would prohibit uncontrolled discharge of groundwater extracted for construction into the surrounding drainage features.

Surface soil adjacent to paved areas within the project corridor may contain aerially deposited lead (ADL) from vehicle exhaust. The bridge and appurtenances may have ACMs in the form of expansion joint compound.

LBP coating has been previously identified on the bridge to the extent that the entire bridge was scheduled for removal of LBP and repainting prior to acceptance of the bridge by Caltrans; however, the LBP replacement plans were discontinued when plans to replace the bridge were developed (POLB, 2002). Based on this information, LBP is likely to be present on the bridge.

Groundwater Documentation

Groundwater documentation was prepared to supplement the ISA and assess the extent of the benzene plume in the vicinity of the proposed project. This literature search compiled and analyzed relevant studies that had been performed in the vicinity of the project (see detailed groundwater discussion in Section 2.2.1) (Parsons-HNTB, 2006).

Several groundwater studies have been performed at the LBNSY IR Site 9 location. Bechtel performed studies in 1997, 1998, and 2001. Woodward-Clyde and HLA performed studies in 1998 and 2000, respectively. Based on the studies, the full vertical and lateral extent of the plume was never determined. Benzene was detected in several locations that could potentially be affected by the proposed project. These locations are shown on Exhibit 2.2.3-1.

ISA Conclusions and Recommendations

Extensive soil and groundwater investigations have been performed at the LBNSY IR Site 9, and they are documented in the reviewed reports (see Section 2.2.1). Although benzene has impacted the shallow and lower water-bearing intervals in the immediate vicinity of Site 9, located approximately 300 ft (91 m) south of West Seaside Boulevard and 600 ft (183 m) west of the intersection of Weaver Street and Corvette Street, there were no benzene detections in the zone between these intervals (identified as the “fine-grained, water-bearing interval”). After all of these investigations, the source of the benzene plume is still being disputed by the potential responsible parties.

In the immediate vicinity of the Gerald Desmond Bridge, benzene impacts to groundwater have been reported. It should be noted that these data were developed in 1997 and potentially do not represent current groundwater conditions in the immediate vicinity of the Gerald Desmond Bridge; however, it is likely that benzene is still a contaminant of concern.

If it is determined that workers may be exposed to contaminated groundwater or there is a potential for cross-contamination, then a risk assessment to assess potential health impacts to workers during bridge construction activities may be required. The risk assessment would need to consider how construction would impact the water-bearing intervals and if workers may potentially be exposed to impacted water. In addition, construction activities would need to include mitigation measures to ensure that cross-contamination between the water-bearing intervals does not occur.

If groundwater is encountered during excavation activities and dewatering would be necessary, then all dewatering activities would be in compliance with Los Angeles RWQCB regulatory requirements. Any dewatering activities, including those that may contact contaminated groundwater, shall be treated to remove pollutants to meet Los Angeles RWQCB discharge requirements, or hauled offsite and properly disposed of. Additionally, where applicable, bridge pile installation would be conducted by driving piles in lieu of pre-drilling to avoid or minimize the need for additional dewatering (see Section 2.2.1 [Water Resources and Hydrology] for more detail).

2.2.3.3 Environmental Consequences

Evaluation Criteria

The proposed project may result in adverse effects if it would:

- Create a significant hazard to the public or environment through the routine transport, storage, use, or disposal of hazardous materials
- Create a significant hazard to the public through reasonably foreseeable upset and accident considerations involving the release of hazardous materials into the environment
- Be located within 0.25-mi (0.4-km) of a site that emits hazardous emissions or handles hazardous or acutely hazardous materials, substances, or wastes
- Be located on a site that is known to contain hazardous materials and, as a result, could create a significant hazard to the public or the environment.

No Action Alternative

Under the No Action Alternative, the Gerald Desmond Bridge would continue to be used until it is replaced. The lack of shoulders and bridge capacity would result in congestion and increased response times to reach spills within the project limits. The No Action Alternative would result in increased future congestion resulting in greater spill response times. The No Action Alternative would have an adverse effect on releases of hazardous materials resulting from traffic-related accidents.

Under the No Action Alternative, there would be no disturbance of ACM or LBP on the bridge or potentially contaminated areas adjacent to the Gerald Desmond Bridge; therefore, the No Action Alternative would have no effect on existing hazardous waste/materials within the project area.

Construction and Demolition Impacts

North-side Alignment Alternative

The following impact assessment is based on the results of the ISA conducted for this project (Diaz Yourman & Associates, 2008) and the Groundwater Documentation (Parsons-HNTB, 2006). During final design, a Phase II Site Investigation would be performed to assess potential soil and groundwater contamination in areas proposed for construction. Construction areas where excavation exceeds 5 ft (1.5 m) bgs would have excavated soil screened for VOC vapors using a photoionization detector (PID) meter. At the discretion of the sampler, vapor readings above background may be (1) further screened for benzene vapors using dragger tubes and/or (2) soil samples may be obtained and submitted to a fix laboratory for VOC analysis. Additionally, groundwater samples would be obtained in areas where groundwater may be encountered and submitted for analysis. The site investigation must be completed prior to any acquisition of ROW and initiation of construction.

USTs. As discussed in Section 2.2.3.2, USTs are currently located within areas that would be affected by construction. Prior to construction, the tanks would be removed under permit from the LBFD. Subsequent to removal, soil and groundwater sampling would be completed in accordance with state, county, and city requirements for tank removal and closure. If contaminated soil or groundwater exists, then the site would be classified as a LUST and would require cleanup prior to closure.

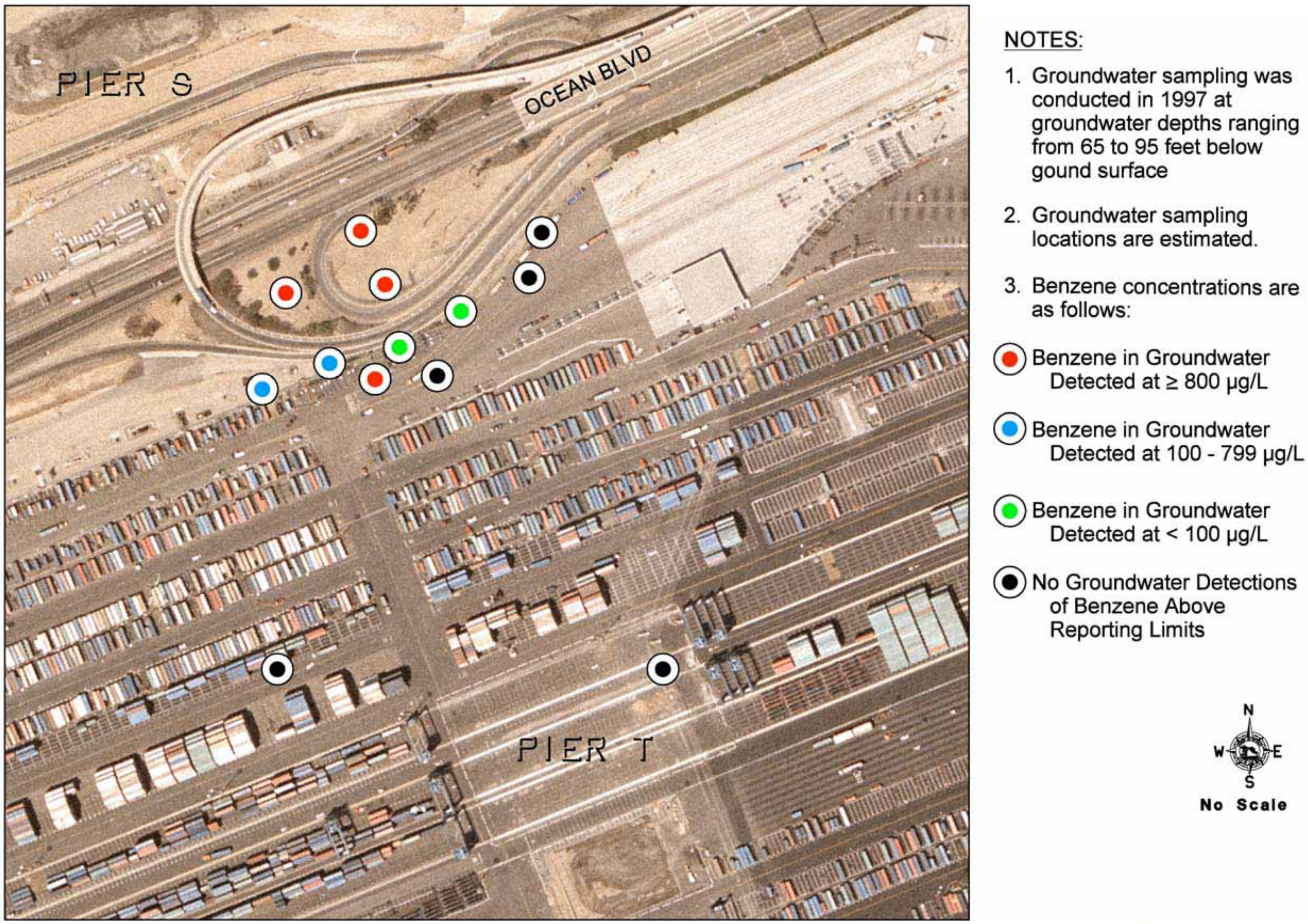
Additionally, USTs were permitted for three locations (Seafarer's Union, 1900 Water Street [also known as Pier D Street], and 1100 Third Street), but no final records were found indicating a "clean" site. It is likely these former USTs have been removed; however, since there are no records of "clean" removal, follow-up Phase II soil testing at the suspected UST locations to check for tanks/contamination would be completed. If tanks or contaminated soil and/or groundwater are present, then the Port would consult the LBFD, regarding reporting, removal, and closure requirements.

If unknown USTs are discovered during construction, then work in this location would be stopped and the POLB would consult with the LBFD regarding appropriate reporting and closure requirements.

Groundwater Contamination at LBNSY IR Site 9. According to the ISA, groundwater beneath the Seaside Boulevard interchange has been impacted by benzene and possibly other VOCs as a result of the activities at the former LBNSY IR Site 9, located approximately 300 ft (91 m) south of West Seaside Boulevard and 600 ft (183 m) west of the intersection of Weaver Street and Corvette Street (see also Section 2.2.1 [Water Resources and Hydrology]). Contaminated groundwater could potentially be affected if deep excavation penetrates multiple water-bearing intervals and allows for cross-contamination between these intervals during construction. Contaminated groundwater could also potentially be affected if dewatering is required. Currently, excavation of the magnitude required to facilitate the cross contamination has not been identified. If dewatering is required, then appropriate dewatering measures will be used to prevent impacts on construction activities and to ensure that polluted runoff does not leave the site. Disposal of the excess water shall comply with the applicable NPDES permit and water quality standards. Potential project impacts associated with the contaminated groundwater are discussed in detail in Section 2.2.1 (Water Resources and Hydrology).

Oil Wells. Due to the oil field history and gradual buildup of earth fill, it is likely that localized zones of soil impacted by former oil field activities may be encountered at unpredictable depths when excavating. Prior to project construction, an oil well abandonment plan, as applicable, would be coordinated with DOGGR. All excavation of contaminated soils would be handled and disposed of in accordance with federal and state laws. The potential for contaminated soils and abandoned oil wells would not result in an adverse effect on human health or the environment during construction of the proposed project.

ADL. Surface soil adjacent to paved areas within the project corridor may contain ADL from vehicle exhaust. Areas within the proposed project corridor where soil may be disturbed during construction will be tested for ADL in accordance with a hazardous waste management plan that will be developed for this project based on the findings of the Phase II Site Investigation referenced above. Potential for ADL would not result in an adverse effect on human health or the environment.



Gerald Desmond Bridge Replacement Project
1997 Groundwater Sampling Event Boring Locations and Reported Benzene Concentrations in Groundwater

EXHIBIT 2.2.3-1

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ACM and LBP Coatings. The buildings and bridge and appurtenances may contain ACM and LBP coatings. ACM, if it exists, is likely to be nonfriable. During demolition, if ACM fibers are airborne, then bridge/building demolition could potentially adversely affect humans due to inhalation hazard; however, potential adverse effects of ACM during demolition would be minimized by completing ACM and LBP surveys and removal prior to demolition activities. Additionally, the contractor would comply with SCAQMD Rule 1403 notification and removal processes and RWQCB disposal requirements. Human heath effects would be less than adverse with screening, removal prior to demolition, and Rule 1403 and RWQCB disposal requirement compliance.

To prevent potential introduction of LBP into receiving waters, the contractor would take appropriate measures to eliminate LBP from reaching receiving waters. It is likely that paint from the bridge would be chemically removed at a suitable offsite location. If LBP removal is necessary during the bridge demolition process, then the contractor will comply with all applicable laws and regulations relative to this process. LBP removed from the bridge would be handled and disposed of in accordance with all applicable laws and regulation. Adverse effects are not anticipated.

<u>South-side Alignment Alternative</u>

Construction and demolition effects under the South-side Alignment Alternative would be the same as those described under the North-side Alignment Alternative.

<u>Rehabilitation Alternative</u>

During final design, a Phase II Site Investigation would be performed to assess potential soil and groundwater contamination in areas proposed for rehabilitation/retrofit activities. Construction areas where excavation exceeds 5 ft (1.5 m) bgs would have excavated soil screened for VOC vapors using a PID meter. At the discretion of the sampler, vapor readings above background may be (1) further screened for benzene vapors using dragger tubes and/or (2) soil samples may be obtained and submitted to a fix laboratory for VOC analysis. Additionally, groundwater samples would be obtained in areas where groundwater may be encountered and submitted for analysis. The site investigation must be completed prior to initiation of construction activities.

This alternative would require improvements to the bridge that have the potential to disturb ACM. The ACM in the bridge, if it exists, is likely to be nonfriable. During rehabilitation of the bridge, if ACM fibers are airborne, ACM fibers could potentially adversely affect humans due to inhalation hazard; however, potential adverse effects of ACM bridge rehabilitation activities would be minimized by requiring the contractor to comply with SCAQMD Rule 1403 notification and removal processes and RWQCB disposal requirements. Human heath effects would be less than adverse with Rule 1403 compliance and RWQCB disposal requirements.

Also, the Rehabilitation Alternative would require the removal of LBP and repainting of the steel structure. The contractor would be responsible to ensure that LBP removal is completed in accordance with all federal and state laws to prevent releases to the environment. The contractor would prepare a Lead Compliance Plan in accordance with CCR Title 8 Section 1532.1. Potential measures the contractor could use to avoid release to the environment include but are not limited to the following:

- Erect shrouds around working areas and suspending nets and tarps below the bridge to catch debris from abrasive removal of old paint, where wind conditions permit.
- Anchor tarps to barges below and enclose the bridge above to confine debris, where the bridge deck is not too far above water level.
- Use barges and booms to capture fugitive floating paint chips and custom-built enclosures to confine and capture the abrasives, old paint chips, and paint.
- Use vacuum or suction shrouds on blast heads to capture grit and old paint.

Operational Impacts

<u>North-side Alignment Alternative</u>

Once the new bridge is constructed and the old bridge is demolished, impacts to the environment or general public due to hazardous materials releases or spills associated with bridge operation could occur from traffic-related accidents involving hazardous material carriers. Responses to hazardous material releases would be provided by the City of Long Beach and City of Los Angeles Fire Departments. The impact to the environment and general public due to hazardous materials releases or spills is expected to be reduced under the North-side Alignment Alternative compared to the No Action Alternative and the Rehabilitation Alternative. This is due to the fact that the new bridge would provide more and wider traffic lanes and shoulders, thus enhancing safety to the commuters and truck drivers using this transportation route.

No adverse effects associated with hazardous materials/wastes would occur due to operation of the proposed project. Releases of hazardous materials resulting from traffic-related accidents during project operation are unavoidable and would occur under all alternatives. These releases would be cleaned up as part of the emergency/hazardous materials response to each vehicle crash.

<u>South-side Alignment Alternative</u>

Operational Effects under the South-side Alignment Alternative would be the same as those described under the North-side Alignment Alternative.

<u>Rehabilitation Alternative</u>

Subsequent to bridge rehabilitation, impacts to the environment or general public due to hazardous materials releases or spills associated with bridge operation could occur from traffic-related accidents involving hazardous material carriers. Responses to hazardous material releases would be provided by the City of Long Beach and City of Los Angeles Fire Departments. The impact to the environment and general public due to potential hazardous materials releases or spills would be similar to the No Action Alternative. The Rehabilitation Alternative would not include more or wider traffic lanes and shoulders; therefore, it would not enhance safety for commuters and truck drivers using this transportation route.

No adverse effects associated with hazardous materials/wastes would occur due to operation of the proposed project. Releases of hazardous materials resulting from traffic-related accidents during project operation are unavoidable and would occur under all alternatives. These releases would be cleaned up as part of the emergency/hazardous materials response to each vehicle crash.

2.2.3.4 Avoidance, Minimization and/or Mitigation Measures

Temporary Measures

HM-1 A Phase II Site Investigation shall be performed in construction areas where excavation will exceed 5 ft (1.5 m) bgs, where groundwater may be encountered and in areas where USTs were removed without closure. The results of the Phase II investigation would be incorporated into the Safety Plan to protect construction workers against known contamination in construction areas. A Hazardous Waste Management Plan based on the results of the Phase II investigation will also be incorporated into the Final Design to ensure proper disposal of contaminated materials and contaminated groundwater found in the construction areas.

HM-2 A risk assessment shall be performed prior to construction to determine how construction activities will impact the water-bearing levels and, as applicable, to determine health risks to construction workers.

HM-3 To minimize cross contamination of the water-bearing zones, the construction contractor shall employ construction techniques to minimize the need for dewatering.

HM-4 The Port shall conduct a survey to screen for ACM in all affected buildings and the bridge prior to the demolition activities. ACM will be removed prior to demolition to mitigate any ACM hazard.

HM-5 Prior to construction, the Port shall test areas within the proposed project corridor where soil may be disturbed for ADL. If ADL levels meet or exceed the action level set forth by the hazardous waste management plan for the project, then ADL-contaminated soils shall be removed in accordance with federal, state, and local regulations.

HM-6 A Safety Plan will be required to address any exposure to hazardous materials. The Safety Plan will include proper personal protective equipment (PPE) work requirements, soil and air space monitoring requirements, documentation and reporting requirements, and action levels.

HM-7 The contractor shall prepare a Lead Compliance Plan in accordance with CCR Title 8 Section 1532.1. The Lead Compliance Plan shall be approved by an Industrial Hygienist certified in Comprehensive Practice by the American Board of Industrial Hygiene

HM-8 If it is determined that the project would require the removal or disturbance of any existing yellow thermoplastic traffic lane striping in the project area, then Caltrans standard measures shall be implemented to ensure the proper removal, storage, and disposal of the material, as applicable.

Permanent Measures

No measures are required.

2.2.4 Public Health and Safety

This section addresses the potential for public exposure to unsafe situations associated with implementation of the proposed project and the potential for disruption to emergency response services provided by the police and fire departments.

2.2.4.1 Affected Environment

The primary police and fire services for the Port are provided by the City of Long Beach. The Long Beach Police Department provides police protection within the vicinity of the Port. Police services within the project vicinity are also supported by the POLB Harbor Patrol. The two closest police stations to the Port are the South Patrol Division, located at Broadway and Magnolia Avenue, and the West Patrol Station, at Santa Fe Avenue and PCH. The South Patrol Division is responsible for responding to calls for service.

The Harbor Patrol supplements City police protection and provides 24-hour service to Port property through radio-directed patrol cars. Emergency response time is approximately 3 to 5 minutes.

The LBFD provides fire protection within the City of Long Beach, including the Port. The Operations Bureau of the LBFD is responsible for 23 fire stations, which house 23 pumpers, 4 support trucks, 8 paramedic rescue vehicles, 1 foam apparatus, 3 airport fire-fighting and rescue vehicles, 2 harbor fireboats, and 1 technical rescue vehicle. The bureau is also responsible for the operations of the Marine (Lifeguard) Division, which maintains 9 lifeguard facilities with a staff of 26 lifeguards. The Port and adjacent areas are located within the District 1 service area. District 1 is geographically located in the southwest area of the city, encompassing the Port and the downtown. It is comprised of Fire Stations 1, 2, 3, 4, 6, 10, 15, 20, and 24. Daily staffing for the district includes 52 personnel, with the following apparatus assigned to its stations:

- One battalion chief command suburban
- Eight fire engines
- One support truck
- Four paramedic ambulances
- Two fire boats
- One technical rescue vehicle

Additionally, The Los Angeles Fire Department (LAFD) has a mutual aid agreement with the LBFD. LAFD Station No. 40 and a Fire Boat Station, located at 330 Ferry Street, are located on Terminal Island approximately 1.5 mi (2.4 km) from the Port. Station No. 111, located at 1411 South Seaside Avenue (Berth 256), also has one fireboat.

Emergency response within marine water is within the jurisdiction of USCG. Spill containment and cleanup, however, is generally the responsibility of the parties involved.

Other organizations that provide emergency assistance include United States Customs, Federal Bureau of Investigation (FBI), California Department of Fish and Game (CDFG) and Department of Homeland Security Transportation Security Administration (TSA).

2.2.4.2 Environmental Consequences

Evaluation Criteria

The proposed project may result in an adverse effect on public health and safety, if it would:

- Impair or interfere with implementation of an adopted emergency response plan or emergency evacuation plan
- Substantially diminish the level of fire and police services (i.e., reduction of acceptable response time)
- Create a significant hazard to the public through the generation of heavy machinery, vehicles, or equipment; or the creation of attractive nuisances, accessible excavations, or accessible open body of water

No Action Alternative

The main purpose of the project is to replace an aging transportation structure with a seismically resistant bridge that would function as a dependable transportation link for the region between the City of Long Beach and Terminal Island for its planned 100-year design life. Under the No Action Alternative, there would be no health and safety effects associated with construction, demolition, or rehabilitation activities. The physically deteriorated Gerald Desmond Bridge would continue to be used by commuters and to access Port facilities on Terminal Island. Spalling concrete on the Gerald Desmond Bridge resulted in the Port installing protective netting beneath the bridge deck to protect Port facilities (e.g., Fireboat Station No. 20) and workers below. When considering future transportation demand, insufficient roadway capacity would result in increased delay for commuters and Port users. When maintenance and protection measures are no longer feasible to ensure the safety of the traveling public, bridge closure may be required until seismic retrofit is completed or a replacement bridge could be constructed. Potential closure of the bridge would adversely affect regional traffic patterns, Port operations, and goods transport.

Construction and Demolition Impacts

North-side Alignment Alternative

Construction activities are anticipated to take place in logical sequence, including footing construction, column construction, tower construction, approach span erection, and main-span erection. These sequences are expected to overlap. The construction duration is estimated to be 48 months. During the period of construction, the existing Gerald Desmond Bridge would continue its normal use; therefore, there would be no major obstruction to emergency response routes during construction of the new bridge. Project construction would not likely be concurrent with construction of the Schuyler Heim Bridge replacement; therefore, all routes to Terminal Island would remain open during construction, and they would not adversely affect emergency vehicle access routes.

Safety of workers and the general public may potentially be adversely affected due to the use of heavy machinery and equipment throughout the construction phase. With implementation of Office of Safety and Health Administration (OSHA) regulations related to safety in the construction site and coordination with USCG, who has policing authority in the water, no adverse effects on worker or general public safety are anticipated.

Reconstruction of all ramps for the existing Terminal Island East interchange and the four existing ramp connections to Pico Avenue could result in some periodic ramp closures. This could potentially adversely affect emergency response times or interfere with the emergency response services. Potential effects on emergency response times would be minimized by submitting bridge construction, demolition, and ramp closure schedules to the Long Beach Police and Fire Departments, USCG, and Caltrans at least 2 weeks before closures would occur. Advance notification and planning with emergency service providers would provide adequate time for these agencies to plan for alternative routes in case of emergencies. No adverse effect on emergency response time or service is anticipated during construction (see Section 2.1.5 [Traffic and Circulation]).

Demolition of the Gerald Desmond Bridge would occur subsequent to completion of the new bridge. Demolition would generally be conducted in logical sequence, staged over a period of approximately 15 months. The demolition phase would include removal of approach span decks, approach span girders, concrete piers, and concrete footings. Conventional means of demolition would be used (e.g., saw-cut, breaking, and hauling away as rubble). Potentially adverse effects to the health and safety of nearby business operators, Port tenants, and commuters using the new bridge and Ocean Boulevard could result from on-road traffic hazards associated with movement of heavy equipment and vehicles. Road hazard impacts would be minimized with adherence to a TMP (see Section 2.1.5 [Traffic and Circulation]). The TMP would address traffic management and safety procedures for travel within the project area. With implementation of the TMP, effects of road hazards on the nearby business operators, Port tenants, and commuters would be less than adverse. Potential road hazards would not affect emergency response routes. All traffic would be routed to the new bridge and ramps during demolition activities. Construction equipment hauling demolition debris would utilize designated haul routes. Demolition materials would be recycled to the extent possible in accordance with Port standards and the City of Long Beach Construction and Demolition Recycling Program. All designated haul routes would be located outside of nearby communities. Local community traffic circulation would not be affected during demolition of the Gerald Desmond Bridge. Road hazards would not affect the health and safety of area residents.

In addition to the on-road traffic hazards, marine transportation hazards could potentially adversely affect ships navigating through the Back Channel during the bridge construction and demolition phases. Potential marine transportation effects on ships utilizing the Back Channel would be minimized by notifying all marine transportation and recreational boating companies of scheduled work over the Back Channel. With proper notification, no adverse effects resulting from potential marine transportation hazards are anticipated.

South-side Alignment Alternative

Although the location of this alternative would be different, the scope and schedule of the construction and demolition phases and the potential effect on public health and safety would be very similar to that of the North-side Alignment

Alternative. Construction and demolition impacts to public health and safety under the South-side Alignment Alternative would be the same as those described under the North-side Alignment Alternative.

Rehabilitation Alternative

As discussed in Chapter 1 (Project Description and Alternatives), the construction activities identified below are required to bring the Gerald Desmond Bridge up to current seismic standards and prevent ongoing bridge deterioration:

- Replacement of the main span bridge deck
- Replacement of all expansion joints
- Replacement of the sway bracings for the main span
- Painting of all steel members
- Seismic retrofit of foundations, columns, bent caps, abutments, and superstructure

The estimated construction time for this alternative is 40 months. With the exception of the bridge deck replacement, all activities would be completed from the bridge or from the ground adjacent to the bridge. Bridge deck replacement would likely be completed at night, one lane at a time. This would allow traffic to be maintained in all 5 lanes during peak operating hours. Bridge deck replacement would occur during 12-hour closures from 7:00 p.m. to 7:00 a.m. This alternative would have very little impact on bridge traffic and practically no impact on Port operations.

No substantial obstructions affecting emergency response routes during rehabilitation of the Gerald Desmond Bridge are anticipated.

Any potential effects on emergency response would be minimized by submitting bridge rehabilitation schedules to the Long Beach Police and Fire Departments, USCG, and Caltrans at least 2 weeks prior to construction. Advance notification and planning with emergency service providers would provide adequate time for these agencies to plan for alternate routes in case of emergencies. No adverse effect on emergency response time or service is anticipated during construction (see Section 2.1.5 [Traffic and Circulation]).

During bridge deck replacement activities, the lane closure would provide construction access for work from the bridge, as well as for replacement of the bridge deck. During these activities, construction equipment, as well as barriers to protect workers, would result in increased road hazards. The associated reduced capacity and heavy equipment could potentially adversely affect bridge users; however, with implementation of OSHA regulations related to safety in the construction site, coordination with USCG, and deck replacement activities occurring during off peak hours, no adverse effects on workers or general public safety are anticipated.

In addition to on-road traffic hazards, marine transportation hazards could potentially adversely affect ships utilizing the Back Channel during bridge rehabilitation activities. Potential marine transportation hazard effects on ships utilizing the Back Channel would be minimized by notifying all marine transportation and recreational boating companies of scheduled work over the Back Channel. With proper notification, no adverse marine hazard effects would occur.

Operational Impacts

North-side Alignment Alternative

Subsequent to completion of the new bridge, ground transportation between SR 710 and Ocean Boulevard would be via the new approach spans and bridge. Once the new bridge is in operation, traffic and worker safety would increase due to the wider and structurally sound bridge. The additional capacity would improve traffic circulation within the Port and between the City of Long Beach and Terminal Island. The roadway shoulders would improve traffic safety by providing additional capacity for breakdowns. Additionally, the wider bridge would improve emergency vehicle access, potentially contributing to reduced response times during major incidents on the roadway or at the industries on Terminal Island. Implementation of the proposed alternative would improve traffic and personal safety. No adverse effects on public health and safety resulting from operation of the North-side Alignment Alternative are anticipated.

Accident/Terrorist Vulnerability Assessment. An analysis of accident and terrorist vulnerability of the new bridge was recommended by the Gerald Desmond Bridge Technical Advisory Panel (TAP). The TAP further recommended that the above assessment be performed prior to beginning final design. The intent of this assessment is to address the potential vulnerability of the bridge and develop conceptual modifications to the bridge design as required. Detailed design of anti-terrorist modifications (e.g., changes to bridge components, armoring) is not included in this environmental assessment. This analysis would be performed as an integral component of the final design phase.

Following the vulnerability assessment, security and hardening measures would be incorporated into the final bridge design to reduce the potential for substantial structural damage during a terrorist attack. Measures may include restricting access to vulnerable elements by using fencing and gates; installing security systems, such as advanced-technology closed-circuit monitors; and strengthening critical bridge elements.

South-side Alignment Alternative

This alternative would result in the same beneficial operational effects on public health and safety. Permanent impacts to public health and safety under the South-side Alignment Alternative would be the same as those described under the North-side Alignment Alternative. Prior to construction, this alternative would also require an accident/terrorist vulnerability assessment.

Rehabilitation Alternative

The Rehabilitation Alternative would improve structure safety and stability by preventing collapse and associated loss of life during major seismic events for the next 30 years; however, it would not provide additional capacity for emergency vehicle access or for breakdowns. This alternative would also result in a continued reduction in the LOS associated with forecasted increased travel demand (see Section 2.1.5 [Traffic and Circulation]) and could result in increased response times during major incidents on the roadway or at the industries on Terminal Island. Additionally, the Rehabilitation Alternative would not eliminate the need for future transportation improvements to address the other deficiencies identified in the Purpose and Need (see Chapter 1). The bridge would still require replacement within the 30-year design life of the Rehabilitation Alternative.

2.2.4.3 Avoidance, Minimization, and/or Mitigation measures

Temporary Measures

North- and South-side Alignment Alternative

HS-1 An Accident and Terrorist Vulnerability assessment of the build alternative shall be completed and all recommendations incorporated into the project during final design. The assessment will analyze and considerer applicable protection measures for the construction and the operational phases of the proposed project.

HS-2 The Port shall submit all bridge work schedules to the Long Beach Police and Fire Departments, USCG, and Caltrans at least 2 weeks prior to initiation of work to provide adequate time for the agencies to plan for alternate routes in case of emergencies.

HS-3 Prior to initiation of construction activities, the Port shall notify all businesses, tenants, and utility companies (i.e., SCE, gas, water, oil, and telecommunications) within the project area of the proposed work schedules and associated roadway and ramp closures.

HS-4 The Port shall notify all marine transportation and recreational boating companies 2 weeks prior to initiation of planned work activities potentially affecting normal operations within the Back Channel.

HS-5 The Port shall regularly notify USCG and all Port tenants of scheduled work over the Back Channel during construction and demolition of the project.

HS-6 The contractor shall prepare an emergency response and health and safety plan in accordance with all applicable federal, state, and OSHA standards. The plan should address potential emergency situations and assure the safety and health of workers by setting and enforcing standards to reduce occupational injuries and accidents. The Port will review and approve the plans prior to initiation of construction activities.

Rehabilitation Alternative

See measures HS-2 through HS-6 above.

Permanent Measures

No measures are required.

2.2.5 Air Quality

The information and analysis within this section is taken from the Gerald Desmond Bridge Air Quality Technical Study (Parsons, 2009d).

2.2.5.1 Regulatory Setting

Many statutes, regulations, plans, and policies have been adopted that address air quality issues. For purposes of summarization, both federal and non-federal regulatory measures are discussed in this section. The proposed project site and vicinity are subject to air quality regulations developed and implemented at the federal, state, and local levels. Adherence to these measures has produced substantial progress in improving air quality in South Coast Air Basin (SCAB or Basin) over the past 30 years. Relevant plans, policies, and regulations applicable to the proposed project are discussed below

Federal Regulation/Standards

The Federal Clean Air Act. The CAA was passed in 1970 and last amended in 1990. It forms the basis for the national air pollution control effort. Basic elements of the CAA include national ambient air quality standards (NAAQS) for criteria air pollutants, hazardous air pollutants (HAPs) emission standards, state attainment plans, motor vehicle emissions standards, stationary source emission standards and permits, acid rain control measures, stratospheric ozone (O_3) protection, and enforcement provisions.

The NAAQS have two tiers: primary standards to protect public health and secondary standards to prevent environmental degradation (e.g., damage to vegetation and property, and visibility impairment). The CAA mandates that the state submit and implement a State Implementation Plan (SIP) for areas not meeting the NAAQS. These plans must include pollution control measures that demonstrate how the standards will be met.

The 1990 Amendments to the CAA identify specific emission reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and incorporation of additional sanctions for failure to attain or meet interim milestones. The sections of the CAA that are most applicable to the project include Title I (Nonattainment Provisions) and Title II (Mobile Source Provisions).

Title I of the CAA identifies attainment, nonattainment, and unclassifiable areas with regard to the criteria pollutants, and it sets deadlines for all areas to reach attainment for the following criteria pollutants: O_3, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulates less than ten microns in diameter (PM_{10}), carbon monoxide (CO), and Pb. The NAAQS were amended in July 1997 to include the 8-hour O_3 standard and an NAAQS for fine particulates less than 2.5 microns in diameter ($PM_{2.5}$). Table 2.2.5-1 presents the standards that are currently in effect for all criteria pollutants. Table 2.2.5-2 includes the potential health effects resulting from exposure to these pollutants.

Title II of the CAA contains a number of provisions with regard to mobile sources, including motor vehicle emission standards (e.g., new tailpipe emissions standards for cars and trucks, and nitrogen oxide [NO_X] standards for heavy-duty vehicles), fuel standards (e.g., requirements for reformulated gasoline), and a program for cleaner fleet vehicles.

EPA amended the NAAQS in 1997 to include an 8-hour standard for O_3 (0.08 parts per million [ppm]) and to adopt new NAAQS for $PM_{2.5}$. EPA reviews the most up-to-date scientific information and the standard for each pollutant every 5 years and obtains advice from the Clean Air Scientific Advisory Committee on each review. Based on these reviews, EPA considers revision to the NAAQS accordingly. The NAAQS for particulate matters were amended by EPA in September 2006 to strengthen the 24-hour $PM_{2.5}$ standard from 65 micrograms per cubic meter (µg/m^3) to 35 µg/m^3 and revoke the annual PM_{10} NAAQS due to a lack of evidence linking health problems to long-term exposure to coarse particulate pollution. The area designation for the new $PM_{2.5}$ standard became effective in October 2009. Furthermore, based on new scientific studies and several health risk assessment results, EPA revised the lead NAAQS to provide increased protection for children and other at-risk populations against adverse health effects, most notably including neurological effects in children. The revised standard level is 0.15 µg/m^3 over rolling 3-month periods. The final rule was signed on October 15, 2008. The area designation/classification based on the new standard will become effective within 2 years (i.e., 2010), and attainment demonstration SIPs will be due by 2013. Additionally, on March 12, 2008, EPA strengthened the 8-hour O_3 NAAQS based on new scientific evidence about the effects of ground-level O_3 on public health and the environment. The new standard (primary and secondary) is 0.075 ppm. Nonattainment

Table 2.2.5-1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [a,c] Concentration	National Standards [b,c]	
			Primary	Secondary
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	—	—
	8 Hour	0.07 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3) [d]	—
Respirable Particulate Matter (PM_{10})	24 Hour	50 µg/m^3	150 µg/m^3	Same as Primary
	Annual Average (AAM)	20 µg/m^3	— [e]	
Fine Particulate Matter ($PM_{2.5}$)	24 Hour	No Separate State Standard	35 µg/m^3 [f]	Same as Primary
	Annual Average (AAM)	12 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	—
	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	
Nitrogen Dioxide (NO_2)	Annual Average (AAM)	0.030 ppm (56 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as Primary
	1 Hour	0.18 ppm (338 µg/m^3)	—	
Sulfur Dioxide (SO_2)	Annual Average (AAM)	—	0.030 ppm (80 µg/m^3)	—
	24 Hour	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)	—
	3 Hour	—	—	0.5 ppm (1,300 µg/m^3)
	1 Hour	0.25 ppm (655 µg/m^3)	—	—
Lead (Pb)[g]	30-Day Average	1.5 µg/m^3		—
	Rolling 3-Month [h]	—	0.15 µg/m^3	Same as Primary
Visibility Reducing Particles	8 Hour	In sufficient amount to produce extinction coefficient of 0.23 per kilometer due to particles when relative humidity is less than 70%	No Federal Standards	
Sulfates	24 Hour	25 µg/m^3		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)		
Vinyl Chloride[g]	24 Hour	0.01 ppm (26 µg/m^3)		

[a] California standards for O_3, CO (except Lake Tahoe), SO_2 (1- and 24-hour), NO_2, suspended particulate matter—PM_{10}, $PM_{2.5}$, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the CCR.

[b] National standards (other than O_3, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above150 µg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

[c] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to these reference conditions; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] The new standard of 0.075 ppm (previously 0.08 ppm) was adopted on March 12, 2008, and became effective in June.

[e] The annual standard of 50 µg/m^3 was revoked by EPA in December 2006 due to lack of evidence linking health problems to long-term exposure to coarse particulate pollution.

[f] Based on 2004-2006 monitored data, EPA tightened the 24-hour standard of $PM_{2.5}$ from the previous level of 65µg/m^3. The updated area designation became effective in October 2009.

[g] The California Air Resources Board (CARB) has identified Pb and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[h] Final rule for the new federal standard was signed on October 15, 2008.

AAM – Annual Arithmetic Mean; mg/m^3 – milligrams per cubic meter; µg/m^3 – micrograms per cubic meter; ppm – parts per million

Source: California Air Resources Board, 2008a.

Table 2.2.5-2
Health Effects Summary for Air Pollutants

Pollutant	Sources	Primary Effects
Ozone (O_3)	Atmospheric reaction of organic gases with nitrogen oxides in the presence of sunlight.	Aggravation of respiratory diseases; irritation of eyes; impairment of pulmonary function; plant leaf injury.
Nitrogen Dioxide (NO_2)	Motor vehicle exhaust; high temperature; stationary combustion; atmospheric reactions.	Aggravation of respiratory illness; reduced visibility; reduced plant growth; formation of acid rain.
Carbon Monoxide (CO)	Incomplete combustion of fuels and other carbon-containing substances, such as motor vehicle exhaust; and natural events, such as decomposition of organic matter.	Reduced tolerance for exercise; impairment of mental function; impairment of fetal development; impairment of learning ability; death at high levels of exposure; aggravation of some cardiovascular diseases (angina).
Particulate Matter (PM_{10} and $PM_{2.5}$)	Fuel combustion in vehicles, equipment, and industrial sources; construction activities; industrial processes; residential, agricultural burning; atmospheric chemical reactions.	Reduced lung function; aggravation of the effects of gaseous pollutants; aggravation of respiratory and cardio-respiratory diseases; increased cough and chest discomfort; soiling; reduced visibility.
Sulfur Dioxide (SO_2)	Combustion of sulfur-containing fossil fuels; smelting of sulfur-bearing metal ores; industrial processes.	Aggravation of respiratory and cardiovascular diseases; reduced lung function; carcinogenesis; irritation of eyes; reduced visibility; plant injury; deterioration of materials (e.g., textiles, leather, finishes, coating).
Lead (Pb)	Contaminated soil.	Impairment of blood function and nerve construction; behavioral and hearing problems in children.

Source: EPA, 2006a.

designations are categorized by EPA into seven levels of severity: basic, marginal, moderate, serious, severe-15, severe-17, and extreme.

The South Coast Air Basin (SCAB or Basin) is currently classified as a nonattainment area for O_3 and fine particulates (PM_{10} and $PM_{2.5}$). Based on 1990 CAA Amendments (CAAAs), the SCAB nonattainment designations are as follows: nonattainment for $PM_{2.5}$, requiring attainment by 2014; and "severe-17" for O_3, requiring attainment with the 8-hour O_3 standard by 2021 (the former 1-hour O_3 standard was revoked by EPA on June 15, 2005; thus, it is no longer in effect for the state of California).

The SCAB was in serious nonattainment status for PM_{10} until 2006. The Basin met the PM_{10} standards at all stations except for western Riverside County, where the annual PM_{10} standard was not met as of 2006. The annual standard was then revoked by EPA in December 2006 due to a lack of evidence linking health problems to long-term exposure to coarse particulate pollution. The 24-hour PM_{10} standard is retained at its existing value. Currently, the Basin meets the 24-hour average federal standard. When exceedances do occur, they are usually associated with high wind natural events or exceptional events due to wildfires.

For CO, attainment demonstrations were previously submitted to EPA in 1992, 1994, and 1997 to bring the SCAB into attainment with the federal standard in 2000. In 2001, the CO standard was exceeded in the SCAB on 3 days, thus leaving the basin in nonattainment status. In January 2005, the California Air Resources Board (CARB) declared CO attainment for the SCAB based on air quality data collected during 2001 through 2003. The redesignation was approved by the State Office of Administrative Law and became effective on July 23, 2004. The 2005 CO Redesignation Request and Maintenance Plan for SCAB was reviewed and approved by EPA, and the federal CO attainment status for SCAB became effective on June 11, 2007.

All nonattainment areas are subject to a "transportation conformity" measure, requiring local transportation and air quality officials to coordinate their planning to ensure that transportation projects do not hinder an area's ability to reach its clean air goals. These requirements become effective 1-year after an area's nonattainment designation.

For a nonattainment area, the CAA provides voluntary reclassification of the area to a higher classification by submitting a request to EPA. For O_3, SCAQMD has requested (as part of its 2007 Air Quality Management Plan [AQMP] submittal to EPA), a reclassification of the Basin from "severe-17' to "extreme" nonattainment. This would extend the 8-hour O_3 attainment date to 2024 and allow attainment demonstration to rely on emission reductions from measures that anticipate the development of new technologies or improving of existing control technologies.

Furthermore, SCAQMD has proposed an extension for attainment demonstration of the federal new standard for 24-hour $PM_{2.5}$ by 2015 instead of 2014.

Transportation Conformity Rule. The CAA mandates that the state submit and implement an SIP for each criteria pollutant that violates the applicable NAAQS. These plans must include pollution control measures that demonstrate how the standards will be met. Conformity to the SIP is defined under the 1990 CAA amendments as conformity with the plan's purpose in eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of these standards. EPA has two types of SIP conformity guidelines: transportation conformity rules that apply to transportation plans and projects, and general conformity rules that apply to all other federal actions.

The Transportation Conformity Rule, as defined in 40 CFR Parts 51 and 93, was established by EPA and the United States Department of Transportation (DOT) on November 30, 1993, to implement the federal CAA conformity provisions. The CAAAs of 1990 require that transportation plans, programs, and projects that are funded by or approved under Title 23 U.S.C. or the Federal Transit Act conform to state or federal air quality plans for achieving NAAQS. The Southern California Association of Governments (SCAG) is the federally designated Metropolitan Planning Organization (MPO) responsible for transportation planning in the SCAB. The transportation conformity process establishes the major connection between transportation planning and emission reductions from transportation sources. In addition, the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 (revised in 1998 as TEA-21) linked compliance with conformity requirements to continued FHWA and Federal Transit Administration (FTA) funding of transportation plans, programs, and projects. These requirements were not changed with enactment of SAFETEA-LU on August 10, 2005. Conformity with the CAA takes place on both regional and local levels.

In March 2006, the Transportation Conformity Rule was updated to include regulations for performing qualitative analysis of PM_{10} and $PM_{2.5}$ hot-spot impacts. Only projects that are considered "Projects of Air Quality Concern" (POAQC) are required to perform an analysis. POAQCs are defined, generally, as: (1) new or expanded highway projects that have a significant number of or significant increase in diesel vehicles, (2) projects affecting intersections that are LOS D, E, or F with a significant number of diesel vehicles, (3) new or expanded bus and rail terminals and transfer points with a significant number of diesel vehicles congregating in a single location, and (4) projects in or affecting locations, areas, or categories of sites that are identified in the PM_{10} or $PM_{2.5}$ applicable implementation plan as sites of possible violation.

Regional Conformity Determination

In determining whether a project conforms with an approved air quality plan, agencies must use current emission estimates based on the most recent population, employment, travel, and congestion estimates determined by an area's MPO. The MPOs are required to develop and maintain long-term and short-term plans and programs such as 20-year RTPs and 4-year RTIPs. These plans set out transportation policies and programs for the region. A conforming RTIP/TIP model outcome projects that the regulated pollutants will be reduced to acceptable levels within time frames that meet the NAAQS.

SCAG, as the MPO for the project region, is responsible for developing the RTP and RTIP for the region, including Los Angeles, Orange, San Bernardino, Riverside, Imperial, and Ventura counties. The RTP provides a long-term vision of regional transportation goals, policies, objectives, and strategies; assesses current and projected demand for travel and goods movement; and identifies necessary actions to meet the region's mobility and accessibility needs. The Final 2008 RTP was adopted by SCAG on May 8, 2008; and it was approved by FHWA and FTA on June 5, 2008. The 2008 RTP presents the transportation vision for the region through the year 2035.

The 2008 RTIP was developed in accordance with state and federal requirements. Under state law, county transportation commissions have the responsibility of proposing county projects, using policies, programs, and projects of the current RTP as a guide, from among submittals by cities and local agencies. The local priority lists of projects were forwarded to SCAG for review. From these lists, SCAG developed the 2008 RTIP based on consistency with the current RTP, inter-county connectivity, financial constraints, and conformity requirements. The 2008 RTIP is SCAG's compilation of state, federal, and local funded transportation projects and includes a listing of all transportation projects proposed over a 6-year period, Fiscal Years (FY) 2008/09 – 2013/14. The 2008 RTIP was adopted by SCAG on July 17, 2008, and it was approved by FHWA and FTA on November 17, 2008.

To be in conformance, a project must be included in the list of projects of the federally approved transportation plans and programs.

<u>Project-Level Conformity</u>

A project-level conformity determination is required for projects in CO, PM_{10}, and $PM_{2.5}$ nonattainment and maintenance areas. As discussed previously, a region is a nonattainment area if one or more monitoring stations in the region fail to attain the relevant NAAQS. Areas that were previously designated as nonattainment, but have recently met the NAAQS, are called maintenance areas. In general, projects must not cause the CO standard to be violated, and in nonattainment areas, the project must not cause any increase in the number and severity of violations.

Furthermore, based on the 2006 update of the Transportation Conformity Rule, specifically section 40 CFR 93.105 (c)(1)(i), an interagency consultation for project-level conformity of the proposed project is required. Pursuant to this requirement, a qualitative PM hot-spot analysis was performed and submitted to SCAG for conformity determination.

EPA Rule on Control of Mobile Source Air Toxics. Controlling air toxic emissions became a national priority with the passage of the CAAA, whereby Congress mandated that EPA regulate 188 air toxics, also known as HAPs. Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined in the CAA as HAPs. MSATs are compounds emitted from roadway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Airborne toxic metals can also result from engine wear or from impurities in oil or gasoline (see document No. EPA420-R-00-023, December 2000). EPA has assessed the expansive list of HAPs in their latest rule on the *Control of Hazardous Air Pollutants from Mobile Sources* (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their *Integrated Risk Information System* (IRIS) (www.epa.gov/ncea/iris/index.html). In addition, EPA identified 6 compounds with significant contributions from mobile sources (FHWA, 2006) that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). The list of priority MSATs was revised in the 2009 Update Memorandum (FHWA, 2009), which added one more compound to the previous list. The priority MSATs are acrolein, benzene, 1,3-butadiene, diesel particulate matter (DPM) plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these priority MSATs, the list is subject to change and may be adjusted in consideration of future EPA rules. Of these pollutants, DPM, 1,3-Butadiene, and benzene account for approximately 89 percent of the total toxic air pollutants for potential excess cancer risk. DPM accounts for 71.2 percent of the total toxic air pollutants for potential excess cancer risk (FHWA, 2009; FHWA, 2006a; CARB, 2000).

FHWA released interim guidance on February 3, 2006, determining when and how to address MSAT impacts in the NEPA process for transportation projects. The guidance document was updated on September 30, 2009 (FHWA, 2009). FHWA has identified three levels of analysis:

1) No analysis for exempt projects or projects with no potential for meaningful MSAT effects;
2) Qualitative analysis for projects with low potential MSAT effects; and
3) Quantitative analysis for projects with higher potential MSAT effects.

Under Category 1, three types of projects are included: (a) projects qualifying as a categorical exclusion under 23 CFR 771.117(c); (b) projects exempt under the CAA conformity rule under 40 CFR 93.126; and (c) other projects with no meaningful impacts on traffic volumes or vehicle mix.

The types of projects included in Category 2 are those that serve to improve operations of highway, transit, or freight movement without adding substantial new capacity or without creating a facility that is likely to meaningfully increase emissions. This category covers a broad range of projects. Any projects not meeting the threshold criteria for higher potential effects set forth in Category 3 below and not meeting the criteria in Category 1 should be included in this category. Examples of these types of projects are minor widening projects and new interchanges, such as those that replace a signalized intersection on a surface street or where design year traffic is not projected to meet the "140,000 to 150,000 annual average daily traffic (AADT)" criterion.

Category 3 includes projects that have the potential for meaningful differences among project alternatives. Only a limited number of projects meet this two-pronged test. To fall into this category, projects must.

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of DPM in a single location; or
- Create new or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000, or greater, by the design year; and
- Projects proposed to be located in proximity to populated areas or in rural areas in proximity to concentrations of vulnerable populations (i.e., schools, nursing homes, hospitals).

EPA Emission Standards for Off-Road and On-Road Diesel Engines. EPA has established a series of increasingly strict standards to reduce emissions from new off-road diesel engines, culminating in the Tier 4 Final Rule of June 2004. Tier 1 standards were phased in from 1996 to 2000 (manufacture year), depending on the engine horsepower category. Tier 2 standards were phased in from 2001 to 2006. Tier 3 standards are being phased in from 2006 to 2008. Tier 4 standards, which likely will require supplemental emission control equipment to attain them, will be phased in from 2008 to 2015 (69 FR 38957-39273; June 29, 2004). These standards apply to construction equipment for the proposed project.

EPA has also established a series of increasingly strict standards to reduce emissions from new on-road heavy-duty diesel engines starting in 1988. The final and cleanest standards were established with the *2007 Heavy-Duty Highway Rule* (EPA, 2007b). These emission standards, which were promulgated on December 21, 2000, require a 0.01 gram per horsepower-hour (g/hp-hr) for the new heavy-duty vehicles beginning with model year 2007. In addition, the NO_X and non-methane hydrocarbons (NMHC) standards of 0.20 g/hp-hr and 0.14 g/hp-hr, respectively, will be phased in between 2007 and 2010, on a percent-of-sales basis: 50 percent from 2007 to 2009 and 100 percent in 2010 (gasoline engines are subject to these standards based on a phase-in requiring 50 percent compliance in 2008 and 100 percent compliance in 2009). These standards result in substantial reduction in emissions of VOCs, and approximately 90 percent reduction in DPM and NO_X emissions for new heavy-duty trucks. Furthermore, with these rules, sulfur emissions from heavy-duty highway vehicles for the 2007 model year and newer will be reduced by more than 90 percent. The estimated future diesel truck emissions that are reported in the estimation of project emissions have factored in these regulations because they are incorporated in the CARB emissions model EMFAC2007, which was released in November 2006.

Climate Change. Climate change is analyzed in Chapter 3. Neither EPA nor FHWA has promulgated explicit guidance or methodology to conduct project-level GHG analysis. As stated on FHWA's climate change Web site[7], climate change considerations should be integrated throughout the transportation decision-making process – from planning through project development and delivery. Addressing climate change mitigation and adaptation up front in the planning process will facilitate decision making and improve efficiency at the program level, and it will inform the analysis and stewardship needs of project-level decision making. Climate change considerations can easily be integrated into many planning factors, such as supporting economic vitality and global efficiency, increasing safety and mobility, enhancing the environment, promoting energy conservation, and improving the quality of life.

Because there have been more requirements set forth in California legislation and executive orders regarding climate change, the issue is addressed

[7] http://www.fhwa.dot.gov/hep/climate/index.htm

in Chapter 3 of this environmental document and may be used to inform the NEPA decision. The four strategies set forth by FHWA to lessen climate change impacts do correlate with efforts that the State has undertaken and is undertaking to deal with transportation and climate change; the strategies include improved transportation system efficiency, cleaner fuels, cleaner vehicles, and reduction in the growth of vehicle hours traveled.

State Regulation/Standards

California Clean Air Act. The State of California began to set California Ambient Air Quality Standards (CAAQS) in 1969 under the mandate of the Mulford-Carrell Act. The California Clean Air Act (CCAA) was enacted on September 30, 1988, and it became effective January 1, 1989. The CCAA requires all areas of the state to achieve and maintain the CAAQS by the earliest practicable date. Table 2.2.5-1 shows the CAAQS for criteria pollutants, as well as the other pollutants recognized by the state. As shown in this table, the CAAQS are generally more stringent than the NAAQS for most of the criteria air pollutants. In addition, the CAAQS include standards for other pollutants recognized by the state. These include sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. Moreover, on April 28, 2005, CARB approved a new 8-hour-average O_3 standard of 0.070 ppm to further protect California's most vulnerable population (i.e., children) from the adverse health effects associated with ground-level O_3. The standard went into effect in early 2006.

According to the CAAQS, the SCAB is classified as an extreme nonattainment area for O_3 and nonattainment area for PM_{10} and $PM_{2.5}$. The SCAB complies with the state standards for sulfates, hydrogen sulfide, and vinyl chloride, but it is unclassified for the California standard for visibility-reducing particles. Table 2.2.5-3 provides the Basin's attainment status with respect to federal and state standards.

Table 2.2.5-3
South Coast Air Basin Attainment Status

Pollutant	Attainment Status Basis	
	National Standard	California Standard
Ozone (O_3), 1-hour average	N/A [a]	Extreme
Ozone (O_3), 8-hour average	Severe-17 [b]	Nonattainment
Carbon Monoxide (CO)	Attainment/Maintenance [c]	Attainment [c]
Nitrogen Dioxide (NO_2)	Attainment/Maintenance	Attainment/Maintenance [d]
Sulfur Dioxide (SO_2)	Attainment	Attainment
PM_{10}	Serious	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
Lead (Pb)	Attainment [e]	Attainment
Sulfates (SO_4^{2-})	N/A	Attainment

N/A = not applicable
[a] The National 1-hour O_3 standard was revoked on June 15, 2005.
[b] A request for reclassification status to "extreme" nonattainment was submitted to EPA in September 2007.
[c] The SCAB was redesignated by EPA as attainment for CO effective June 11, 2007.
[d] State NO_2 standard was amended on February 22, 2007, to lower the 1-hour standard to 0.18 ppm and establish a new annual standard of 0.030 ppm. These changes become effective after regulatory changes are approved by the Office of Administrative Law. The attainment status provided in this table is based on the old standard.
[e] In August 2009, CARB submitted a recommendation for nonattainment status of the Los Angeles County portion of SCAB based on the new federal lead standard (0.15 μg/m^3 rolling 3-month concentration).

Source: EPA, 2007a; CARB, 2009a; SCAQMD, 2007.

California Diesel Fuel Regulations. This rule sets sulfur limitations for diesel fuel sold in California for use in on-road and off-road motor vehicles (CARB, 2004). Harbor-craft and intrastate locomotives were originally excluded from the rule but they were later included by a 2004 rule amendment (CARB, 2005). Under this rule diesel fuel used in motor vehicles, except harbor-craft and intrastate locomotives, has been limited to 500 ppm sulfur since 1993. The sulfur limit was reduced to 15 ppm beginning September 1, 2006. (A federal diesel rule similarly limited sulfur content nationwide for on-road vehicles to 15 ppm beginning October 15, 2006.) Diesel fuel used in harbor craft in the SCAB also was limited to 500 ppm of sulfur starting January 1, 2006, and 15 ppm of sulfur by September 1, 2006. Diesel fuel used in intrastate locomotives (i.e., switch locomotives) was limited to 15 ppm of sulfur starting January 1, 2007.

Heavy-Duty Diesel Truck Idling Regulation. This CARB rule became effective February 1, 2005, and it prohibits heavy-duty diesel trucks from idling for longer than 5 minutes at a time, unless they are queuing, and provided that the queue is located beyond 100 ft (30.5 m) from any homes or schools (CARB, 2006).

California Drayage Truck Rule. In December 2007, CARB approved a new regulation to reduce emissions from heavy-duty drayage trucks (i.e., trucks committed to container cargo transport) at ports and intermodal railyards. This regulation includes an accelerated phase-out of existing vehicles to trucks that meet 2007 emission standards by 2014 (CARB, 2009b). The regulation requires all drayage trucks that operate at ports and railyards to be registered in a “drayage truck registry” (DTR) by September 30, 2009. The rule sets two compliance deadlines:

- Phase 1: By January 1, 2010, all pre-1993 model year (MY) engines are to be retired and all drayage trucks with 1994-2003 MY engines would be required to be equipped with a CARB-approved Level 3 verified diesel emission control system (VDECS), such as a particulate filter.
- Phase 2: By January 1, 2014, all trucks would be required to further reduce emissions to meet the 2007 MY California or federal heavy-duty diesel-fueled on-road emission standards.

The regulation is expected to significantly reduce emissions of DPM and NO_X. In 2010, after full implementation of Phase 1, DPM emissions from drayage trucks would be reduced by 86 percent and NO_X emissions would be reduced by approximately 3 percent from 2007 levels. In 2014, after full implementation of Phase 2, NO_X emissions would be reduced by nearly 56 percent from 2007 levels. The regulation is expected to prevent approximately 1,200 premature deaths, with significant health cost savings of $8.7 billion through 2020.

California Climate Change Regulations. Climate change regulations and analysis are addressed in Chapter 3 of this EIR/EA.

Local Plans and Regulations

Regional Air Quality Plan. CARB coordinates and oversees state and federal air pollution control programs in California. CARB has divided the state into 15 air basins. Authority for air quality control within each basin has been given to local Air Pollution Control Districts (APCD) or Air Quality Management Districts (AQMD) to regulate stationary source emissions and develop local plans for achieving and maintaining attainment.

SCAQMD is the agency responsible for attaining state and federal clean air standards in the SCAB. SCAQMD works directly with SCAG, county transportation commissions, and local governments, and it cooperates actively with all state and federal government agencies. SCAQMD regulates stationary source emissions and has been given the authority to regulate mobile emissions as an indirect source. As such, it also has transportation-related programs aimed primarily at reducing the number of cars on the road and promoting the use of cleaner fuels and vehicles. In addition, SCAQMD is responsible for developing and adopting an AQMP that serves as the blueprint for all future rules necessary to bring the SCAB into compliance with federal and state clean air standards. CARB regulates motor vehicles and fuels.

SCAQMD is required to update its plans on a regular basis. Updates may be in the form of a new plan or an amendment. Plans range in scope from the regional AQMP to plans dealing with specific pollutants in specific geographic locales. Every 3 years, SCAQMD prepares an overall plan for air quality improvement. Each update of the plan includes revisions and amendments to the previous plan and has a 20-year horizon. The currently applicable Plan is the 2007 AQMP. It employs the most recent scientific findings, primarily in the form of updated emission inventories, ambient measurements, new meteorological episode data, and new modeling tools. The 2007 AQMP also incorporates a comprehensive strategy aimed at controlling pollution from all sources, including stationary sources, area sources, and on-road and off-road mobile sources.

The 2007 AQMP was adopted by the SCAQMD Governing Board on June 1, 2007. The 2007 AQMP Transportation Conformity Budgets were adopted by the Board on July 13, 2007, and they forwarded to CARB for its approval and subsequent submittal to EPA. Furthermore, on June 22, 2007, a state strategy was proposed by the AQMD Board that recommended more-aggressive actions to reduce emissions from mobile sources that contribute more than 80 percent of the particulate matter pollution in the region. On September 27, 2007, CARB adopted the revised State Strategy for the 2007 SIP and the 2007 AQMP as part of the SIP.

The Final 2007 AQMP builds upon improvements accomplished from previous plans, and it aims to incorporate all feasible control measures while balancing costs and socioeconomic impacts. The 2007 AQMP outlines the air pollution control measures needed to meet federal health-based standards for O_3 (8-hour standard) by 2024 and $PM_{2.5}$ by 2015. Because it will be more difficult to achieve the 8-hour O_3 standard compared to the 1-hour standard, the 2007 AQMP contains a substantial number of additional and improved emission reduction measures. The basic PM (PM_{10} and $PM_{2.5}$) control strategy contained in the 1997 and 2003 Plans, augmented by the additional $PM_{2.5}$ control measures included in this Plan revision (2007 AQMP), appears to be adequate to demonstrate attainment of the new federal $PM_{2.5}$ standard. The emissions reductions are expected to be achieved through implementation of new and advanced control technologies, as well as improvement of existing control techniques.

The 2007 AQMP includes 31 stationary and 30 mobile source control measures. These measures are derived from:

- SCAQMD Stationary and Mobile Source Control Measures;
- State Control Measures proposed by CARB;
- SCAQMD staff-proposed Policy Options to supplement CARB's Control Strategy; and
- Transportation Strategy and Control Measures provided by SCAG.

The AQMP control strategy for stationary and mobile source emissions is based on the following approaches:

- Energy efficiency and conservation;
- Equipment and facility modernization;
- Good management practices;
- Area source emission control programs;
- Market incentive/compliance flexibility; and
- Mobile source emission reduction programs.

AQMP control measures include further emission reductions from large VOC sources and in-use off-road vehicles and equipment, an Emission Fee Program for Port-related mobile sources, strengthening of high-occupancy vehicle (HOV) measures, introducing and enhancing transit and system management measures, establishing information-based transportation strategies, accelerating retirement of older high-emitting vehicles, improving smog checks, and modifying stationary source monitoring requirements.

The AQMP specifically listed control measures for Marine Vessels and Port Equipment. It indicated that through implementation of the cost-effective SCAQMD and CARB programs, the emissions have been reduced significantly. Currently, the California Maritime Air Quality Technical Working Group, which is comprised of CARB, EPA, SCAQMD, and the Ports, is exploring promising retrofit technologies to be used on marine vessels. The group has identified technologies that can reduce up to 90 percent of NO_X and PM emissions. For portside equipment, the new technologies that are being studied can have the potential to reduce VOC emissions by up to 40 percent and PM emissions up to 90 percent.

SCAQMD has published a handbook (*CEQA Air Quality Handbook, November 1993*) that provides local governments with guidance for analyzing and mitigating project-specific air quality impacts. This handbook provides standards, methodologies, and procedures for conducting air quality analyses in EIRs, and it was used extensively in the preparation of this analysis. In addition, SCAQMD has published a guidance document *(Localized Significance Threshold Methodology for CEQA Evaluations, June 2003b*) for evaluating localized effects from mass emissions during construction. This document was also used in the preparation of this analysis. The localized significance threshold (LST) methodology was provisionally adopted by the Governing Board in October 2003 and formally approved by SCAQMD's Mobile Source Committee in February 2005. SCAQMD currently recommends LSTs for PM_{10}, NO_2, and CO. LSTs represent the maximum level of pollutant emissions from a project that are not expected to cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard. The significance thresholds are developed based on: (1) the ambient concentrations of the pollutants for each source receptor area, and (2) the distance to the nearest sensitive receptor. For PM_{10}, LSTs were derived based on requirements in SCAQMD Rule 403 – *Fugitive Dust*.

On October 6, 2006, the SCAQMD Governing Board adopted the "*Final Methodology to Calculate Particulate Matter (PM) 2.5 and $PM_{2.5}$ Significance Threshold*". The document provides guidelines to estimate regional and localized $PM_{2.5}$ emissions and includes $PM_{2.5}$ LSTs for projects in SCAQMD jurisdiction.

SCAQMD adopts rules and regulations to implement portions of the AQMP. Several of these rules may apply to construction or operation of the project. The most pertinent SCAQMD rules to the proposed project are listed below.

- **Rule 402 – Nuisance**: A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.
- **SCAQMD Rule 403 – Fugitive Dust:** This rule prohibits emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area that remains visible beyond the emission source property line. During proposed project construction, best available control measures identified in the rule would be required to minimize fugitive dust emissions from proposed earth-moving and grading activities. These measures would include site pre-watering and re-watering as necessary to maintain sufficient soil moisture content. Additional requirements apply to construction projects on property with 50 or more acres of disturbed surface area, or for any earth-moving operation with a daily earth-moving or throughput volume of 5,000 cu yd or more three times during the most recent 365-day period. These requirements include submittal of a dust control plan, maintaining dust control records, and designating an SCAQMD-certified dust control supervisor.
- **Rule 431.2 – Sulfur Content of Liquid Fuels:** This rule is established to limit the sulfur content in diesel and other liquid fuels for the purpose of reducing the formation of sulfur oxides and particulates during combustion and to enable the use of add-on control devices for diesel-fueled internal combustion engines. The Rule applies to all refiners, importers, and other fuel suppliers such as distributors, marketers, and retailers, as well as users of diesel, low-sulfur diesel, and other liquid fuels for stationary source applications in the District. The Rule also affects diesel fuel supplied for mobile source applications. Low-sulfur diesel fuel (less than 15 ppm by weight sulfur) should also be utilized in all diesel-powered construction equipment.
- **Rule 1113 – Architectural Coatings:** Compliance with SCAQMD Rule 1113 on the use of architectural coatings and asphalt operations shall be implemented to reduce VOC emissions, as feasible. The rule limits the VOC content of architectural coatings and asphalt off-gas in the Basin so that these emissions do not exceed the allowable specified limits.
- **SCAQMD Rule 1403 – Asbestos Emissions from Demolition/Renovation Activities:** The purpose of this rule is to limit emissions of asbestos, which is a toxic air contaminant, from structural demolition/renovation activities. The rule requires people to notify SCAQMD of proposed demolition/renovation activities and to survey these structures for the presence of ACMs. The rule also includes notification requirements for any intent to disturb ACM; emission control measures; and ACM removal, handling, and disposal techniques. All proposed structural demolition activities associated with proposed project construction would need to comply with the requirements of Rule 1403.

POLB/POLA Vessel Speed Reduction Program (VSRP). The Ports began this voluntary program in May 2001 for ships that call at the Ports to reduce their speed to 12 knots (kts) or less within 20 nautical miles (nm) of the Point Fermin Lighthouse. A reduction in vessel speed in the offshore shipping lanes (up to 13 kts for the largest container ships) can substantially reduce emissions from the main propulsion engines of the ships. The Clean Air Action Plan (CAAP) adopted the VSRP as control measure OGV-1, and it expands the program out to 40 nm from the Point Fermin Lighthouse.

POLB Clean Trucks Program (CTP). The POLB approved the Ports-specific CTP on February 19, 2008. The CTP was developed in collaboration with POLA and became a part of the CAAP. The POLB CTP requires drayage truck owners to scrap and replace old-model polluting trucks (approximately 16,000 trucks) working at the ports, with the assistance of a Port-sponsored grant or loan subsidy. Under the POLB "concession" plan, truckers can lease to own a new truck at an affordable rate, for as little as $500 per month. They can choose to work as employees or owner-operators.

Beginning October 1, 2008, pre-1989 trucks were banned. Beginning January 1, 2010, 1993 and older trucks will be banned, and 1994-2003 trucks will need to be retrofitted or replaced. The program progressively bans all trucks that do not meet 2007 EPA emission standards by 2012. To finance the $2 billion truck replacement program, POLB started a fee plan on loaded containers ($35 per loaded TEU and smaller; $70 for larger containers) since October 1, 2008.

Port of Long Beach Green Port Policy.
In November 2004, the POLB Board of Harbor Commissioners (BHC) directed the Port to develop a policy that would provide guidance for decision making and to establish a framework for environmentally friendly Port operations. The POLB Green Port Policy (GPP) was based on the previous Healthy Harbor Program, with environmental enhancement goals including air quality policies that would reduce harmful air emissions from Port activities (Ports, 2006b). As a means to implement the GPP, the POLB, in conjunction with POLA, adopted a Clean Air Action Plan for the Ports.

San Pedro Bay Clean Air Action Plan. The Ports jointly prepared the *San Pedro Bay Ports CAAP* in cooperation with SCAQMD, CARB, and EPA. The CAAP was developed to define implementation strategies to meet shared air quality improvement goals for both Ports. The CAAP includes a comprehensive set of goals, implementation strategies, and initiatives to reduce emissions from trucks, locomotives, harbor craft, and cargo-handling equipment.

CAAP Goals include a set of commitments (i.e., Foundations) that are addressed to achieve improved air quality and reduced health risks, while at the same time facilitating growth in regional economic benefits generated by the Ports. Accompanying the Foundations are a set of standards that apply to San Pedro Bay as a whole, individual projects proposed within the two Ports, and specific emissions sources. The latter standards apply to heavy-duty trucks, ocean-going vessels, cargo-handling equipment, harbor craft, and railroad locomotives. Implementation strategies embodied in the CAAP include lease requirements, changes in tariff policies, CEQA mitigations, incentives, voluntary measures, credit trading, capital lease-backs, government-backed loan guarantees, third-party discount leasing/ purchasing, franchises, joint powers authority trucking entity, environmental mitigation fee, and a recognition program.

The Ports released the Draft CAAP on June 28, 2006, for public review, and the revised Final Plan was approved by both the Los Angeles and Long Beach Board of Harbor Commissioners on November 20, 2006. The CAAP focuses on reducing emissions with two main goals: (1) reduce Port-related air emissions in the interest of public health; and (2) accommodate growth in trade. The Plan includes near-term measures implemented largely through the CEQA/NEPA process, tariffs, and new leases at both Ports.

The Port has negotiated and signed environmentally friendly "green" leases with several terminal customers. These "green" leases require environmental compliance that is above requirements by federal and state law. As a landlord port, leases are the primary mechanism for the Port to implement its environmental initiatives, including the CAAP.

The Port measures progress toward the goals of its air quality program by: (1) development of periodic annual emission inventories of Port operations (years 2002 and 2005 to date); and (2) updates to the CAAP. These efforts allow the Port, the community, and regulators to assess the progress of air quality programs and determine the best use of resources to address air quality problems. In addition, the Port maintains air monitoring locations in the Port to provide the community with information on current air quality conditions.

San Pedro Bay Standards. The POLB and the POLA are in the process of establishing the San Pedro Bay Standards (SPBS), which they will use as tools for future air quality planning. The SPBS will help the ports and air agencies to better understand and evaluate the long-term cumulative effects of future ports projects in conjunction with implementation of CAAP measures and existing regulations.

There are two components to the SPBS: (1) the Health Risk Reduction Standard, which proposes to reduce health risks from Port-related DPM emissions in residential areas surrounding the Ports by 85 percent in year 2023 compared to 2005 levels; and (2) the Emission Reduction Standard, which proposes to achieve a "fair share" reduction of Ports-related air emissions. These components address the primary air quality goals of the Port to reduce health risks to local communities from Port operations and to assist the region in attaining the ambient air quality standards. Once the SPBS are adopted, the Port will commit to revising the CAAP to require implementation of additional emissions control measures for purposes of achieving these goals.

The SPBS includes methodologies that can be used to assess whether a project is consistent with the SPBS. Based on the current draft methodologies, a project would be consistent with the Health Risk and Emission Reduction Standards if:

- The project environmental analysis is consistent with assumptions regarding the projected growth of operations at the Ports and the effect of existing CAAP and regulatory measures that were used to develop the Standards;
- The project complies with all of the applicable laws and regulations;
- The project implements all applicable Project-Specific and Source Specific Standards in the then-existing version of the CAAP; and
- The project environmental analysis assesses potentially practicable new emission reduction technologies beyond those required under the then-existing version of the CAAP and imposes a requirement that the project use any such technologies found to be feasible, available, and effective at reducing emissions as needed to achieve the Standards.

Development of the SPBS is a complex process that includes input from several members of the SPBS Technical Working Group (TWG), which is comprised of representatives from CARB, SCAQMD, and EPA. The Ports recently completed the Draft SPBS, which is currently under review by members of the SPBS TWG. The Ports anticipate that agreement between the TWG and the Ports on the SPBS will be achieved shortly, and at that time the Standards would be available for public review. These standards and guidelines are mainly related to the proposed project construction. The project air quality utilized all applicable standards and methodologies and is consistent with the SBPS.

POLB Climate Change/Greenhouse Gas Strategic Plan. The Port's commitment to protecting the environment from the harmful effects of Port operations, as stated in the Green Port Policy, necessitates the development of programs and projects to reduce GHG emissions. In addition to CARB's actions to formalize GHG regulations for the goods movement sector, the Port has begun work in this area.

The Ports Climate Change Program is discussed further in Section 3.3 of this EIR/EA.

The analysis conducted for this EIR/EA assumes that the proposed project will comply with the CAAP. Project mitigation measures applied to reduce air emissions and public health impacts are consistent with, and in some cases exceed, the emission-reduction strategies of the CAAP.

2.2.5.2 Affected Environment

Regional Setting

The Port is located within the 6,745-sq-mi (17,469-sq-km) SCAB. The SCAB is defined as encompassing all of Orange County; Los Angeles County, with the exception of Antelope Valley; and the non-desert portions of Riverside and San Bernardino counties. It consists of a coastal plain with interconnecting broad valleys and low hills. Elevations range from sea level to more than 11,000 ft (3,353 m) above MSL. SCAQMD has jurisdiction over air quality issues within the SCAB.

The project site is located within a major ocean port, characterized by heavy industrial and transportation uses, including ocean-going vessels; heavy-duty on-road and off-road vehicles; and light-duty motor vehicles. There is little open space or recreational and residential land use in the project vicinity. The applicable general plans (City of Long Beach and Port) envision future intensification of cargo-handling activities within the Port.

The climate of the project region is categorized as Mediterranean, characterized by warm, dry summers, low precipitation, and mild winters. The average daily winter temperature is 56 degrees Fahrenheit (^{o}F) (13.3°C), and the average daily summer temperature is 75^{o}F (23.9^{o}C). More than two-thirds of the annual rainfall occurs from December through March, with approximately 90 percent occurring between December and April.

The mean annual precipitation in the Long Beach area over a 50-year period (1958-2007) was 11.96 in (304 mm). In nearly all months of the year, evaporation exceeds precipitation.

Topography is a major factor influencing wind direction over the project area. The predominant daily winds in the Long Beach area are onshore morning flows from the southwest at a mean speed of 7.3 mph (11.75 kilometers per hour [km/hr]). The afternoon and evening winds are generally northeasterly at speeds ranging from 0.2 to 4.7 mph (0.3 to 7.6 km/hr). There is little seasonal variability in this pattern. Occasionally during autumn and winter, “Santa Ana” conditions develop from a high-pressure zone to the east, bringing dry, high-velocity winds from the deserts over Cajon Pass to the coastal region. These winds, gusting to more than 80 mph (129 km/hr), can reduce relative humidity to less than 10 percent. Generally, the worst air quality in the coastal area occurs during Santa Ana winds, as they transport contaminated air from the east to the ocean.

The Palos Verdes Hills, located north of the project site, have a major influence on wind flow in the Port area. For example, during afternoon southwesterly sea breezes, the Palos Verdes Hills often block this flow and create a zone of lighter winds in the inner harbor area. During strong sea breezes, this flow can bend around the north side of the hills and end up as a northwest breeze in the inner harbor area. This topographic feature also deflects northeasterly land breezes that flow from the coastal plains to northerly direction through both San Pedro Bay Ports.

The SCAB experiences a persistent temperature inversion (i.e., increasing air temperature with increasing altitude) as a result of the Pacific high. This inversion limits the vertical mixing and dispersion of air contaminants, holding them relatively near the ground. As the sun warms the ground, the lower air layer is warmed and its temperature approaches that of the base of the inversion (upper) layer until the inversion layer finally breaks, which allows vertical mixing with the lower layer. This phenomenon is observed in the mid to late afternoon on hot summer days, when the smog appears to clear up suddenly. Winter inversions frequently break by mid morning.

The greatest air pollution impacts throughout the Basin occur from June through September. This condition is generally attributed to the large amount of pollutant emissions, light winds, and shallow vertical atmospheric mixing. This frequently reduces pollutant dispersion, thus causing elevated air pollution levels. Pollutant concentrations in the Basin vary with location, season, and time of day. O_3 concentrations, for example, tend to be lower along the coast, higher in the near inland valleys, and lower in the far inland areas of the Basin and adjacent desert.

Existing Ambient Air Quality

Criteria Pollutants. A network of air quality monitoring stations, located throughout the SCAB, characterize the air quality environment in the Basin by measuring and recording pollutant concentrations in the local ambient air. The Basin is divided into 38 source/receptor areas (SRAs), and the project is located in SRA number 4, South Coastal Los Angeles County. The nearest SCAQMD air monitoring station to the project site is the North Long Beach Monitoring Station (Station No. 072), which is located at 3648 Long Beach Boulevard, approximately 4 mi (6.4 km) northeast of the project site. All criteria pollutants are monitored at this station (i.e., O_3, CO, NO_2, Pb, SO_2, PM_{10}, and $PM_{2.5}$). Federal and state standards that have been established represent the maximum allowable atmospheric concentrations of these pollutants (see Table 2.2.5-1).

Ambient air quality data from the North Long Beach monitoring station for the past 4 years (2005 through 2008), are summarized in Table 2.2.5-4. The table includes maximum recorded pollutant levels and the number of days in each year that the pollutant level exceeded the national and state standards.

Table 2.2.5-4 also shows that exceedances of the California standards, as recorded at the North Long Beach station for O_3 (1-hour, California standard), PM_{10} (24-hour and annual), and $PM_{2.5}$ (24-hour and annual) on one or more occasions from 2005 through 2008. The national standards were exceeded only for $PM_{2.5}$ (24-hour and annual). No exceedances of either the state or national standards were recorded for SO_2, Pb, NO_2, or CO.

In 2006, the Ports initiated air monitoring studies to collect representative ambient pollutants and meteorological data within the Ports’ operational region of influence (ROI). The POLB air monitoring stations are located in two areas at the Port: one in the Inner Harbor area, near West Long Beach, and a second in the Outer Harbor area, near the breakwater at the end of Navy Mole Road. These monitoring stations were developed to expand upon and complement other regional air monitoring efforts. The data gathered at these

Table 2.2.5-4
Summary of Criteria Pollutants Data
(Measured at North Long Beach Monitoring Station)

Pollutant	Averaging Time	Standard	2005	2006	2007	2008
Ozone (O_3)	(1-Hour)	Maximum Concentration (ppm)	0.09	0.08	0.1	0.09
		Days > CAAQS (0.09 ppm)	0	0	**1**	0
	(8-Hour)	Maximum Concentration (ppm)	0.069	0.058	0.073	0.074
		Days > NAAQS (0.08 ppm)	0	0	0	0
		Days > CAAQS (0.07 ppm)[a]	0	0	**1**	**1**
Particulate Matter (PM_{10})	(24-Hour)	Maximum Concentration (μg/m^3)	66	78	75*	62
		Days > NAAQS (150 μg/m^3)	0	0	0	0
		Days > CAAQS (50 μg/m^3)	**24**	**30**	n/a	n/a
	(Annual)	National Annual Average (50 μg/m^3)[b]	30	31	34	29
		State Annual Average (20 μg/m^3)b	**30**	**31**	**31**	**31**
Particulate Matter ($PM_{2.5}$)	(24-Hour)	Maximum Concentration (μg/m^3)	54	59	**83**	39
		Days > NAAQS (35 μg/m^3)[c]	**12**	**5**	**14**	**2**
		3-year Avg 98th Percentile (μg/m^3)[d]	45	41	39	38
	(Annual)	Annual Arithmetic Mean (15 μg/m^3)	**15.9**	14.1	14.6	13.3
Carbon Monoxide (CO)	(1-Hour)	Maximum Concentration (ppm)	4.2	4.2	3.3	3.3
		Days > NAAQS (35 ppm)	0	0	0	0
		Days > CAAQS (20 ppm)	0	0	0	0
	(8-Hour)	Maximum Concentration (ppm)	3.5	3.4	2.6	2.5
		Days > NAAQS (9 ppm)	0	0	0	0
		Days > CAAQS (9.0 ppm)	0	0	0	0
Nitrogen Dioxide (NO_2)	(1-hour)	Maximum Concentration (ppm)	0.14	0.10	0.11	0.13
		Days > CAAQS (0.25 ppm)[e]	0	0	0	0
	(Annual)	Maximum Concentration (ppm)	0.024	0.022	0.020	0.021
		Days > NAAQS (0.053 ppm)	0	0	0	0
Sulfur Dioxide (SO_2)	(24-hour)	Maximum Concentration (ppm)	0.010	0.010	0.010	0.012
		Days > CAAQS (0.04 ppm)	0	0	0	0
		Days > NAAQS (0.14 ppm)	0	0	0	0
	(Annual)	Annual Arithmetic Mean (0.03 ppm)	0.002	0.001	0.003	0.002

Exceedances shown in **bold;** ppm – parts per million; μg/m^3 – micrograms per cubic meter; n/a – not available

* The data reported for 2007 represent the second high value. The first high value measured at the station (232 μg/m^3) is flagged as "exceptional event" and occurred on October 21, 2007, which coincides with southern California wildfires in 2007.

[a] The new California 8-hour-average O_3 standard was adopted by CARB on April 28, 2005; therefore, the exceedance statistics are not applicable before this date.

[b] State statistics are based on California-approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and national statistics may therefore be based on different samplers.

[c] Based on 2004-2006 monitored data, EPA tightened the 24-hour standard of $PM_{2.5}$ from the previous level of 65 μg/m^3. The updated area designation became effective in October 2009.

[d] Attainment condition for $PM_{2.5}$ is that the 3-year average of the 98th percentile of 24-hour concentrations at each monitor within an area must not exceed the standard (35 μg/m^3).

[e] NO_2 standard was amended on February 22, 2007, to lower the 1-hour standard to 0.18 ppm and establish a new annual standard of 0.030 ppm. These changes become effective after regulatory changes are approved by the Office of Administrative Law.

Source: CARB, 2009a; and EPA, 2009.

stations are available from September 2006 (POLB, 2008b). These data are considered in context with the North Long Beach monitoring station for comparison purposes and to ensure the use of representative ambient data. Table 2.2.5-5 presents the maximum pollutant concentrations measured at these stations between November 2006 and January 2008 (2007 data). At the time of preparation of this EIR/EA, the POLB meteorological monitoring program had not finalized a completed set of annual meteorological data. Of the four POLA monitoring stations, the annual data currently available from the POLA Wilmington Community site (located at the Saints Peter and Paul School) are the most representative of the project area conditions. These data were used as input for the dispersion modeling and health risk analysis in determining potential project impacts.

Toxic Air Contaminants: Toxic air contaminants (TACs) consist of a variety of compounds, including metals, minerals, hydrocarbon-based chemicals, and soot. There are hundreds of different types of air toxics, with varying degrees of toxicity. Sources of TACs include industrial processes, such as petroleum refining and chrome-plating operations; commercial operations, such as gasoline stations and dry cleaners; and motor vehicle exhaust. TACs are a concern in the SCAB because of the large number of mobile sources and industrial facilities throughout the basin. Toxicity of TACs is studied by the California Office of Environmental Health Hazard Assessment (OEHHA).

California regulates TACs through its Air Toxics Program, which is mandated in Chapter 3.5 – Toxic Air Contaminants of the Health and Safety Code (H&SC Section 39660 *et seq.*) and Part 6 – Air Toxics "Hot Spots" Information and Assessment (H&SC Section 44300 *et seq.*).

The regulatory approach used in controlling TAC levels relies on a quantitative risk assessment process rather than on ambient air conditions to determine allowable emissions from the source. In addition, for carcinogenic air pollutants, there is no safe concentration in the atmosphere. Local concentrations can pose a health risk and are termed "toxic hot spots".

Table 2.2.5-5
Maximum Pollutant Concentrations
Measured at POLB Air Monitoring Stations during 2007

Pollutant (Concentration unit)	Averaging Period	National Standard	State Standard	POLB Monitoring Station	
				Inner Harbor	Outer Harbor
Ozone (ppm)	1-hour	—[a]	0.09	0.09	**0.10**
	8-hour	0.08	0.07	0.07	0.06
PM_{10} ($\mu g/m^3$)	24-hour	150	50	**200**[c]	**211**[c]
	Annual	—	20	**58.6**[c]	**45.5**[c]
$PM_{2.5}$ ($\mu g/m^3$)	24-hour	35	—	**51**[c]	**47**[c]
	Annual	15	12	**26.4**[c]	**22.5**[c]
CO (ppm)	1-hour	35[b]	20	6.1	4.9
	8-hour	9.0	9.0	5.0	4.2
NO_2 (ppm)	1-hour	—	0.18	0.15	0.14
	Annual	0.053	0.030	0.052	0.042
SO_2 (ppm)	1-hour	—	0.25	**0.31**	0.20
	24-hour	0.14	0.04	0.04	0.03
	Annual	0.03	—	0.008	0.006

Exceedances shown in **bold**.
[a] The National 1-hour ozone standard was revoked on June 15, 2005.
[b] Based on 2004-2006 monitored data, EPA tightened the 24-hour standard of $PM_{2.5}$ from the previous level of 65$\mu g/m^3$. The updated area designation will became effective in October 2009.
[c] Excludes elevated values recorded during wildfires
Source: POLB, 2008b.

SCAQMD conducted the most comprehensive study on air toxics in the SCAB called *Multiple Air Toxics Exposure Study* (MATES-II [March 2000] and MATES III [January 2008]). The monitoring program measured more than 30 air toxics, including gaseous and particulate TACs. The monitoring program was accompanied by a computer modeling study in which SCAQMD estimated the risk of cancer from breathing toxic air pollution throughout the region, based on emissions and weather data. MATES-II found that the average cancer risk in the region from carcinogenic air pollutants ranged from approximately 1,100 in a million to 1,750 in a million, with an average regional risk of approximately 1,400 in a million. The higher risk levels were found in the urban core areas in south central Los Angeles County, in Wilmington adjacent to the Port, and near freeways.

Overall, the study showed that airborne DPM contributed approximately 70 percent of the total cancer risk. Mobile sources accounted for approximately 90 percent of that risk, and industries and other stationary sources accounted for the remaining 10 percent.

In January 2008, a draft study report of MATES III became available for a 90-day public review and comment period, which ended April 4, 2008. The study is a follow-up to MATES II and focuses on the carcinogenic risk from exposure to air toxics. The Draft MATES III Report was revised after the public review period; the revised document, the Final MATES III Report, was released in September 2008. The results indicate that:

- Across the Basin, the population-weighted risk was 853 in one million, which is approximately 8 percent lower compared to the MATES II period of 931 per million;
- The overall average lifetime risk from TACs in the Ports area experienced an approximate 17 percent increase in risk. The 2005 average population-weighted air toxics risk in the Ports area was estimated to be approximately 1,415 per million, compared with 1,208 per million lifetime cancer risk as estimated for the MATES II period (1998-1999);
- Mobile source toxics account for 94 percent of risk; and
- Diesel accounts for 84 percent of air toxics risk.

As described above, the Ports' CAAP is designed to substantially reduce DPM emissions and health risks from the operations of port-related ships, trains, trucks, terminal equipment, and harbor craft (Ports, 2006a). The CAAP proposes to cut DPM emissions from port-related sources by at least 47 percent within 5 years (i.e., by 2011) (Ports, 2006a).

Based on the finding that DPM is a significant contributor to cancer risk in the region, SCAQMD has approved fleet rules to limit diesel exhaust emitted by municipal vehicle fleets, trash trucks, street sweepers, taxis, shuttles, and buses in the region. That rule will be one of many measures outlined in a comprehensive plan to reduce toxic air pollution from mobile and stationary sources. Other programs to reduce diesel emissions include SCAQMD grant programs that cover conversion of diesel equipment to alternative fuels.

AB 1807 (Tanner) set up a statewide process to determine the need for methods to set standards for TACs. The process includes identification of TACs, determination of emissions and ambient levels of the identified compounds, preparation of regulatory needs documents, and establishment of minimum statewide emission control standards by CARB.

Asbestos. According to the California Division of Mines and Geology (CDMG), the project location is not an area of naturally occurring asbestos. Naturally occurring asbestos areas are identified based on the type of rock found in the area. Asbestos-containing rocks found in California are ultramafic rocks, including serpentine rocks, which are not present in the project area (CDMG, 2003). Based on the project's ISA study, the bridge and appurtenances may have ACM in the form of expansion joint compound (Diaz Yourman & Associates, 2007). ACM has been identified as a hazardous airborne contaminant; therefore, demolition of the existing Gerald Desmond Bridge would be subject to the applicable rules and regulations, as listed earlier in this section. These regulations require demolition activities to minimize asbestos released into the air. The ISA also suggests that all buildings requiring demolition should be screened for ACM.

Secondary $PM_{2.5}$ Formation. Primary $PM_{2.5}$ particles are directly emitted into the atmosphere, while secondary particulates are formed through atmospheric chemical reactions of precursor gases. Primary $PM_{2.5}$ includes diesel soot, fossil fuel combustion products, road dust, and other fine particles. Secondary $PM_{2.5}$, which includes products such as sulfates, nitrates, and complex carbon compounds, are formed from reactions with directly emitted NO_X, SO_X, VOCs, and ammonia (SCAQMD *et al.,* 2006). Project-generated emissions of NO_X, SO_X, and VOCs would contribute toward secondary $PM_{2.5}$ formation some distance downwind of the emission sources; however, the air quality analysis in this EIR/EA focuses on the effects of direct $PM_{2.5}$ emissions generated by the proposed project and their ambient impacts. This approach is consistent with the recommendations of SCAQMD (SCAQMD, 2006d).

Ultrafine Particles. Although EPA and the State of California currently regulate and monitor respirable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$), there is an increased level of interest on the health impacts of the smallest size fraction of particulates, namely the ultrafine particles (UFP). UFPs are defined as the particles with diameter of less than or equal to 0.1 micron (µm). UFPs are formed mainly during a combustion cycle, independent of fuel type. With diesel fuel, UFPs can be formed directly during combustion. With gasoline and natural gas (liquefied or compressed), the UFPs are derived mostly from the lubricant oil. UFPs are emitted directly from the tailpipe as solid particles, such as soot (i.e., elemental carbon) and metal oxides; and semi-volatile compounds (e.g., sulfates and hydrocarbons) that coagulate to form particles.

The research regarding UFPs is in its infancy but suggests that UFPs might be more hazardous to human health than the larger PM_{10} and $PM_{2.5}$ particles (termed fine particles) due to size and shape. Because of the smaller size, UFPs are able to travel more deeply into the lung (i.e., the alveoli) and are deposited in the deep lung regions more efficiently than fine particles. UFPs are inert; therefore, normal bodily defense mechanisms do not recognize the particle. UFPs might have the ability to travel across cell layers and enter into the bloodstream and/or into individual cells. With a large surface area-to-volume ratio, other entities might attach to the particle and travel into the cell as a kind of “hitchhiker.” Current UFP research primarily involves roadway exposure. Preliminary studies suggest that more than 50 percent of an individual’s daily exposure is from driving on highways. Levels appear to drop off rapidly as one moves away from major roadways. Little research has been done directly on ships and off-road vehicles. CARB is currently measuring and studying UFPs at the San Pedro Bay Ports. Work is being done on filter technology, including filters for ships, which appears promising. The Port actively participates in the CARB testing at the Port and will comply with all future regulations regarding UFPs. In addition, measures included in the CAAP aim to reduce all emissions Port-wide.

Atmospheric Deposition. The fallout of air pollutants to the surface of the earth is known as atmospheric deposition. Atmospheric deposition occurs in both a wet and dry form. Wet deposition occurs in the form of precipitation or cloud water and is associated with the conversion in the atmosphere of directly emitted pollutants into secondary pollutants such as acids. Dry deposition occurs in the form of directly emitted pollutants or the conversion of gaseous pollutants into secondary PM. Atmospheric deposition can produce watershed acidification, aquatic toxic pollutant loading, deforestation, damage to building materials, and respiratory problems.

The CARB and the SWRCB are in the process of examining the need to regulate atmospheric deposition for the purpose of protecting fresh and saltwater bodies from pollution. Port emissions deposit into local waterways and regional land areas. Emission sources from the proposed project alternatives would produce DPM, which contains trace amounts of toxic chemicals. Through the CAAP, the Port will reduce air pollutants from its future operations, which will work towards the goal of reducing atmospheric deposition for purposes of water quality protection. The CAAP will reduce air pollutants that generate acidic and toxic compounds, including emissions of DPM, NO_X, and SO_X.

Sensitive Receptors. Some population groups, such as children, the elderly, and acutely and chronically ill persons, especially those with cardio-respiratory problems, are considered more sensitive to air pollution than others. Sensitive receptor locations, as defined by SCAQMD (2006), include schools, residential areas, day-care centers, convalescent homes, hospitals, and rehabilitation centers. Residential areas are considered sensitive to air pollution because residents, including children and the elderly, tend to be at home for extended periods of time, resulting in sustained exposure to pollutants. The nearest residences are located east of the eastern project limit.

Sensitive receptors in the project vicinity are shown in Exhibit 2.2.5-1. The nearest schools to the project area include Cesar Chavez (730 W. 3rd Street) and Edison Elementary Schools (625 Maine Avenue), located approximately 0.3-mi and 0.35-mi (483 m and 567 m) east of the project site, respectively. The nearest daycare facility is the Childtime Learning Center (1 World Trade Center), 0.5-mi (800 m) east of the project site. The nearest medical facility is the St. Mary Medical Center (432 E. 10th Street) approximately 1.3 mi (2 km) northeast of the eastern project limit.

2.2.5.3 Environmental Consequences

The NEPA baseline conditions for determining project impacts is based on the No Action Alternative, which is defined as activities associated with the existing bridge maintenance, and it would not require federal permits or funding. Impacts associated with the proposed project are determined by comparing the project-related emissions level to the No Action Alternative conditions (i.e., the incremental difference). Comparison of the project-related emissions with the year 2005 (year of the notice of preparation [NOP] of the environmental document – CEQA Baseline) is also provided in this analysis; however, discussion of the results in terms of CEQA effects and the significance of these effects when compared to the CEQA Baseline or thresholds are provided in Chapter 3 of this EIR/EA. Any references to CEQA, state, or local agency thresholds have been included for consideration of the potential impacts pursuant to CEQA provided in Chapter 3 (Section 3.2.2 [Air Quality]).

Applicable CAAP Control Measures. As part of the Port's commitment to promote the GPP and implement CAAP, the proposed project construction and operation would employ all applicable control measures included in the CAAP. The measures employed by the project to reduce air pollutant emissions include:

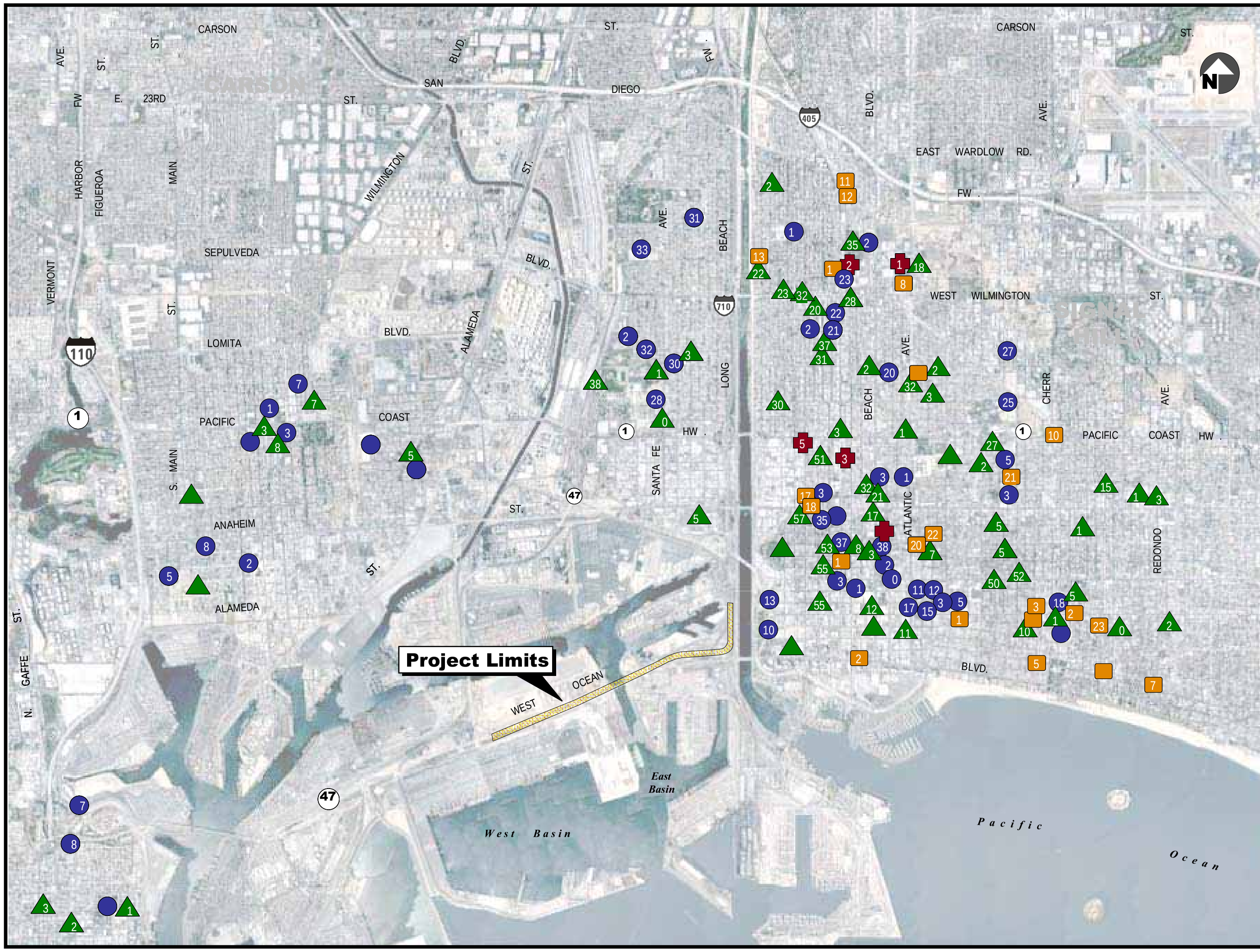
- Project construction contractors would use construction equipment that, at a minimum, would achieve EPA Tier 3 non-road equivalent standards.
- Project heavy-duty construction equipment would use clean fuels, such as ultra-low sulfur fuel or compressed natural gas, and oxidation catalyst.
- On-road heavy-duty trucks during construction, as well as the heavy-duty trucks that call at the Port's terminals, would comply with the CAAP control measure HDV1, which would replace or retrofit the existing Port's truck fleet by 2012 to comply with the "clean" truck measure. The control measure requires trucks of model year 1992 and older to meet or be cleaner than the EPA 2007 on-road truck emission standard (0.01 g/bhp-hr for PM) and have the cleanest available NO_X emission rate at the time of replacement or retrofit, but not greater than the 2007 NO_X emission standards.
- In the event that tugboats are used in construction activities, they would be of EPA Tier 2 through 4 standards, which is with the highest standards available at the time of project construction.

Furthermore, construction of the proposed project would comply with SCAQMD applicable rules and regulations, such as Rule 403 (Fugitive Dust Control), to reduce regional and localized PM_{10} and $PM_{2.5}$ emissions associated with earthwork activities; Rule 1113 (Architectural Coatings) to limit the amount of VOC emissions from paving, asphalt, concrete curing, and cement coating operations; and Rule 1403, to control asbestos emissions from demolition activities.

Air Quality Assessment Methodology

This air quality analysis is based on the methodology and assumptions which are consistent with the requirements of NEPA, CEQA, the CAAAs of 1990, the CCAA of 1988, and the CAAP. The study also utilizes guidelines and procedures provided in applicable air quality analysis protocols such as *Air Quality and Risk Assessment Protocol for Projects at the Port of Long Beach* (POLB, 2007c); *Transportation Project-Level Carbon Monoxide Protocol (CO Protocol)* (Caltrans, 1998a [UCD-ITS-RR-97-21, 1997]); *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas (Guidelines)* (EPA, 2006a); and *Interim Guidance Update on Air Toxics Analysis in NEPA Documents* (FHWA, 2009).

Construction Emissions. Construction impact analysis is not required by Caltrans and FHWA, pursuant to NEPA for projects having a construction schedule not longer than 5 years. The proposed project has an estimated construction schedule that extends into a fifth year if demolition of the existing bridge is included; therefore, it would qualify for quantitative analysis under that criterion. However, Caltrans, as a matter of policy, does not provide quantitative construction impact analysis, except for projects proposed within the San Joaquin Valley, where it is required by regulation. The POLB, which is the local agency sponsor for the proposed project, requires such an analysis for all of its projects; therefore, a quantitative construction impact analysis is included pursuant to POLB CEQA requirements. Federal guidance is not available for calculating construction impacts. Accordingly, the screening



SENSITIVE RECEPTORS

Child Care Centers

1 Our Saviour's Lutheran Preschool
2 Phases An Early Learning Comp.
3 Munchkin Center
4 New Harbor Vista Child Development Center
5 Wilmington Park Children's Center
6 Yvette's Daycare
7 Sanchez Family Child Care
8 Voa/Cesar Chavez Head Start
9 A Love 4 Learning Academy
10 Carousel Preschool
11 YMCA Fairfield 3rd Street Preschool
12 Young Horizon's Child Development Centers
13 Coronado Head Start Child Care Center
14 First Foursquare Church Preschool
15 Huntington Academy Preschool
16 Simply Kare Child Development Center
17 12th Street Head Start
18 Long Beach Day Nursery
19 Atlantic Headstart
20 Comprehensive Child Development
21 Elm Street Head Start
22 Fords Family Daycare
23 Kelly's Kids Daycare Center
24 Long Beach Blvd. Head Start
25 Long Beach Center For Child Development
26 Long Beach Child Development Center
27 Long Beach City College Child Development
28 Oakwood Children's Center
29 Old King Cole Day Care
30 P.A.L. Family Day Care
31 Pacific Head Start
32 Ruiz Family Daycare
33 Signal Hill Head Start
34 Smart & Manageable
35 Tender Child Care
36 Young Horizons Child Development Centers
37 Young Horizons Child Development Centers
38 Cabrillo Child Development Center
39 Garfield Child Head Start
40 Job Corp Head Start
41 West Child Development Center
42 Bundle of Joy Day Care 2
43 Child Care Center at St. Mary Medical Center
44 Childtime Learning Center
45 Gabiota Head Start
46 Jenkins Day Care
47 Kelly's Care
48 Little Lighthouse Educational Childcare Center
49 Lucy's Baby Care
50 My Three Kids Tons Of Fun Day Care
51 N2 Lil Folkz
52 Ole King Cole Dev Center
53 Pine Head Start
54 Play House, The
55 Progressive Steps Children Center
56 Vincent Family Child Care
57 West Anaheim Child Care Center
58 Young Horizons/Lel Jardin De La Felicidad
59 Bethany Preschool
60 Great Beginnings
61 World of Tots LA

Schools

1 Avalon High School
2 Banning New Elementary School #1
3 First Baptist Christian School
4 Fries Ave. Elementary School
5 Hawaiian Avenue Elementary School
6 Holy Family Preschool and Elementary School
7 Phineas Banning Senior High School
8 Saints Peter & Paul School
9 Wilmington Park Elementary School
10 Cesar Chavez Elementary
11 Constellation Community Charter Middle
12 Saint Anthony High School
13 Edison Elementary
14 Franklin Classical Middle
15 Saint Anthony Preschool/Elementary
16 Select Community Day (Secondary)
17 Stevenson Elementary
18 City Christian School
19 Birney Elementary
20 Burnett Elementary
21 Cambodian Christian
22 Holy Innocent Elementary School
23 Jackie Robinson Academy
24 Lafayette Elementary School
25 Mary Butler Elementary
26 Oakwood Academy
27 Signal Hill Elementary School
28 Cabrillo (Juan Rodriguez) High School
29 Hudson Daycare and Elementary School
30 James A. Garfield Elementary
31 Muir Elementary
32 Saint Lucy School
33 Stephens Middle
34 Abraham Lincoln Elementary School
35 Artesia Well Preparatory Academy
36 Creative Arts Daycare and Elementary School
37 First Baptist Church School
38 First Lutheran Daycare, Preschool & Elementary School
39 George Washington Middle School
40 Long Beach Montessori School
41 Polytechnic High School
42 Renaissance High School for the Arts
43 Roosevelt Academy
44 The New City School
45 John G. Whittier Elementary School
46 Burbank Elementary
47 Harbor Occupational Center
48 Barton Hill Elementary School
49 Port of LA High School & Charter School

Hospitals

1 Miller Children's Hospital; Long Beach Memorial Medical Center
2 Pacific Hospital of Long Beach
3 Long Beach Doctors Hospital
4 St Mary Medical Center
5 Tom Redgate Memorial Hospital

Convalescent Homes

1 Bellagio Manor
2 Breakers Of Long Beach, The
3 Colonial Care Center
4 Crofton Manor Inn
5 Wells House
6 Broadway By The Sea
7 Villa Via Redondo Care Home
8 Atlantic Memorial Care Center
9 Caruthers Royale Care
10 Courtyard Care Center
11 Deluxe Guest Home
12 Deluxe Guest Home II
13 Rmr Residential Care Facility, LLC
14 Royal Care Skilled Nursing Center
15 Burnett Home Care
16 Loram Mannor
17 Harbor View Rehabilitation Center
18 Regency High School
19 Healthview Pine Villa Assisted Living
20 Olive Tree Home
21 Skylight Convalescent Hospital
22 Villa Maria Care Center
23 Edgewater Convalescent Hospital
24 Ruby's Guest House

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Exhibit 2.2.5-1 Sensitive Receptor Locations

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criteria, significance thresholds, and analysis methodologies in SCAQMD's guidance document *CEQA Air Quality Handbook, November 1993* (Handbook) were used to calculate air pollutant emissions from construction of the proposed project and to determine the significance of construction emissions. SCAQMD has promulgated daily emission thresholds for construction and operational activities. SCAQMD thresholds are set at a level that either promotes or maintains regional attainment of the relevant ambient air quality standards. Based on the Handbook guidelines, daily emissions were calculated for a worst-case day. The worst-case day represents the maximum or peak daily emissions that can reasonably be expected during any phase of construction. The construction schedule and information needed to perform emissions analysis were provided by the project construction engineers. This information include type and number of pieces of equipment used in each phase, amount or area of soil disturbance and cut and fill material, number of haul trucks and construction workers, and average trip length of haul trucks and workers commuting to and from the jobsite.

To estimate peak daily construction emissions, daily emissions were forecast for a period with most-intensive construction activities wherein a relatively large amount of construction would occur from overlapping construction phases during each year of construction.

The CARB OFFROAD 2007 model was used to develop exhaust emission factors for the various types of off-road construction equipment that would be used for the project construction. The EMFAC2007 model was used to develop the emission factors for on-road trucks and employee vehicles. Fugitive dust emission factors were based on guidance from SCAQMD.

The localized effects from the onsite portion of the mass daily emissions to the offsite sensitive receptors were evaluated for each phase of construction using the guidelines in the *Localized Significance Threshold Methodology for CEQA Evaluations* (SCAQMD, 2003b). It should be noted again that Caltrans does not utilize these thresholds, and they have been included for purposes of CEQA impact analysis discussed in Section 3.2.2.

Operational Emissions. For operational emissions, the impacts of the project-related air pollutant emissions from direct and indirect sources were considered in the analysis.

Regional air quality impacts directly associated with operation of the project would include emissions from vehicle traffic along the study area roadways. The Bridge Replacement Alternatives would provide a new bridge with more vertical clearance than the existing bridge. In general, this could affect vessel traffic by allowing the passage of taller, larger marine vessels through the Back Channel, and could indirectly affect local air quality; however, as discussed below, vehicular emissions would constitute the primary emission source associated with operation of the proposed project. The direct emissions associated with vehicle traffic were estimated based on the daily traffic volumes and vehicle miles traveled (VMT) within the project study area, using the modeled emission factors from EMFAC2007.

For this study, the operational emissions were estimated for the opening year 2015 and the horizon year 2030. Evaluation of the local impacts includes the following analysis.

Localized CO Analysis. The localized CO impacts from project operations were evaluated following the guidelines and procedures of the Caltrans CO Protocol (UC Davis, 1997). Supporting documentation, including the screening procedure for determining the project-level conformity requirements, applicable to the proposed project, are provided in Appendix B2 of the Air Quality Technical Study. Following the screening procedure, the localized concentrations of CO were calculated using the CALINE4 microscale dispersion model, which was developed by Caltrans, in combination with EMFAC2007 emission factors for the project analysis years. EMFAC2007 is the latest EPA-approved emission inventory model that calculates emission inventories and emission rates for motor vehicles operating on roads in California. Traffic volumes from the project traffic study (Iteris, 2009) were used to estimate CO concentrations at a distance of 10 ft (3 m) from the study intersections. The annual VMT data, also provided by the traffic report, were used to estimate regional emissions.

Particulate Matter Hot-Spot Analysis. To implement the PM hot-spot analysis requirements of the March 10, 2006, final rule, the *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas (Guidance)* [EPA420-B-06-902, March 2006a], which was developed by EPA and FHWA, was used to perform a qualitative hot-spot analysis and conduct an interagency consultation with SCAG for project conformity determination.

Mobile Source Air Toxics Emissions. MSATs are released as part of vehicle exhaust emissions and include benzene, naphthalene, acrolein, 1,3-butadiene, formaldehyde, DPM and diesel exhaust organic gases, and polycyclic organic matter (POM) (FHWA, 2009). Prolonged exposure to MSATs may cause cancer and/or other serious health effects, such as reproductive problems and birth defects. Such effects are also influenced by other variables, such as distance between sources of MSAT and sensitive receptors. The extent of potential health effects of MSATs can only be determined by conducting a detailed health risk assessment (HRA) to assess carcinogenic risks and acute and chronic non-cancer health effects. For assessment of project-specific health impacts from MSATs, the currently available tools and techniques are limited (FHWA, 2006a). FHWA has prepared a guidance document and its update for when and how to analyze MSATs in the NEPA process: *Interim Guidance on Air Toxics Analysis in NEPA Documents* (FHWA, 2006a) and *Interim Guidance Update on Air Toxics Analysis in NEPA Documents* (FHWA, 2009). Analysis of potential impacts of MSAT emissions was conducted using these Guidance documents to determine in which category the proposed project falls (i.e., no analysis, qualitative analysis, or quantitative analysis). The analysis then uses the prototype language or provided data as prescribed in the Update Guidance document.

Based on the review of the Interim Guidance, and in consideration of the project alternatives, the proposed project would be in Category 2 and qualifies for a qualitative MSAT analysis; however, because of (1) the high percentage of diesel trucks using the local roadways in the project area, and (2) the enhanced capacity of the project corridor, a more conservative approach of a quantitative MSAT analysis was completed for the project. This conservative approach is consistent with the approach of the Schuyler Heim Bridge Replacement Project, which is similar to and in close proximity to the proposed Gerald Desmond Bridge Replacement Project. As previously discussed, there are only a few sensitive receptors in close proximity to the proposed project corridor.

Because evaluation of the project-level impact of MSATs for transportation projects is an emerging process, guidance manuals and protocols to assess air quality impacts are currently in the development stage. For instance, UC Davis and Caltrans developed a methodology and a Spreadsheet Tool for estimation of the project-level MSAT emissions in 2006 (UC Davis-Caltrans, 2006). In 2008, the spreadsheet tool was replaced with the CT-EMFAC version 2.6 (UC Davis-Caltrans, 2008), which is a model to estimate transportation projects emissions. CT-EMFAC is an interpretation of the CARB EMFAC model that simplifies the process of getting composite emission factors. It also extends EMFAC to include the priority MSATS, which otherwise require off-model speciation of total organic gases (TOG) when the standard EMFAC model is used (as used in the 2006 Spreadsheet Tool). The model is capable of estimating project-level emissions of MSATs, as well as criteria pollutants and CO_2. It includes two main modules: an *Emissions Factors* module that creates emission factors from EMFAC2007 for pollutants based on the project location (county, air basin, or statewide), and analysis year(s); and an *Emission Calculations* module that uses the estimated emission factors from the Emission Factor run, combined with the user-provided travel activities, to generate project-level emissions values for selected pollutants. CT-EMFAC version 2.6, which was released on May 29, 2008, was used to provide an estimate of the MSAT emissions along the project segments and project corridor for the base year 2005 and the future years (opening year 2015, and horizon year 2030) for the build and no-build alternatives. It should be noted that at the time of preparation of this EIR/EA, there was not an update to the 2008 release of CT-EMFAC to include data for the revised priority MSAT list.

Air Quality Analysis

Transportation Conformity

The Transportation Conformity Rule requires a regional emission analysis to be performed by the MPO for projects within its jurisdiction. The regional emissions analysis includes all projects listed in the RTP and RTIP. Projects listed in the RTP and RTIP are considered to have met the requirement for regional emissions conformity. Both plans must support an affirmative conformity finding to obtain FHWA approval.

The currently approved plans are the 2008 RTP and the 2008 RTIP. The 2008 RTP was adopted by SCAG on May 8, 2008, as Resolution #08-497-2, and it was approved by FHWA and FTA on June 5, 2008. The 2008 RTIP was adopted by

SCAG on July 17, 2008, and was federally approved on November 17, 2008.

The Gerald Desmond Bridge Replacement Project is included in the 2008 RTP and RTIP, and assumptions in SCAG's regional emissions analysis. The proposed project is referenced in the Project Listing Report of the 2008 RTP within the "2008 RTP – Los Angeles County RTIP Projects" list, and in the "Final 2008 RTIP – Los Angeles County Local Highways Project List" under the conformity category "non-exempt." The Listing ID and description are provided below. A copy of the listing from the 2008 RTIP is provided in Appendix A.

> *LA000512 Gerald Desmond Bridge Replacement (SAFETEA-LU PNRS #14 – SEC 1301B); Ocean Boulevard over Entrance Channel, UP RR, 1.0 Mile E of State Route 47, Replace Existing 5 Lane Gerald Desmond Bridge with new 6 Land Bridge (previously also included ID No. LAF011)*

The Port is coordinating with SCAG and Caltrans to determine if a revised project description that includes the improvements along Ocean Boulevard and freeway ramps is necessary for consideration in future supplemental/amendment for regional emissions analysis. It is anticipated that only a change to the description would be necessary and that all of the project elements were included in the project assumptions for regional emissions analysis.

The 2008 RTIP was federally approved on November 17, 2008, and it is also consistent with the 2008 State Transportation Improvement Program (STIP) cycle and incorporates the SCAG portion of the 2008 STIP. Given that the proposed project is consistent with the 2008 RTP and included in the 2008 RTIP, it will not interfere with the timely implementation of all Transportation Control Measures (TCMs) identified in the currently approved SIP. Because the proposed project is included in the regional analysis for determining emissions budgets of the RTIP, the project meets the regional air quality conformity criteria.

Construction/Demolition Impacts

No Action Alternative

The No Action Alternative assumes that the bridge structure and interchanges within the project area would remain unchanged. This alternative would not include any planned construction activities. Periodic maintenance activities would be provided to keep the bridge open to traffic; therefore, there would be no impacts associated with construction emissions.

North-side Alignment Alternative

Construction Process. Project's construction-related emissions are based on equipment emission factor data and the magnitude of daily construction activities. The total amount and duration of construction and the intensity of construction activities could have a substantial effect upon the daily emissions level, pollutant concentrations, and the resulting impacts occurring at any one time. The emission forecasts provided in this analysis reflect a specific set of conservative assumptions based on the expected construction scenario wherein a relatively large amount of construction is occurring in a relatively intensive manner. Because of these conservative assumptions, actual construction emissions would be, in all probability, less than those forecasted. Exhibit 2.2.5-2 shows an outline of the estimated construction schedule and worst-case day with maximum concurrent construction activities (see Section 1.6.1.3 [Proposed Construction and Phasing]). The last phase of construction (Phase 5) consists of tie-in activities and demobilization of equipment, and air quality issues would not be of general concern.

At this time, it is envisioned that there would be two potential contractor staging areas. One could be located in or around the lumberyard located on the southwest side of the existing Gerald Desmond Bridge on Pier T Avenue, and the other is the current location of the Port Maintenance Yard on the east side of the existing bridge on Broadway. The Port Maintenance Yard is proposed to be relocated prior to construction of the Gerald Desmond Bridge. Emissions associated with the demolition of Port Maintenance Yard buildings were accounted for within Phase I of the construction phasing.

Regional Construction Air Quality Effects. Construction of the proposed project has the potential to affect regional air quality through the use of heavy-duty construction equipment within the construction site, and through vehicle trips generated from construction workers traveling to and from the project site. In addition, fugitive dust emissions would result from earthwork (e.g., excavation and demolition) and onsite construction activities. Off-road (onsite) mobile source emissions, primarily NO_X, would result from the use of construction equipment such as bulldozers, cranes, and loaders. During the finishing phase, paving operations and the application of architectural coatings and other building materials would release reactive organic compounds and off-gassing products (e.g., paints and asphalt). Construction emissions can vary substantially from day to day, depending on the level of activity, the specific mix of construction equipment and, for dust, the prevailing weather conditions. The assessment of construction air quality impacts considers each of these potential sources.

Based on the expected construction schedule, calculation of the peak daily construction emissions were based on three timelines during construction and one timeline during demolition. Each timeline represents maximum daily activities from overlapping construction subphases. The three selected timelines during construction of the proposed new bridge include:

- month 9 of construction Year 1,
- month 9 of construction Year 2, and
- month 3 of construction Year 3.

Estimation of the peak daily emissions during demolition of the old bridge (which would occur subsequent to completion of the new bridge) was also included in the impact analysis (see Exhibit 2.2.5-2).

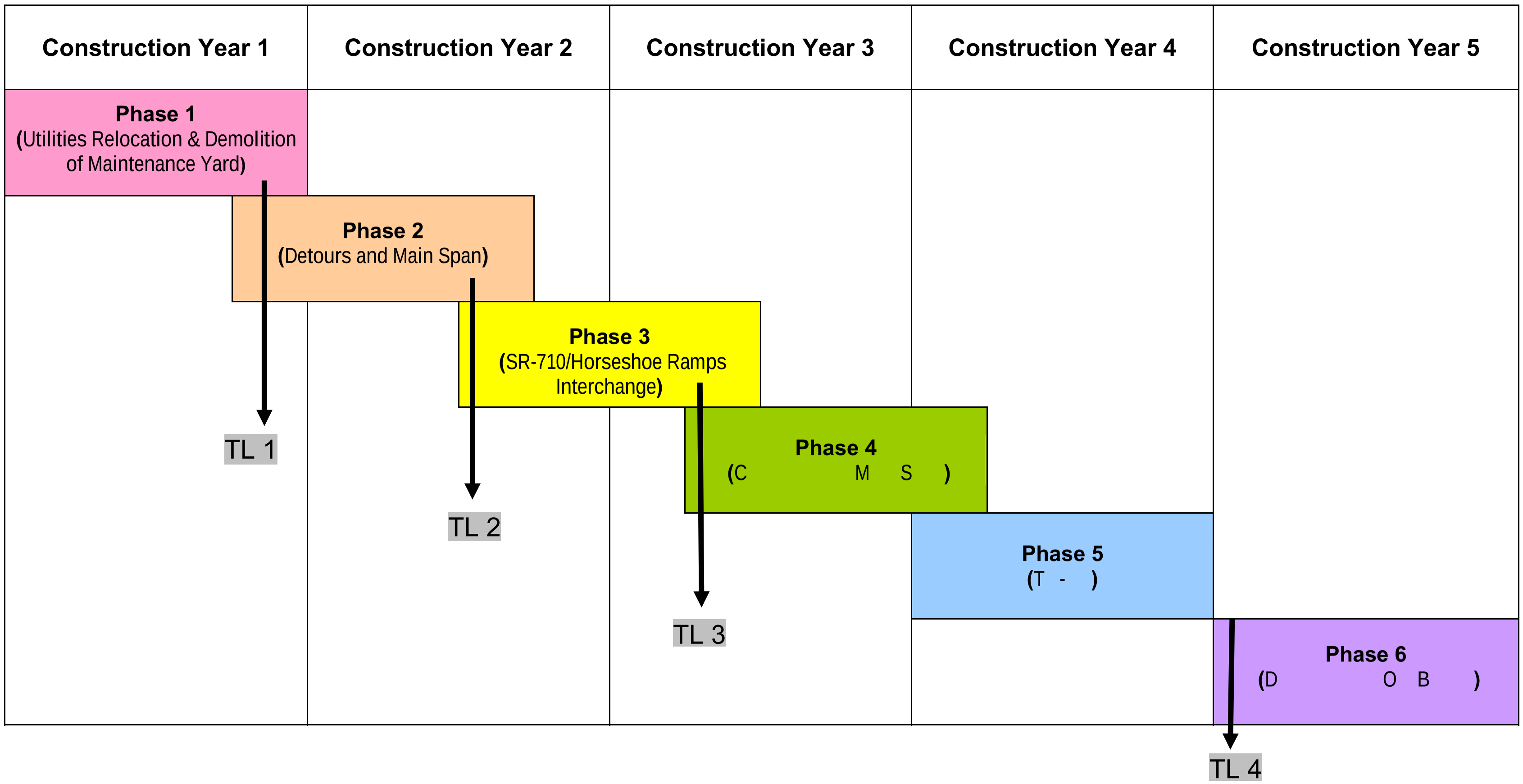
Table 2.2.5-6 summarizes the estimates of unmitigated mass daily emissions for the selected timelines. Emissions exceeding the SCAQMD regional threshold criteria are shown in bold type. As shown, Year 2 of construction activities would include the highest peak daily pollutant emissions. Table 2.2.5-6 also indicates that the unmitigated daily emissions of NO_X would exceed the SCAQMD regional significance threshold during peak overlapping activities of each year of construction of new bridge. Peak daily emissions of other criteria pollutants would not exceed the SCAQMD significance thresholds. Peak daily emissions during demolition of the old bridge would not exceed the significance thresholds for any criteria pollutant. In conclusion, without mitigation, the regional construction emissions of NO_X would result in a short-term adverse effect during construction of the new bridge.

Localized Air Quality Construction Effects. The localized effects from onsite construction emissions were evaluated to determine whether the proposed project concentration would result in offsite ambient air pollutant concentrations that would exceed an SCAQMD threshold of significance. The analysis was conducted using the methodology promulgated by SCAQMD in its LST Methodology for CEQA Evaluations (SCAQMD, 2003a). It was estimated that the project's maximum daily disturbed area during any construction phase would be 4 to 5 acres (1.5 to 2 ha). This corresponds with the lookup tables in the LST document for projects that have maximum disturbance areas at any time of less than or equal to 5 acres (2 ha). The project onsite construction emissions of NO_X, CO, PM_{10}, and $PM_{2.5}$ were compared with the threshold values in lookup tables C-1, C-2, C-4, and C-5 of the 2005-2007 LSTs, respectively.

Localized construction emissions were estimated using the peak onsite mass daily emissions. The closest sensitive receptors to the construction site include the residences located northeast of Ocean Boulevard and West Broadway, approximately 0.3-mi (500 m) from the project's eastern boundary; and the Cesar Chavez Elementary School, which is also approximately 0.3-mi (500 m) northeast of the project corridor. The projected maximum daily localized emissions are provided in Table 2.2.5-7. As shown, at the nearest sensitive receptors, the estimated localized mass daily emissions would exceed the SCAQMD daily significance thresholds for NO_X during the second and third years of construction. These elevated levels of NO_X are mainly associated with exhaust emissions from the heavy-duty construction equipment that simultaneously operate onsite during the days of maximum construction activities. Because the analysis assumes that all construction off-road equipment would meet Tier 3 standards and use clean fuels, as a project feature, few feasible mitigation measures are available to reduce exhaust emissions in a more efficient manner, and even with incorporation of all feasible mitigation measures (see Section 2.2.5.5), it is considered an unavoidable project air quality effect. Additionally, NO_X exceedance would be temporary and intermittent during construction and would return to background levels subsequent to construction.

Toxic Air Contaminants The potential for TAC emissions during construction would be related to DPM emissions associated with heavy equipment operations; however, the health effects from carcinogenic air toxics at sensitive receptors would not be considered substantial, because the health risk posed by TACs is based on long-term (70-year lifetime) exposure. Given the construction schedule of 5 years, the proposed project would not result in a long-term (i.e., 70-year) substantial source of TAC emissions. As such, potential impacts related to TAC emissions during construction would be considered less than adverse.

Exhibit 2.2.5-2
Outline of Construction Schedule



TL #: Analyzed timeline in a month (of each construction year) with maximum concurrent construction activities; selected to estimate worst-case daily emissions.

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Table 2.2.5-6
Estimate of Unmitigated Peak Daily Regional Construction Emissions [a] – North- and South-Side Alignment Alternatives (pounds/day)

Construction Year - Stage	CO	NO_X	VOC	PM_{10} [b]	$PM_{2.5}$
Year 1: Peak Construction Activities (month 9)					
Onsite	33	88	7.5	97	23
Offsite [c]	29	20	3.6	1	1
Total [d]	62	108	11	98	24
SCAQMD Regional Daily Significance Threshold	*550*	*100*	*75*	*150*	*55*
Over/(Under)	(488)	**8**	(64)	(52)	(31)
Exceed Threshold?	No	Yes	No	No	No
Year 2: Peak Construction Activities (month 9), worst case					
Onsite	304	731	67	122	50
Offsite [c]	36	19	4	1	1
Total [d]	340	750	71	123	51
SCAQMD Regional Daily Significance Threshold	*550*	*100*	*75*	*150*	*55*
Over/(Under)	(210)	**650**	(4)	(27)	(4)
Exceed Threshold?	No	**YES**	NO	NO	NO
Year 3: Peak Construction Activities (month 3)					
Onsite	187	426	40	108	37
Offsite [c]	32	16	4	1	1
Total [d]	219	442	44	109	38
SCAQMD Regional Daily Significance Threshold	*550*	*100*	*75*	*150*	*55*
Over/(Under)	(331)	**342**	(31)	(41)	(17)
Exceed Threshold?	No	**YES**	No	No	No
Demolition of Old Bridge – New Bridge Opening Year, 2015					
Peak Construction Activities (month 8)					
Onsite	24	38	4	8	3
Offsite [c]	5	8	1	<1	<1
Total [d]	29	46	5	8	3
SCAQMD Regional Daily Significance Threshold	*550*	*100*	*75*	*150*	*55*
Over/(Under)	(521)	(54)	(70)	(142)	(52)
Exceed Threshold?	No	No	No	No	No

Note: Exceedances from thresholds are shown in bold type.

[a] Compiled using the CEQA Air Quality Handbook and the emissions inventory from OFFROAD model. The equipment mix and use assumption for each phase is provided by the construction engineer, a list of which is included in Appendix A.

[b] Onsite PM_{10} emissions estimates are based on compliance with SCAQMD Rule 403 requirements for fugitive dust suppression.

[c] Offsite emissions include motor vehicle emissions associated with construction equipment transport to site, workers' commute, and debris hauling activities.

[d] Maximum annual construction emissions of GHGs (based on peak-day construction activities) were calculated and provided below. The emissions are presented in metric ton per year of CO_2 equivalent (MT CO_2e):

Construction year	*Year 1*	*Year 2*	*Year 3*	*Year 4*	*Demolition of old bridge (opening year)*
GHG emission (MT CO_2e)	*1,187*	*10,771*	*4,503*	*2,845*	*307*

Source: Parsons, 2009d.

Table 2.2.5-7
Estimated Unmitigated Peak Daily Localized Construction Emissions [a] – North- and South-Side Alignment Alternatives (pounds/day)

Analyzed Construction Stage/Phase	Maximum Onsite Pollutants Emissions			
	CO	NO_X	PM_{10}	$PM_{2.5}$
Nearest Sensitive Receptors [a] – 500 meters from project eastern boundary				
Year 1	33	88	98	23
Year 2	304	**731**	122	50
Year 3	187	**426**	108	37
Gerald Desmond Bridge Demolition	24	38	8	3
SCAQMD Localized Daily Significance Threshold [b]	*10,198*	*143*	*191*	*120*
Exceed Threshold?	No	**YES**	No	No

[a] The nearest sensitive receptors include Cesar Chavez Elementary School and the multi-family residences that are located approximately 0.30-mi (483 m) to the east of the construction site boundary. The project site is located in SCAQMD SRA No. 4. This analysis assumed that no more than 5 acres (2 ha) would actively be disturbed at one time. The LSTs are for a 5-acre site with a receptor at a 1,640-ft (500-meter) distance in SRA No. 4. Construction assumptions and equipment list for peak daily construction activities in each year are presented in Appendix A.
[b] The project site is located in SCAQMD SRA No. 4. It was estimated that the project's maximum daily disturbed area during any construction phase would be 4 to 5 acres (1.5 to 2 ha) (see Appendix A). The localized significance thresholds (LST) in the table are from the lookup tables for a 5-acre (2-ha) site at 1,640-ft (500-m) distance in SRA No. 4, South Coastal LA County; Tables C-1, C-2, C-4, and C-5 of the 2005-2007 lookup tables were used for LSTs of NO_X, CO, PM_{10}, and $PM_{2.5}$, respectively.

Source: Parsons, 2009d.

Odors. During project construction, objectionable odors would be mainly related to operation of diesel-powered equipment and to off-gas emissions during road-building activities, such as paving and asphalting. Objectionable odors may also occur as a result of construction in marine sediments during drilling and auguring activities for the support piers for the bridge if contaminated sediments and/or soils that would release odorous gases to the atmosphere were encountered. Such odors, however, would be short-term and limited to the area where the specific activity is occurring. The perception of these odors would be dependent upon climatic conditions such as temperature, humidity, wind speed, and wind direction.

SCAQMD Rule 1113 (Architectural Coatings) limits the amount of VOCs from paving, asphalt, concrete curing, and cement coating operations. Construction of the proposed project would be performed in compliance with SCAQMD Rules, which limits VOC emissions. In addition, construction activities would be located within fenced, secured sites as far from receptors as feasible, with no public access. Due to the relatively short-term nature of construction odors, controlled access, and the distance to the nearest receptors, odors are not likely to affect a substantial number of people. No adverse effects from odors associated with construction are anticipated.

South-Side Alignment Alternative

The construction activities and associated air quality emissions for this alternative would be the same as those of the North-side Alignment Alternative.

Rehabilitation Alternative

Construction emissions from the Rehabilitation Alternative were estimated in a similar way as the Bridge Replacement Alternatives. The assessment of maximum daily emissions was based on the expected construction schedule, the level of activity, and the specific mix of construction equipment for a worst-case with maximum daily activities from overlapping construction subphases.

The daily activity was assumed on an 8-hour per day schedule, based on the fact that the equipment used during the day (i.e., activities other than the bridge deck replacement) would be different from those employed during nighttime bridge deck replacement activities. Table 2.2.5-8 summarizes the estimates of unmitigated mass daily emissions from construction activities of the Rehabilitation Alternative. As shown, peak daily emissions associated with construction of the Rehabilitation Alternative would not exceed the thresholds for any criteria pollutant; therefore, no adverse air quality impacts would be anticipated during construction of the Rehabilitation Alternative.

Table 2.2.5-8
Estimate of Peak Daily Construction Emissions [a] – Rehabilitation Alternative (pounds/day)

Construction Year – Stage	CO	NO_X	VOC	PM_{10} [b]	$PM_{2.5}$
Regional Emissions					
Peak Construction Activities (September 2012)					
Onsite	27	57	5	90	21
Offsite [c]	15	13	2	1	<1
Total	42	70	7	91	21
SCAQMD Regional Daily Significance Threshold	*550*	*100*	*75*	*150*	*55*
Over/(Under)	(508)	(30)	(68)	(59)	(34)
Exceed Threshold?	No	No	No	No	No
Localized Emissions					
Nearest Sensitive Receptors [d] – 500 meters from project eastern boundary					
Maximum Construction Onsite Emissions	27	57	—	91	21
SCAQMD Localized Daily Significance Threshold [e]	*10,198*	*143*	—	*191*	*120*
Exceed Threshold?	No	No	—	No	No

[a] Compiled using the CEQA Air Quality Handbook and the emissions inventory from OFFROAD model. The equipment mix and use assumption for each phase is provided by the construction engineer, a list of which is included in the Air Quality Technical Study Report and Appendix A.
[b] Onsite PM_{10} emissions estimates are based on compliance with SCAQMD Rule 403 requirements for fugitive dust suppression. A copy of Rule 403 is provided in Appendix A.
[c] Offsite emissions include motor vehicle emissions associated with construction equipment transport to site, workers commute, and debris hauling activities .
[d] The nearest sensitive receptors include Cesar Chavez Elementary School and the multi-family residences that are located approximately 0.3-mi (483 m) to the east of the construction site boundary.
[e] The project site is located in SCAQMD SRA No. 4. In regard to the LST lookup tables, this analysis assumed that no more than 5 acres (2 ha) would actively be disturbed at one time. The LSTs are for a 5-acre (2-ha) site with a receptor at 1,640 ft (500 m) distance in SRA No. 4.

Source: Parsons, 2009d.

Operational Impacts

Regional and localized operational emissions were evaluated for the project corridor. The considered project corridor extends along Ocean Boulevard from just west of Navy Way/Seaside Avenue on Terminal Island to Pine Avenue in downtown Long Beach; as well as connector ramps along the project segments of Ocean Boulevard.

No Action and Rehabilitation Alternatives

The Rehabilitation Alternative would include retrofit activities only and would be operationally equivalent to the No Action Alternative.

Operational analysis for the Rehabilitation Alternative would be the same as the No Action Alternative; therefore, it would not result in any operational air quality effects

North- and South-side Alignment Alternatives

Operational emissions were estimated for the opening year 2015 and the horizon year 2030. Air quality impacts from operational emissions of the proposed project were assessed by comparing the No Action Alternative with build emissions, for each year analyzed. The North and South-side Alignment Alternatives would operate the same and are referenced as the Build Alternatives.

Direct Operational Emissions. Project direct operational emissions are mainly from vehicular traffic within the project area. The amount of pollutant emission from vehicle traffic is proportional to VMT. The peak-hour VMT data and projected average vehicle speeds along segments of the project corridor were provided by the project Traffic Study (Iteris, 2009). Vehicle emission factors at the average travel speeds were obtained using the EMFAC2007 model (CARB, 2007).

Indirect Operational Emissions. The existing Gerald Desmond Bridge provides a vertical clearance of 156 ft (47.5 m) above MHWL with two through lanes and a truck climbing lane in each direction. The Bridge Replacement Alternative would provide a higher vertical clearance of 200 ft (61 m), and provide additional capacity along Ocean Boulevard (three through lanes in each direction). As discussed in Section 2.1.2 (Growth Inducement), the Bridge Replacement Alternative would have the potential to indirectly influence growth when considered in the context of future cumulative development that is likely to occur within the Ports and the surrounding communities associated with the traffic congestion relief and redistribution of trips on roadways within the vicinity of the Port to the new bridge and the potential for increased throughput associated with larger vessel access to the back channel; however, predicting air quality effects associated with the potential indirect growth is too speculative for further analysis of air quality emissions to provide credible evaluation of these indirect effects.

For this reason, the possible impact of vessel-produced indirect emissions was not quantified in this analysis.

2005 Base Year. The 2005 base year emissions are established based on the existing roadways and traffic. This is also used for CEQA analysis to determine changes in air quality associated with the alternatives from 2005 through the horizon year 2030. See Chapter 3 for CEQA air quality analysis.

Year 2015 – New Bridge Opening Year. For all of the alternatives, the facility is scheduled to be opened to traffic in the year 2015. For the Build Alternatives, there would be two distinct activities during the opening year. First, all traffic would be rerouted from the old bridge onto the new facility. Second, the old bridge structure would be demolished and the debris would be disposed of. The demolition and removal activities would be completed by the end of the year. A worst-case for daily emissions during opening year would be associated with emissions from the simultaneous demolition of the Gerald Demand Bridge and operational emissions during the overlapping period for the Build Alternatives.

Year 2030 – Horizon Year. Operation phase motor vehicle emissions would result from vehicle exhaust and fugitive particulate emissions. Operational phase motor vehicle emissions were calculated for the No Action Alternative future and for the future with implementation of the proposed Build Alternatives.

Regional Operational Air Quality Effects. To determine the regional direct operational impact, the roadway traffic emissions along the segments of the project corridor were estimated for the base year 2005, opening year 2015, and horizon year 2030. The peak-hour VMT data and projected average vehicle speeds along each roadway segment were provided by the project Traffic Study (Iteris, 2009). Vehicle emission factors at the average travel speeds were obtained using the EMFAC2007 model (CARB, 2007). The re-entrained road dust emission factor was computed using the equation provided in the fifth edition of EPA's AP-42 document.[8]

For the opening year, the emissions associated with demolition of the old bridge structure were added to the operational emissions to evaluate the peak daily project emissions. The results of project operational emissions analysis are summarized in Table 2.2.5-9.

For the future analyzed years (i.e., 2015 and 2030), the data in Table 2.2.5-9 show that:

- For the No Action/Rehabilitation Alternative, the daily operational emissions for all criteria pollutants would be less than the operational emission levels during the base year 2005.
- For the Bridge Replacement Alternative, the project daily operational emissions of CO, NO_X, VOCs, SO_2 and $PM_{2.5}$ would be less than the operational emission levels during the base year 2005, and only the daily emissions of PM_{10}, including the re-entrained road dust, show a relatively small increase in the future analyzed years compared with the 2005 emissions; however, the emission increments remain well below the SCAQMD daily threshold and would decrease with time (2015 versus 2030).

The emissions reduction over time is due to modeled emission factors (from EMFAC 2007) that incorporate newer vehicle fleet composition and compliance with adopted regulations in the AQMP that are aimed at controlling emissions from mobile sources. Compliance measures include the use of alternative or reformulated fuels, retrofit control on engines, and installing or

[8] The AP-42 emission factor assumes that road dust emissions are proportional to VMT, roadway silt loading, and average vehicle weight.

Table 2.2.5-9
Summary of Project Daily Operational Emissions

Project Scenario/Roadway Segments	Emissions (pounds/day)					
	CO	NOx	VOC	SO_2	PM_{10}	$PM_{2.5}$
Base Year 2005						
Ocean Boulevard						
Navy Way to Pier S Avenue	277	250	8	2	26	11
Pier S Avenue to Terminal Island Freeway	124	79	14	<1	9	5
Terminal Island Freeway to Horseshoe Ramps	339	334	18	3	32	15
Gerald Desmond Bridge	446	436	16	3	44	18
NB SR 710 Connector Ramp	112	146	9	1	12	6
SB SR 710 Connector Ramp	41	60	4	<1	4	2
Ocean Boulevard Connector Ramps to Downtown	88	31	4	<1	8	2
Total Year 2005	**1,428**	**1,337**	**73**	**11**	**136**	**59**
Year 2015 – Opening Year – No Action/Rehabilitation Alternative						
Ocean Boulevard						
Navy Way to Pier S Avenue	96	124	8	<1	21	7
Pier S Avenue to Terminal Island Freeway	97	111	7	<1	21	7
Terminal Island Freeway to Horseshoe Ramps	65	69	7	<1	11	4
Gerald Desmond Bridge	275	308	26	1	48	17
NB SR 710 Connector Ramp	58	90	5	<1	12	5
SB SR 710 Connector Ramp	27	50	3	<1	6	2
Ocean Boulevard Connector Ramps to Downtown	33	17	1	<1	8	2
Total Year 2015 – No Action/Rehabilitation	**651**	**770**	**57**	**3**	**127**	**45**
Net Change from 2005	**-777**	**-607**	**-16**	**-8**	**-9**	**-14**
Year 2015 – Opening Year – North- and South-side Alignment Alternatives						
Ocean Boulevard						
Navy Way to Pier S Avenue	98	123	8	<1	21	7
Pier S Avenue to Terminal Island Freeway	114	132	8	<1	25	8
Terminal Island Freeway to Horseshoe Ramps	60	62	6	<1	10	4
New Bridge	267	353	22	1	55	19
NB SR 710 Connector Ramp	68	108	6	<1	14	6
SB SR 710 Connector Ramp	49	86	5	<1	10	4
Ocean Boulevard Connector Ramps to Downtown	48	24	2	<1	11	3
Total On-Road – Operational Emissions	*704*	*887*	*57*	*3*	*147*	*51*
Demolition of Old Bridge – Construction Emissions	*23*	*37*	*5*	*<1*	*8*	*3*
Total Year 2015 – Project Opening Year	**727**	**924**	**62**	**3**	**155**	**54**
Net Change from 2005	-701	-414	-11	-8	19	-5
Net Change from No Action Alternative	76	**154**	5	<1	28	11
Horizon Year 2030 – No Action/Rehabilitation Alternative						
Ocean Boulevard						
Navy Way to Pier S Avenue	50	53	4	<1	22	6
Pier S Avenue to Terminal Island Freeway	45	44	3	<1	20	5
Terminal Island Freeway to Horseshoe Ramps	31	29	3	<1	11	3
Gerald Desmond Bridge	130	129	14	1	44	12
NB SR 710 Connector Ramp	27	33	2	<1	11	3
SB SR 710 Connector Ramp	14	19	1	<1	5	2
Ocean Boulevard Connector Ramps to Downtown	14	5	<1	<1	8	2
Total Year 2030 – No Action/Rehabilitation Alternative	**310**	**311**	**27**	**3**	**121**	**33**
Net Change from 2005	**-1,118**	**-1,026**	**-46**	**-8**	**-15**	**-26**

Table 2.2.5-9
Summary of Project Daily Operational Emissions

Project Scenario/Roadway Segments	Emissions (pounds/day)					
	CO	NOx	VOC	SO_2	PM_{10}	$PM_{2.5}$
Horizon Year 2030 – North- and South-side Alignment Alternatives						
Ocean Boulevard						
Navy Way to Pier S Avenue	52	53	4	<1	23	6
Pier S Avenue to Terminal Island Freeway	54	53	4	<1	24	6
Terminal Island Freeway to Horseshoe Ramps	25	25	3	<1	9	3
New Bridge	126	136	11	1	53	14
NB SR 710 Connector Ramp	33	42	3	<1	13	4
SB SR 710 Connector Ramp	25	33	2	<1	9	3
Ocean Boulevard Connector Ramps to Downtown	21	7	<1	<1	12	2
Total Year 2030 – With Project	**335**	**349**	**28**	**3**	**143**	**39**
Net Change from 2005	-1,092	-989	-45	-7	7	-20
Net Change from No Action Alternative	25	38	1	<1	22	6
SCAQMD Daily Significance Thresholds	550	55	55	150	150	55

Notes: NB: northbound; SB: southbound.

- Exceedances from thresholds are shown in **bold, underlined** type.
- Emissions are calculated using emission factors from EMFAC2007, at the projected average speed, and VMT of each roadway segment within the study area (from Traffic Study).
- Estimates of *directly emitted PM emissions include tailpipe, tire wear, break wear, and the contribution from road dust emissions. The Paved Road Dust emission factor was calculated using EPA's empirical equation (AP-42):*

$$E = k \left(\frac{sL}{2}\right)^{0.65} x \left(\frac{W}{3}\right)^{1.5} x \left(1 - \frac{P}{4N}\right)$$

Where, E= particulate emission factor; k=particle size multiplier; sL=road surface silt loading; W=average weight (tons) of vehicles traveling the road; P=number of days per year with >0.01 inch rain; N=days per period (365 days /year).

- The emissions data are rounded to the nearest integer number; thus, the "total" values in table may differ 1 unit from the added numbers as presented.
- Calculation worksheets are provided in Appendix B of project's Air Quality/HRA Technical Study Report.

Source: Parsons, 2009d.

encouraging the use of new engines and cleaner in-use heavy-duty vehicles. In conclusion, the estimated operational emissions show reductions for all pollutants except PM_{10} as compared with the 2005 daily emissions. The increase of PM_{10} operational emission during future analyzed years, compared with the 2005 level would be well below the SCAQMD daily operational threshold.

The data in Table 2.2.5-9 also show a net increase in daily operational emissions for the Bridge Replacement Alternative compared to the No Action/Rehabilitation Alternative during the opening year 2015 and horizon year 2030. The net increase in daily operational emissions is due to increases in ADT. The net increases of project operational emissions relative to the No Action Alternative emissions would be relatively small, with the exception of NO_X. The net change in NO_x emissions between proposed Project and No Action Baseline during 2015 is estimated to be approximately 154 pounds per day, which would exceed the SCAQMD threshold. During the horizon year 2030, the net change in daily emissions would be below the SCAQMD thresholds for all criteria pollutants.

It should be noted that as described in the analysis methodology, the emission results are obtained using the emission factors generated from the EMFAC2007 model run (with the exception of re-entrained road dust emission factors). The model was released in November 2006 and, as such, only the control and mitigation measures that were approved by that time were incorporated in the development of the available version of the model; however, after 2007, the Port truck fleet has begun experiencing changes due to implementation of the Ports CAAP, and specifically the Port CTP, with the goal of eliminating "dirty trucks" from the fleet and regional roadways. Specific commitments of the Port CTP were not incorporated into the project truck fleet profiles to capture these important improvements in the project build-out years 2015 and 2030.

Furthermore, according to the California Drayage regulation, by January 1, 2014, 100 percent of Port trucks will meet the 2007 model year standards that will result in reduction of diesel PM and NO_X by 86 percent and 56 percent, respectively.

Moreover, Port replacement/retrofit programs will encourage alternatively-fueled vehicles, such as LNG trucks. As a result, the project emissions in Table 2.2.5-9 present a worst-case scenario and overestimates the actual project operational emissions.

Localized Operational Air Quality Impacts. The local analysis is commonly referred to as project-level air quality or hot-spot analysis. The primary focus is the operational impact on air quality created by the proposed improvement. The analysis for localized NO_X impacts was conducted for the project opening year, 2015, when the Build Alternative would generate NO_X in excess of the SCAQMD regional threshold. The year 2015 represents the time with the highest project emissions, and the analysis is consistent with SCAQMD requirements. For CO, PM_{10}, and $PM_{2.5}$, the analysis years consist of the project opening year and the design or horizon year, consistent with the federal transportation conformity requirements.

<u>NO_X Local Effects</u>

The 2015 roadway emissions from project operations were combined with the emissions from demolition of the old bridge to determine the highest potential pollutant concentrations at the offsite sensitive receptor locations. A dispersion modeling analysis using the EPA-approved AERMOD model was performed to estimate NO_2 local concentrations in the vicinity of the project corridor. The meteorological data used in the model were from POLA's Wilmington Community Station, which is located at the Saints Peter and Paul School, as the available data most representative of the ambient data for the project site and vicinity. The closest sensitive receptors to the project corridor are the residences located east of SR 710 across the Los Angeles River approximately 0.3-mi (485 m) from the project corridor. Vehicle movements in each segment of the project corridor were simulated as a line source in the modeling analysis and represented as a series of separated volume sources. Mobile source NO_X emissions along each segment of the project corridor were used for model inputs. The details of model inputs and assumptions are provided in Appendix D.

To determine whether project emissions create significant adverse localized NO_2 impacts, the emissions contribution from the project is added to ambient concentrations and the total is then compared to the most stringent applicable state and/or federal ambient air quality standards for NO_2. The modeled incremental impacts from project activities were added to the background values to estimate the peak impacts downwind of the activities.

Table 2.2.5-10 presents comparison of the SCAQMD significance thresholds with the estimated maximum localized NO_2 concentrations at the nearest sensitive receptors to the project corridor. As shown, the local concentrations would not exceed the localized operational thresholds; therefore, project local NO_2 impact is considered less than adverse.

<u>CO and PM Local Effects</u>

Table 2.2.5-9 indicates that the project-related emissions of other criteria pollutants, including CO, PM_{10}, and $PM_{2.5}$, would not exceed the SCAQMD regional significance threshold at any future operating year of the project; however, following the requirements of transportation conformity, the local effects of CO and PM are provided here to ensure the local conformity of the project with CAA standards.

Based on the project traffic study (Iteris, 2009), some local roadways would have an increase in traffic volume in excess of 5 percent. Tables 2.2.5-11 and 2.2.5-12 summarize the ADT volumes with and without the project for the opening year 2015 and the horizon year 2030, respectively. According to the CO Protocol, these increases would be sufficient to warrant the preparation of a quantitative CO analysis.

Localized CO Analysis. Localized CO effects were assessed by estimating the maximum ambient CO concentrations near the intersections with the greatest potential for hot-spot generation. The concentration estimates were conducted for the opening and horizon years of 2015 and 2030, respectively. The predicted concentrations were compared to the NAAQS and CAAQS for CO. SCAQMD recommends a hot-spot evaluation of potential localized CO impacts at intersections when an intersection decreases in LOS by one level beginning when LOS changes from C to D, and at intersections with LOS D or worse where LOS does not change but v/c ratio increases by 2 percent or more. Intersections were selected for analysis based on information provided in the project Traffic Study (Iteris, 2009).

Table 2.2.5-10
Estimate of NO_2 Local Operational Impacts

Averaging Time	Background NO_2 Concentration[a] (µg/m³)	Maximum Ambient NO_2 Impact at the Nearest Sensitive Receptors [b,c]								SCAQMD Significance Threshold[d]
		Residential		School		Medical		Daycare		
		Project Increment	NO_2 Conc. (µg/m³)	Project Increment	NO_2 Conc. (µg/m³)	Project Increment	NO_2 Conc. (µg/m³)	Project Increment	NO_2 Conc. (µg/m³)	
1-hour	226	22	248	19	245	27	253	28	254	338
Annual	43	2.5	45.5	1.2	44.2	2.9	46	1.9	44.9	56

[a] The thresholds for CO and NO_2 are combined thresholds; therefore, impacts from project emissions plus background pollutant concentrations are compared to the thresholds.
[b] The nearest sensitive receptors include single-family residences located approximately 500 m northeast of the project and east of SR 710; Cesar Chavez Elementary School and Edison Elementary School, both located within 500 m east of the project eastern limit; Childtime Learning Center located approximately 1,000 m east of the project corridor; and Saint Mary Medical Center located approximately 2,000 m northeast of project site.
[c] NO_2 concentrations were calculated using the conversion rate from NO_X to NO_2 based on the distance of receptor from the emission source . NO_2/NO_x ratios were obtained using Figure 2-5 and Table 2-4 in the LST Methodology document (SCAQMD, 2003).
[d] Estimated based on ambient concentration trends and the last 4 years of recorded data at the North Long Beach Monitoring Station.

Source: Parsons, 2009.

Table 2.2.5-11
Comparison of Roadway Segments Traffic Conditions for the No Action/Rehabilitation and Build Alternatives (Opening Year 2015)

Roadway Segment	Traffic Direction	AADT[1] (All Vehicles)			Truck AADT[1]		
		No Action[2]	Build[3]	% Change	No Action	Build	% Change
Ocean Boulevard							
Navy Way to Pier S Avenue	EB	41,910	43,440	3.7	12,810	12,860	0.4
	WB	37,910	38,980	2.8	11,400	11,530	1.1
Pier S Avenue to Terminal Island Freeway	EB	35,660	32,030	11.3	7,900	8,660	9.6
	WB	30,750	32,200	4.7	5,650	5,960	5.5
Terminal Island Freeway to Horseshoe Ramps	EB	37,780	42,260	11.9	10,130	11,440	12.9
	WB	33,700	36,690	8.9	7,380	9,170	24.3
Between SR 710 Connector Ramps and Downtown Long Beach	EB	9,040	10,248	13.4	96	120	25.0
	WB	12,196	12,712	4.2	2,084	2,148	3.1
Gerald Desmond Bridge/New Bridge	EB	40,870	46,070	12.7	12,240	14,000	14.4
	WB	36,200	40,660	12.3	10,550	12,100	14.7
NB SR 710 Connector Ramp	-	14,092	20,480	45.3	8,472	9,792	15.6
SB SR 710 Connector Ramp	-	12,840	17,880	39.3	8,844	11,796	33.3

[1] AADT: annual average daily traffic
[2] No Action Alternative traffic numbers are equivalent to the Rehabilitation Alternative traffic numbers.
[3] Build traffic numbers are equivalent to North- and South-side Alignment Alternative traffic numbers.

Source: Iteris, 2009.

Table 2.2.5-12
Comparison of Roadway Segments Traffic Conditions for the No Action/ Rehabilitation and Build Alternatives (Horizon Year 2030)

Roadway Segment	Traffic Direction	AADT[1] (All Vehicles)			Truck AADT[1]		
		No Action[2]	Build[3]	% Change	No Action	Build	% Change
Ocean Boulevard							
Navy Way to Pier S Avenue	EB	59,540	62,410	4.8	22,020	22,220	0.9
	WB	57,720	59,620	3.3	22,650	22,580	-0.3
Pier S Avenue to Terminal Island Freeway	EB	48,310	51,210	6.0	15,540	21,960	41.3
	WB	49,230	51,820	5.3	16,730	17,470	4.4
Terminal Island Freeway to Horseshoe Ramps	EB	54,350	58,830	8.2	19,840	21,840	10.1
	WB	56,030	58,340	4.1	21,300	19,130	-10.2
Between SR 710 Connector Ramps and Downtown Long Beach	EB	9,912	11,824	19.3	104	116	11.5
	WB	12,956	13,948	7.7	2,104	2,124	1.0
Gerald Desmond Bridge/New Bridge	EB	62,170	68,850	10.7	26,280	29,120	10.8
	WB	62,500	67,080	7.3	28,080	30,610	9.0
NB SR 710 Connector Ramp	-	18,300	21,056	15.1	9,944	12,300	23.7
SB SR 710 Connector Ramp	-	14,040	19,136	36.3	10,424	14,200	36.2

[1] AADT: annual average daily traffic
[2] No Action Alternative traffic numbers are equivalent to the Bridge Rehabilitation traffic numbers.
[23] Build traffic numbers are equivalent to North and South-side Alignment Alternative traffic numbers.
Source: Iteris, 2009.

Tables 2.2.5-13 and 2.2.5-14 provide comparison of intersection traffic conditions for the No Action and Build Alternatives for the base year (2005), opening year (2015), and horizon year (2030).

Tables 2.2.5-13 and 2.2.5-14 show that traffic conditions under the project Build Alternatives would improve compared to the No Action Alternative at all of the studied intersections except three. As shown, at the intersection of Navy Way and Seaside Avenue, either a peak-hour LOS would decline (MD peak hour during 2015) or the LOS would be the same, but the v/c ratio would increase by 2 percent or more. The intersection of Ocean Boulevard and Magnolia Avenue would be affected during the morning peak hour in 2015 (increase in v/c) and during AM, mid-day, and PM peak hours in 2030 (decline in LOS) by the proposed project. The intersection of Ocean Boulevard and Golden Shore Street is projected to be affected only during the PM peak hour in 2030 (LOS decline). These intersections and three other intersections projected to operate at LOS E or F were analyzed for potential CO hot-spot generation during opening year 2015 and horizon year 2030.

CO concentrations were projected using the CALINE 4 traffic pollutant dispersion model. Tables 2.2.5-15 and 2.2.5-16 show the concentrations at 10 ft (3 m) from the studied intersections, projected for the years 2015 and 2030, respectively. As indicated, 1-hour CO concentrations would range from approximately 5.4 ppm to 6.9 ppm in 2015 and from 5.3 ppm to 6.0 ppm in 2030. Eight-hour CO concentrations are anticipated to range from approximately 4.1 ppm to 5.2 ppm in 2015 and from 4.0 ppm to 4.6 ppm in 2030. The state and federal 1- and 8-hour standards would not be exceeded. No localized operational adverse air quality CO effect is anticipated.

Localized Particulate Matter (PM_{10} and $PM_{2.5}$) Analysis. Pursuant to Federal Conformity Regulations (specifically, 40 CFR 93.105 [c] [1][i]), a qualitative analysis of the localized PM emissions was conducted following the methodology provided in the EPA Guidelines (EPA, 2006a). The qualitative PM hot-spot analysis was submitted to the SCAG Transportation Conformity Working Group (TCWG) and was discussed among representatives at their meeting on February 27, 2007. The TCWG determined that the "analysis [was] deemed acceptable for NEPA circulation." A copy of the TCWG conformity determination (from the minutes of the work group meeting) is provided in Appendix A. The qualitative analysis is presented in this section.

Table 2.2.5-13
Comparison of Intersection Traffic Conditions for the No Action/Rehabilitation and Build Alternatives (Opening Year 2015)

Intersection	Peak Hour	Base Year 2005			Opening Year – 2015					
		CEQA Baseline			No Action [1]			Build Alternatives[2]		
		LOS	v/c	Delay/ Vehicle	LOS	v/c	Delay/ Vehicle	LOS	v/c	Delay/ Vehicle
Terminal Island Interchange Ramps / Ocean Boulevard	AM	C	0.792	-	B	0.661	-	B	0.648	-
	MD	D	0.833	-	E	0.966	-	D	0.899	-
	PM	E	0.912	-	D	0.865	-	D	0.813	-
Pier S Avenue / Ocean Boulevard	AM	C	0.709	-	B	0.681	-	B	0.679	-
	MD	C	0.700	-	C	0.761	-	B	0.656	-
	PM	D	0.824	-	B	0.650	-	A	0.597	-
Pier S Avenue / New Dock Street	AM	A	0.327	-	A	0.328	-	A	0.352	-
	MD	A	0.350	-	A	0.420	-	A	0.432	-
	PM	A	0.356	-	A	0.337	-	A	0.337	-
Navy Way / Seaside Avenue	AM	A	0.474	-	C	0.735	-	C	0.776	-
	MD	A	0.414	-	C	0.753	-	**D**	0.768	-
	PM	A	0.581	-	E	0.914	-	E	0.935	-
Pico Avenue Pier B Street / 9th Street	AM	A	0.428	-	B	0.606	-	A	0.594	-
	MD	A	0.455	-	A	0.594	-	B	0.613	-
	PM	A	0.494	-	A	0.575	-	A	0.588	-
Pico Avenue / Pier C Street	AM	A	0.309	-	A	0.376	-	A	0.378	-
	MD	A	0.340	-	A	0.309	-	A	0.306	-
	PM	A	0.343	-	A	0.306	-	A	0.308	-
Pico Avenue / Pier D Street	AM	B	-	10.1	C	-	23.3	A	0.492	-
	MD	B	-	11.3	C	-	19.2	A	0.432	-
	PM	B	-	10.7	C	-	15.5	A	0.399	-
Pico Avenue / Pier E Street	AM	A	-	9.9	B	-	12.4	A	0.331	-
	MD	B	-	11.8	B	-	14.0	A	0.410	-
	PM	B		11.3	C	-	18.9	A	0.582	-
Terminal Island Freeway SB Off-Ramp/ New Dock Street	AM	B	-	10.8	B	-	12.2	B	-	10.8
	MD	A	-	9.1	B	-	13.3	B	-	12.1
	PM	A	-	9.3	B	-	10.5	B	-	10.3
Terminal Island Freeway NB On-Ramp/ New Dock Street	AM	A	-	7.4	A	-	9.1	A	-	8.9
	MD	A	-	7.6	B	-	11.9	B	-	11.1
	PM	A	-	7.9	B	-	10.8	B	-	10.1
Pico Avenue / Broadway	AM	B	-	10.6	B	-	10.6	B	-	10.3
	MD	B	-	11.2	A	-	9.8	A	-	9.9
	PM	B	-	10.5	A	-	9.3	A	-	10.0
Ocean Boulevard/ Golden Shore Street	AM	A	0.570	-	B	0.628	-	B	0.637	-
	MD	A	0.569	-	B	0.691	-	C	0.708	-
	PM	A	0.593	-	B	0.693	-	C	0.719	-
Ocean Boulevard/ Magnolia Avenue	AM	B	0.693	-	E	0.907	-	**E**	0.929	-
	MD	A	0.575	-	C	0.741	-	C	0.785	-
	PM	B	0.601	-	C	0.771	-	C	0.765	-

[1] No Action Alternative intersection conditions are equivalent to the Bridge Rehabilitation intersection conditions.
[2] Build intersection conditions are equivalent to North- and South-side Alignment Alternative intersection conditions.
Notes: SB – southbound; NB – northbound; AM – morning peak hour; MD – mid-day peak hour; PM – afternoon peak hour
v/c – Vehicle to capacity ratio, presents traffic conditions for signalized intersections.
Delay/Vehicle – delay per vehicle in seconds, presents traffic conditions for unsignalized intersections.
LOS of intersections that are not improved by the proposed project are shown in **bold** type.
Source: Iteris, 2009.

**Table 2.2.5-14
Comparison of Intersection Traffic Conditions
for the No Action/Rehabilitation and Build Alternatives (Horizon Year 2030)**

Intersection	Peak Hour	Base Year 2005			Horizon Year – 2030					
		CEQA Baseline			No Action[1]			Build Alternatives[2]		
		LOS	v/c	Delay/ Vehicle	LOS	v/c	Delay/ Vehicle	LOS	v/c	Delay/ Vehicle
Terminal Island Interchange Ramps / Ocean Boulevard	AM	C	0.792	-	F	1.255	-	F	1.130	-
	MD	D	0.833	-	F	1.471	-	F	1.304	-
	PM	E	0.912	-	F	1.181	-	F	1.170	-
Pier S Avenue / Ocean Boulevard	AM	C	0.709	-	F	1.110	-	F	1.008	-
	MD	C	0.700	-	F	1.274	-	F	1.202	-
	PM	D	0.824	-	F	1.114	-	F	1.011	-
Pier S Avenue / New Dock Street	AM	A	0.327	-	B	0.678	-	A	0.591	-
	MD	A	0.350	-	D	0.843	-	C	0.739	-
	PM	A	0.356	-	B	0.684	-	A	0.588	-
Navy Way / Seaside Avenue	AM	A	0.474	-	E	0.904	-	**E**	0.931	-
	MD	A	0.414	-	D	0.854	-	**D**	0.875	-
	PM	A	0.581	-	F	1.091	-	**F**	1.125	-
Pico Avenue Pier B Street / 9th Street	AM	A	0.428	-	C	0.766	-	C	0.708	-
	MD	A	0.455	-	D	0.897	-	B	0.640	-
	PM	A	0.494	-	B	0.688	-	B	0.625	-
Pico Avenue / Pier C Street	AM	A	0.309	-	A	0.442	-	A	0.446	-
	MD	A	0.340	-	A	0.385	-	A	0.381	-
	PM	A	0.343	-	A	0.402	-	A	0.402	-
Pico Avenue / Pier D Street	AM	B	-	10.1	F	-	55.1	B	0.630	-
	MD	B	-	11.3	E	-	42.0	A	0.529	-
	PM	B	-	10.7	E	-	36.8	A	0.543	-
Pico Avenue / Pier E Street	AM	A	-	9.9	C	-	18.7	A	0.465	-
	MD	B	-	11.8	C	-	23.9	A	0.559	-
	PM	B		11.3	E	-	47.6	C	0.782	
Terminal Island Freeway SB Off-Ramp / New Dock Street	AM	B	-	10.8	F	-	95.1	E	-	48.2
	MD	A	-	9.1	E	-	47.3	D	-	29.6
	PM	A	-	9.3	C	-	15.4	C	-	15.3
Terminal Island Freeway NB On-Ramp / New Dock Street	AM	A	-	7.4	C	-	15.9	B	-	13.9
	MD	A	-	7.6	D	-	30.6	C	-	22.5
	PM	A	-	7.9	D	-	32.7	C	-	21.7
Pico Avenue / Broadway	AM	B	-	10.6	B	-	11.9	B	-	11.9
	MD	B	-	11.2	B	-	10.7	B	-	11.3
	PM	B	-	10.5	B	-	10.3	B	-	11.4
Ocean Boulevard/ Golden Shore Street	AM	A	0.570	-	B	0.658	-	B	0.670	-
	MD	A	0.569	-	C	0.733	-	C	0.735	-
	PM	A	0.593	-	C	0.739	-	**D**	0.801	-
Ocean Boulevard/ Magnolia Avenue	AM	B	0.693	-	E	0.982	-	**F**	1.099	-
	MD	A	0.575	-	D	0.869	-	**E**	0.912	-
	PM	B	0.601	-	D	0.865	-	**E**	0.930	-

[1] No Action Alternative intersection conditions are equivalent to the Bridge Rehabilitation intersection conditions.
[2] Build intersection conditions are equivalent to North- and South-side Alignment Alternative intersection conditions.
Notes: SB – southbound; NB – northbound; AM – morning peak hour; MD – mid-day peak hour; PM – afternoon peak hour
v/c – Vehicle to capacity ratio, presents traffic conditions for signalized intersections.
Delay/Vehicle - delay per vehicle in seconds, presents traffic conditions for unsignalized intersections.
LOS of intersections that are not improved by the proposed project are shown in **bold** type.
Source: Iteris, 2009.

Table 2.2.5-15
Year 2015 Localized Carbon Monoxide Concentrations

Intersection	Peak Hour	1-hour Concentration (ppm)			8-hour Concentration (ppm)		
		Base Year 2005	No Action[1]	Build Alternatives[2]	Base Year 2005	No Action	Build Alternatives
Navy Way and Seaside Avenue	AM	8.1	6.6	6.7	6.1	5.0	5.0
	MD	8.1	6.4	6.5	6.1	4.8	4.9
	PM	9.1	6.8	6.9	6.8	5.1	5.2
Ocean Boulevard and Pier S Avenue	AM	8.2	5.7	5.8	6.2	4.3	4.4
	MD	8.2	5.9	5.8	6.2	4.5	4.4
	PM	8.7	5.9	5.8	6.5	4.5	4.4
Ocean Boulevard and Terminal Island Freeway	AM	8.3	6.1	6.0	6.2	4.6	4.5
	MD	8.2	6.4	6.4	6.2	4.8	4.8
	PM	9.0	6.8	6.6	6.7	5.1	5.0
SB Off-Ramp/ New Dock Street and Terminal Island Freeway	AM	6.3	5.5	5.4	4.8	4.2	4.1
	MD	6.3	5.5	5.4	4.8	4.2	4.1
	PM	6.4	5.4	5.4	4.9	4.1	4.1
Ocean Boulevard/ Golden Shore Street	AM	8.8	6.4	6.4	6.6	4.8	4.8
	MD	8.2	6.2	6.3	6.1	4.7	4.7
	PM	8.3	6.2	6.2	6.2	4.7	5.2
Ocean Boulevard/ Magnolia Avenue	AM	8.4	6.2	6.2	6.3	4.7	4.7
	MD	7.8	6.0	6.0	5.9	4.5	4.5
	PM	7.9	6.0	6.0	5.9	4.5	4.5
State Standard (ppm)		20			9.0		
Federal Standard (ppm)		35			9.0		

[1] No Action Alternative concentrations are equivalent to the Bridge Rehabilitation concentrations.

[2] Build concentrations are equivalent to North- and South-side Alignment Alternative concentrations.

Notes: Total CO concentrations include background 1-hour and 8-hour concentrations of 5.1 and 3.9 ppm, respectively, based on SCAQMD projected future concentration for Long Beach monitoring station in SRA number 4 (SCAQMD, 2007).

Base-year CO levels refer to 2005 and include worst-case background concentrations of 5.9 ppm, 1-hour average, and 4.55 ppm, 8-hour average. Background concentrations are based on a 3-year average of the highest 1-hour and 8-hour concentrations measured at the Central Los Angeles (Main Street) air monitoring station. This scenario presents conditions for CEQA thresholds.

AM – morning peak hour; MD – mid-day peak hour; PM – afternoon peak hour; ppm – parts per million

Source: Parsons, 2009d.

Table 2.2.5-16
Year 2030 Localized Carbon Monoxide Concentrations

Intersection	Peak Hour	1-hour Concentration (ppm)			8-hour Concentration (ppm)		
		Base Year 2005	No Action[1]	Build Alternatives[2]	Base Year 2005	No Action	Build Alternatives
Navy Way and Seaside Avenue	AM	8.1	6.0	6.0	6.1	4.5	4.5
	MD	8.1	5.9	5.9	6.1	4.5	4.5
	PM	9.1	6.1	6.1	6.8	4.6	4.6
Ocean Boulevard and Pier S Avenue	AM	8.2	5.5	5.5	6.2	4.2	4.2
	MD	8.2	5.6	5.6	6.2	4.3	4.3
	PM	8.7	5.6	5.6	6.5	4.3	4.3
Ocean Boulevard and Terminal Island Freeway	AM	8.3	5.7	5.7	6.2	4.3	4.3
	MD	8.2	5.7	5.7	6.2	4.3	4.3
	PM	9.0	6.0	5.9	6.7	4.5	4.5
SB Off-Ramp/ New Dock Street and Terminal Island Freeway	AM	6.3	5.5	5.4	4.8	4.2	4.1
	MD	6.3	5.4	5.4	4.8	4.1	4.1
	PM	6.4	5.3	5.3	4.9	4.0	4.0
Ocean Boulevard/ Golden Shore Street	AM	8.8	5.7	5.7	6.6	4.3	4.3
	MD	8.2	5.6	5.6	6.1	4.2	4.2
	PM	8.3	5.6	5.6	6.2	4.2	4.2
Ocean Boulevard/ Magnolia Avenue	AM	8.4	5.6	5.6	6.3	4.2	4.2
	MD	7.8	5.5	5.6	5.9	4.1	4.2
	PM	7.9	5.5	5.6	5.9	4.1	4.2
State Standard (ppm)		20			9.0		
Federal Standard (ppm)		35			9.0		

[1] No Action Alternative concentrations are equivalent to the Bridge Rehabilitation concentrations.
[2] Build concentrations are equivalent to North- and South-side Alignment Alternative concentrations.
Notes: Total CO concentrations include background 1-hour and 8-hour concentrations of 5.1 and 3.9 ppm, respectively, based on SCAQMD projected future concentration for Long Beach monitoring station in SRA number 4 (SCAQMD, 2007).
Base-year CO levels refer to 2005 and include worst-case background concentrations of 5.9 ppm, 1-hour average, and 4.55 ppm, 8-hour average. Background concentrations are based on a 3-year average of the highest 1-hour and 8-hour concentrations measured at the Central Los Angeles (Main Street) air monitoring station. This scenario presents conditions for CEQA thresholds.
AM – morning peak hour; MD – mid-day peak hour; PM – afternoon peak hour; ppm – parts per million
Source: Parsons, 2009d.

a) Standards and Conformity Conditions

PM_{10} nonattainment and maintenance areas are required to attain and maintain two standards:

- **24-hour standard: 150 μg/m^3:** The 24-hour PM_{10} standard is attained when the average number of exceedances in the previous 3 calendar years is less than or equal to one. An exceedance occurs when a 24-hour concentration of greater than the standard 150 μg/m^3 is measured at a monitoring site near the project site. The annual PM_{10} standard is attained if the average of the annual arithmetic means for the previous 3 calendar years is less than or equal to 50 μg/m^3.
- **Annual standard: 50 μg/m^3:** This standard was revoked by EPA on December 17, 2006, due to a lack of evidence linking health problems to long-term exposure to coarse particulate pollution (EPA, 2006b); however, the 2006 RTIP conformity determination for PM_{10} was made on October 2, 2006, and it was based on the previous annual standard of

50 μg/m^3. To maintain consistency with the conformity determination, the PM_{10} hot-spot analysis includes an analysis of the annual PM_{10} standard.

$PM_{2.5}$ nonattainment and maintenance areas are required to attain and maintain two standards as well. The standards are described below.

- **24-hour standard: 35 μg/m^3:** The standard, as established in 1997, was 65 μg/m^3. Based on 2004-2006 monitored ambient data, EPA strengthened the standards for $PM_{2.5}$. This standard became effective on December 17, 2006. It is expected that EPA will designate the new 24-hour $PM_{2.5}$ nonattainment areas by November 2009, and they will become effective April 2010. A SIP revision will be due to EPA by April 2013 demonstrating an attainment date of April 2015 with a possible extension to April 2020. The $PM_{2.5}$ conformity for the proposed project is based on trend analysis and is applicable to the current standard and the previous 24-hour standard of 65 μg/m^3.
- **Annual standard: 15.0 μg/m^3:** The 24-hour $PM_{2.5}$ standard is based on a 3-year average of the 98th percentile of 24-hour recorded concentrations; the annual standard is based on a 3-year average of the annual arithmetic mean $PM_{2.5}$ recorded at the monitoring station. A $PM_{2.5}$ hot-spot analysis must consider both standards unless it is determined for a given area that meeting the controlling standard would ensure that CAA requirements are met for both standards.

b) Project Compliance with CFR 93.116 and 93.123

Section 93.116 (a) of 40 CFR states that an FHWA/FTA project must not cause or contribute to any new localized $PM_{2.5}$ violations or increase the frequency or severity of any existing PM_{10} or $PM_{2.5}$ violations in nonattainment or maintenance areas. The regulations further state that projects may satisfy this requirement without an analysis of their potential to create particulate matter hot spots, provided that they do not meet the criteria set forth in Section 93.123 (b) for "Project of Air Quality Concern (POAQC)."

A project may be considered to have one of three types of status: (1) Exempt; (2) Not be exempt but not be a POAQC based on the specific parameters established in the regulations; and (3) It may be a POAQC, which requires that a qualitative hot-spot analysis be conducted. The Gerald Desmond Bridge Replacement Project does not meet the definition of an exempt project under Section 93.126 or 93.128.

The 2006 Final Transportation Conformity Rule defines a POAQC that requires PM_{10} and $PM_{2.5}$ hot-spot analysis in 40 CFR 93.123(b)(1) as:

i) New or expanded highway projects that have a significant number of or significant increase in diesel vehicles;

ii) Projects affecting intersections that are at LOS D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;

iii) New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;

iv) Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and

v) Projects in or affecting locations, areas, or categories of sites that are identified in the $PM_{2.5}$ and PM_{10} applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

The proposed project falls within the category of new or expanded highway projects with a significant number of diesel vehicles, and it would be affecting intersections that are at LOS D, E, or F with a significant number of diesel vehicles. The proposed project is a POAQC based on the criteria listed in the final conformity rule (40 CFR 93.123 (b)(1)); therefore, a qualitative project-level hot-spot assessment was conducted to assess whether the project would cause or contribute to any new localized PM_{10} or $PM_{2.5}$ violations, or increase the frequency or severity of any existing violations, or delay timely attainment of the PM_{10} or $PM_{2.5}$ NAAQS.

c) Analysis Methodology and Types of Emissions Considered

As mentioned above, the qualitative PM hot-spot analysis was performed following the EPA document *Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas* (Guidelines - EPA, March 2006b).

The analysis was based on directly emitted $PM_{2.5}$ emissions, including tailpipe, brake wear, and tire wear. Secondary particles formed through $PM_{2.5}$ precursors take several hours to form in the atmosphere and would be dispersed beyond the immediate project vicinity; therefore, they are not considered in a hot-spot analysis. Secondary emissions are included in the regional emission analysis prepared for the conforming RTP and TIP. Vehicles cause dust from paved and unpaved roads to be re-entrained or re-suspended in the atmosphere. According to the 2006 Final Rule, road dust emissions are to be considered for PM_{10} hot-spot analysis. For $PM_{2.5}$, road dust emissions are only to be considered in hot-spot analysis if EPA or the state air agency has made a finding that such emissions are a significant contributor to the $PM_{2.5}$ air quality problem (40 CFR 93.102(b)(3)). EPA and CARB have not made such findings; therefore, these emissions are not included in this analysis.

Additionally, the proposed project construction would last less than 5 years; therefore, temporary construction emissions are not considered in this analysis.

Trend Analysis, For performing the trend analysis, PM_{10} and $PM_{2.5}$ ambient air quality data from monitoring stations within the proposed project area were utilized. This data was compared with PM_{10} and $PM_{2.5}$ NAAQS and also examined for trends to predict future conditions in the project vicinity. In the following sections, the project impacts, as well as the likelihood of these impacts interfering with the ambient $PM_{2.5}$ and PM_{10} levels to cause hot spots, are discussed. The opening year (2015), as well as the horizon year of 2030, were considered for the analysis.

d) Data Consideration

Recent data available from the North Long Beach Monitoring Station include the years 1999 to 2006. Table 2.2.5-16 and Exhibit 2.2.5-3 show the particulate concentrations and their historical trend (both PM_{10} and $PM_{2.5}$), as recorded at this monitoring station. Table 2.2.5-17 provides the measured concentrations and the number of days that the applicable NAAQS was exceeded. Exhibit 2.2.5-3 includes normalized concentrations and shows the trend of the pollutant changes in the area. Normalized concentrations represent the ratio of the highest measured concentrations in a given year to the applicable national standard; therefore, normalized concentrations lower than one indicate that the measured concentrations were lower than the ambient air quality standard. The monitored data show the following trends:

- Respirable Particulate Matter (PM_{10}) – During the recorded period of 1999 to 2006, both the 24-hour maximum and the annual average monitored data were well below the NAAQS. The highest recorded 24-hour concentration during the period of 1999 to 2006 was 91 µg/m^3, which was recorded in 2001. The highest annual average was 39 µg/m^3 for 1999. The NAAQS were not exceeded at any time during the last 8 years at the monitoring station.
- Fine Particulate Matter ($PM_{2.5}$) – During the recorded period of 1999 to 2006, the 24-hour 98th percentile concentration, which was averaged over 3 years, remained below the NAAQS (57 to 45 µg/m^3, or between 88 percent and 70 percent of the standard level), with a higher declining rate since 2002. The annual mean $PM_{2.5}$ concentration exceeded the NAAQS every year; however, the data show a declining trend. Specifically, from 2001 to 2003 the annual average concentrations show an approximate 8.5 percent reduction rate, which is very little change from 2003 and 2004, and a higher reduction rate of approximately 12 percent from 2004 to 2005 (17.9 µg/m^3 to 15.9 µg/m^3) concentrations. The data indicate a general declining trend for the ambient $PM_{2.5}$ concentrations in the project area.

Future Air Quality Trends. The area surrounding the project is mostly built out and consists primarily of industrial and Port-related uses. The climate and meteorology at the project site are typical of coastal areas, with variable winds during the day that facilitate the dispersion of pollutants better than in the inland areas; therefore, future air quality is expected to improve per the trend shown in Table 2.2.5-17, Exhibit 2.2.5-3, and in the SIP.

The proposed project is included in the RTP; thus, it is included in the SCAB air quality modeling efforts for the region, as provided in the 2007 AQMP.

Basin Trends. SCAQMD's 2007 AQMP includes modeled estimates of future air quality levels within the SCAB. The modeling results that are reported in the 2007 AQMP indicate that particulate matter emissions and other criteria pollutants have decreased significantly with implementation of new air quality standards and more stringent rules and regulations. Additionally, comparisons with recent year projections show that the air quality is improving at a greater rate than what was projected by the models.

Table 2.2.5-18, which was derived from Chapter 10 (Looking beyond Current Requirements) of the 2007 AQMP, provides a comparison of the monitored 2005 PM levels to the model predicted values for 20015 and 2021. As shown, the projected data indicate a trend of decreasing ambient PM concentrations from 2005 to 2021.

Table 2.2.5-17
Particulate Matter Data Summary (North Long Beach Monitoring Station)

Pollutant	Standard (µg/m³)	Recorded Concentrations (µg/m³)							
		1999	2000	2001	2002	2003	2004	2005	2006
Respirable Particulate Matter (PM_{10})	(24-Hour)								
	1st Maximum Concentration	79	105	91	74	63	72	66	51
	Days > NAAQS (150 µg/m³)	0	0	0	0	0	0	0	0
	(Annual Average)								
	Annual Arithmetic Mean (50 µg/m³)	39	38	37	36	33	33	30	31
Fine Particulate Matter ($PM_{2.5}$)	(24-Hour)								
	1st Maximum Concentration	67	82	73	63	115	67	54	59
	98th Percentile of 24-hour Concentration	51	64	49	47	47	46	41	50
	Days > NAAQS (65 µg/m³)	0	0	0	0	0	0	0	0
	3-year Average 98th Percentile [a]	55	57	55	53	48	47	45	46
	(Annual Average)								
	Annual Arithmetic Mean (15 µg/m³)	**20.7**	**19.7**	**21.2**	**19.5**	**18.0**	**17.9**	**15.9**	**15.2**

[a] Attainment condition for $PM_{2.5}$ is that the 3-year average of the 98th percentile of 24-hour concentrations at each monitor within an area must not exceed 65 µg/m³. Annual exceedances are shown in **bold** type.

Source: CARB, 2008.

Exhibit 2.2.5-3
Normalized Monitored PM Concentrations – 1999 to 2006, North Long Beach Monitoring Station

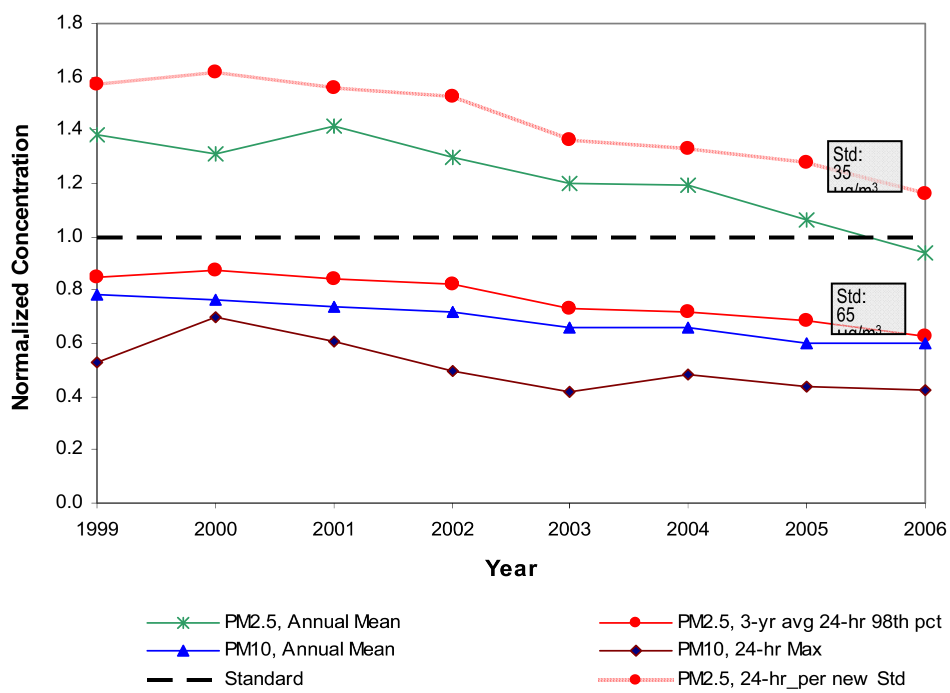


Table 2.2.5-18
Comparison of Particulate Matter Ambient Concentrations (SCAB)

Pollutant (Averaging Time)		Standard ($\mu g/m^3$)	2005		2015 [a]		2021	
			Observed Max Value ($\mu g/m^3$)	% Above Standard	Projected Max Value ($\mu g/m^3$)	% Above Standard	Projected Max Value ($\mu g/m^3$)	% Above Standard
PM_{10} (24-hour)		150	131	Met	117	Met	111	Met
$PM_{2.5}$ (Annual)		15	21	40	15	Met	<15	Met
$PM_{2.5}$ (24-hour)	Current	65	133	104	57	Met	52	Met
	New	35	133	279	57	63	52	49

[a] Projected data include the 2007 Control Strategies.

Source: SCAQMD, 2007 AQMP, Chapter 10.

The monitored PM ambient concentrations at the Long Beach Station, shown in Table 2.2.5-17, support the modeled predicted trends, as the recorded PM_{10} and $PM_{2.5}$ levels at the monitoring station between the years 1999 and 2006 for both the 24-hour levels and average annual values show a general declining trend.

e) Traffic Condition Effects

The proposed project would replace the existing physically and functionally deficient Gerald Desmond Bridge with a new structure that would be able to carry the projected traffic volume increase in the area. In addition, the project includes reconfiguration of freeway interchanges within the project limits and some arterial street intersections; therefore, the project would improve traffic operations along the project corridor, including segments of Ocean Boulevard over the new bridge, and freeway ramps and interchanges, as well as intersections within the study area. The effects of the Build Alternatives on the roadway segment and intersections are discussed below.

Roadway Segments. The existing bridge has two travel lanes in each direction, with a truck-climbing lane approach grade of 6 percent up to the crest of the bridge where they merge back to the two-lane configuration. The need for the truck climbing lanes, coupled with traffic congestion during the morning and afternoon peak operation hours, has resulted in traffic congestion along the bridge. The Gerald Desmond Bridge Replacement Project would accommodate current and future car and truck traffic volumes by providing three travel lanes and shoulders in each direction. The addition of the third lane, combined with the reduced approach grade, would eliminate the current merging movement and improve LOS. In addition, the roadway shoulders would reduce nonrecurring congestion in the project area. Nonrecurring congestion is traffic congestion related to automobile crashes, disabled vehicles, work zones, adverse weather events, and planned special events (FHWA, 2006b). The addition of a 9.8-ft-wide (3-m) outside shoulder and an 11.8-ft-wide (3.6-m) inside shoulder at the approaches of the new bridge would provide room for emergency response vehicles, roadway maintenance personnel, and disabled automobiles without causing major congestion/roadway closures to occur. These improvements in access would reduce delays in traffic, thereby providing the benefit of improved air quality in the project area. Furthermore, the proposed improved 5 percent approach grade would help reduce emissions of pollutants from faster-moving trucks in comparison to the emissions from the slower truck traffic and higher revolution-per-minute trucks to climb uphill on the existing steep grade of the climbing lane.

Intersections. As a result of the proposed project, delays due to traffic congestion at most of the studied intersections in the project area would be greatly reduced, and the average vehicle travel speed would slightly increase. Both of these effects would translate into a decrease in vehicle emissions. In 2030, the LOS at the intersections within the project area would be improved with implementation of the Build Alternatives. Tables 2.2.5-13 and 2.2.5-14 compare the PM peak-hour intersection conditions of the No Action Alternative to the Build Alternatives for 2015 and 2030, respectively. Among the 13 intersections that were analyzed, the LOS of the Build Alternatives would improve at all but three intersections when compared to the No Action Alternative.

The intersection of Navy Way and Seaside Avenue would have a worse v/c compared to the No Action Alternative. The effect would be more significant for the AM peak hour during the opening year. The mid-day and PM peak-hour LOS would not change and would result in only a slight increase in v/c. The two intersections of Ocean Boulevard at Golden Shore Street and at Magnolia Avenue would have worse v/c and/or LOS compared with the No Action Alternative. The effect at these two intersections would be more significant for the horizon year, when the PM LOS at Golden Shore Street and Ocean Boulevard changes from C to D, and the LOS at the intersection of Magnolia Avenue and Ocean Boulevard would decline at all peak hours.

An increase of PM emissions would occur if the project significantly increased ADT in the project area and at locations where there are more traffic delays. Traffic delays would occur at intersections where vehicles are accumulating and idling. It is unlikely that PM hot spots would be associated with the proposed project because local accumulation and delay of vehicles would be reduced by the project. For all intersections except one, LOS would improve under the Build Alternatives when compared to the No Action Alternative. Potential localized PM increases associated with the increase in ADT would be offset by the increase of vehicle speed in the project area, which is an indication of reduced congestion and idling of vehicles. Thus, the project is not expected to cause an adverse affect with respect to localized concentrations of $PM_{2.5}$ or PM_{10}, at any nearby sensitive receptor.

Emissions Calculation

Table 2.2.5-9 presents emissions, including PM_{10} and $PM_{2.5}$, from vehicles traveling along the project corridor for the years 2005, 2015, and 2030. The particulate emissions in Table 2.2.5-9 include PM emissions from vehicle exhaust, brake wear, tire wear, and re-entrained road dust. The emission inventories presented in the SCAQMD 2007 AQMP show that emissions from paved roads are a significant contributor to directly emitted PM_{10} and $PM_{2.5}$. Because the 2007 AQMP is incorporated as part of the California 2007 SIP, PM from re-entrained roads was included in the hot-spot analysis. Re-entrained road dust was estimated based on VMT, and Chapter 13.2.1 of *AP-42, Fifth Edition, Compilation of Air Pollutant Emission Factors* (EPA, 2006c).

As shown in Table 2.2.5-9, estimates of PM_{10} and $PM_{2.5}$ emissions for base, opening, and horizon years show that project implementation would not generate significant additional daily emissions. Because the VMT and the number of trucks (not percentage) are predicted to increase with time, the paved road dust emissions would also increase with time. This finding is consistent with the emission inventories reported in the SCAQMD 2007 AQMP, which also shows an increase of road dust emissions with time. Because paved road emissions are included in the 2007 AQMP and the $PM_{2.5}$ SIP, paved road emissions have been accounted for as part of the $PM_{2.5}$ attainment plan; therefore, the proposed project is not expected to cause new violations or increase the frequency or severity of any existing violations, or delay timely attainment of the NAAQS.

In conclusion, the proposed project would improve the operations of the intersections and increase vehicle speeds in the project area, compared to the No Action scenario. Accordingly, it is reasonable to conclude that PM emissions associated with the proposed action would not generate high concentrations of PM (hot spots); therefore, the project meets the project-level conformity requirements for PM_{10} and $PM_{2.5}$ as defined in 40 CFR Sections 93.116 and 93.123.

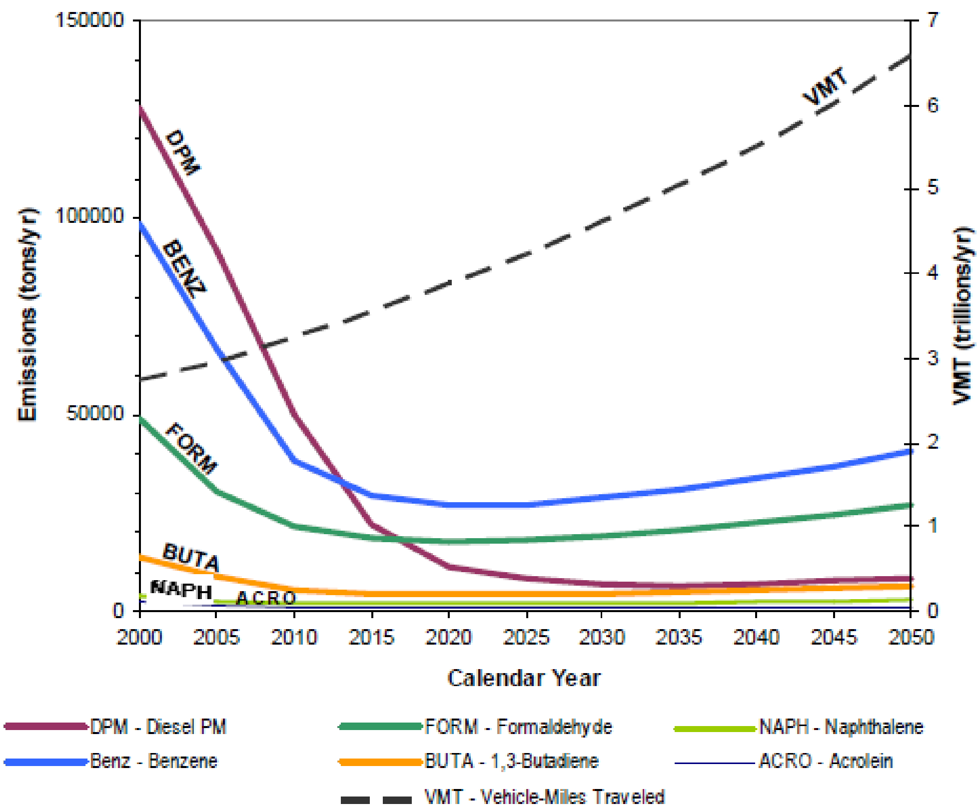
Mobile Source Air Toxics. As described in Section 2.2.5.1, EPA issued a Final Rule on *Controlling Emissions of Hazardous Air Pollutants from Mobile Sources, 66 FR 17229* (March 29, 2001). Furthermore, several studies have concluded that mobile sources (i.e., on-road and non-road combined) are responsible for most of the excess cancer risk associated with exposure to urban air toxics. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. Currently, the tools and techniques for assessing project-specific health impacts from MSATs are limited. Moreover, EPA has not established regulatory concentration targets for the relevant MSAT pollutants appropriate for use in the project development process. For the same reason, states are not required to achieve an identified level of air toxics in the ambient air or to identify air toxics reduction measures in the SIP. Developing strategies for reduction of MSATs is a cooperative effort between federal and local authorized agencies. The CAA provides EPA with the authority to establish and regulate emission standards for engines and vehicles. The State of California also has the right to adopt its own emission regulations, which are often more stringent than the federal rules. To reduce mobile source emissions, mandatory and incentive-based programs are developed in conjunction with new engine emission regulations; additional emission testing requirements (i.e., supplemental emission test [SET], not-to-exceed [NTE] limits); and limiting fuel sulfur content. These programs are implemented by all levels of government: federal, state, and local (Dieselnet, 2007). Currently, FHWA's interim guidance update (FHWA, 2009) is used for analysis of potential impacts of MSATs to be included in environmental documents.

The 2007 EPA rule mentioned in Section 2.1.1.3 requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050, as shown in Exhibit 2.2.5-4.

California's vehicle emission control and fuel standards are more stringent than federal standards and are effective sooner, so the effect of combined state and federal regulations is expected to result in a greater reduction of MSATs sooner than the FHWA analysis predicts.

Based on FHWA's tiered approach in their interim guidance document, the proposed project would be considered to have minimal potential MSAT effects. The following analysis provides an assessment of project local MSAT effects. The analysis was conducted using the projected traffic data, including local roadway traffic volumes and VMT, vehicle mix, traffic diversion data, average speed, and associated changes in MSATs for the project alternatives.

Exhibit 2.2.5-4
National MSAT Emissions Trend, 1999 - 2050
for Vehicles Operating on Roadways



Notes: (1) The projected data were estimated using EPA's MOBILE6.2 Model run August 20, 2009.
(2) Annual emissions of polycyclic organic mater are projected to be 561 tons per year for 1999, decreasing to 373 tons per year for 2050.
(3) Trends for specific location may be different, depending on locally derived information representing VMT, vehicle speeds, vehicle mix, fuels, emission control programs, methodology, and other factors.

Source: FHWA, 2009.

Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Impacts of MSATs. Research into the health impacts of MSATs is ongoing. For different emission types, a variety of studies show that some either are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals demonstrate adverse health outcomes when exposed to large doses.

Exposure to toxics has been a focus of many of EPA's efforts. Most notably, the agency conducted the NATA in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or State level.

As described in Section 2.2.5.2, SCAQMD conducted a comprehensive study on air toxics within the SCAB. The MATES-II and MATES-III Studies (SCAQMD, 2000 and 2008, respectively), which monitored more than 30 toxic air pollutants, included estimates of cancer risk from exposure to DPMs. The MATES studies identified particulate emissions, attributed mostly to diesel engines, as an important cancer risk factor. According to MATES-III, DPMs accounted for approximately 84 percent of the total cancer risk associated with the investigated group of air pollutants. MATES studies also provided regional trends in estimated outdoor cancer risk from air toxics emissions.

EPA is in the process of assessing the risks of various kinds of exposures to MSAT emissions. The EPA IRIS is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at http://www.epa.gov/iris. The following toxicity information for the six prioritized MSATs was taken from the IRIS database Weight of Evidence Characterization summaries. This information is taken from EPA's IRIS database and represents the Agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- **Benzene** is characterized as a known human carcinogen.
- The potential carcinogenicity of **acrolein** cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure.
- **Formaldehyde** is a probable human carcinogen, based on limited evidence in humans, and sufficient evidence in animals.
- **1,3-butadiene** is characterized as a human carcinogen by inhalation.
- **Acetaldehyde** is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure. **Naphthalene,** which is the replacement for acetaldehyde in the 2009 update memorandum, is also a probable human carcinogen based on observations of respiratory tumors in mice after inhalation and oral exposure. Noncancer effects of concern in humans exposed to naphthalene include hemolytic anemia, cataract, and respiratory toxicity.
- **Diesel exhaust (DE)** is likely to be carcinogenic to humans by inhalation from environmental exposures. DE, as reviewed in this document, is the combination of DPM and DE organic gases. **DE** also represents chronic respiratory effects, possibly the primary noncancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.
- **Polycyclic Organic Matter (POM)** consists of a mixture of hundreds of chemicals, including polycyclic aromatic hydrocarbons (PAHs), their oxygenated products, and their nitrogen analogs (nitro-PAHs). Sources of airborne POM include various mobile-source combustion, industrial, and domestic processes. Occupational and community studies suggest that exposure to mixtures containing POM (and specifically PAHs) is associated with carcinogenic and reproductive effects, although it is not possible specifically to implicate POM or its individual components as being causally related to these health effects. Recent evidence from occupational epidemiologic studies indicated that exposure to high concentrations of PAHs is associated with mortality from respiratory and cardiovascular effects.

Other studies have addressed MSAT health impacts in proximity to roadways. The Health Effects Institute, which is a nonprofit organization funded by EPA, FHWA, and the industry, has undertaken a major series of studies to research near-roadway MSAT hot spots, the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years.

SCAQMD's MATES studies offer an opportunity to estimate air toxics-related health risks from roads; however, while at the regional scale the studies approximate air toxics-related health risk from roads, they were not designed to provide accurate approximations of risk as a function of proximity to roads. Monitoring data near freeways were limited to three sites, and modeling results were not finely resolved to provide concentration gradients near roads. The MATES monitoring results are consistent with other research indicating that pollutant concentrations are often close to or approximately the same as background conditions beyond 328 ft (100 m) from a road. Furthermore, the studies caution that results are highly dependent upon the unit risk factors assumed, particularly for DPM, for which uncertainties are an order of magnitude or more. At the microscale, neither MATES-II nor MATES-III was designed to effectively assess changes in pollutant concentrations with varying distance from roadways; therefore, the available methodology and techniques need to be refined so that they provide tools and information that would be useful to alleviate the uncertainties listed above and enable us to perform a more comprehensive evaluation of the health impacts specific to this project.

MSAT Effect Analysis

Emissions of priority MSATs were estimated along the project corridor. Emissions were estimated for opening year 2015 and the horizon year 2030, as well as for the CEQA baseline base year 2005. The 2005 emissions are included to show the effect of current VMT levels and the degree of control plans on MSAT emissions.

The analysis was conducted for six air toxics that are identified as priority MSATs by EPA. The EMFAC2007 model was used to provide the emission factors of total organic gas (TOG) and PM in Los Angeles County for the analysis years (i.e., base year 2005, year 2015, and horizon year 2030). The PM data from EMFAC provide information for DPM. For the remaining priority MSATs (i.e., acrolein, acetaldehyde, formaldehyde, benzene, and 1,3-butadiene), CARB-supplied speciation factors can be used to obtain each MSAT compound as a fraction of TOG data.

It should be noted that because at the time of this writing the methodology for MSAT estimation was not updated to include the revised MSAT list as defined in FHWA's 2009 Update Guidance document, the analysis is provided for the six MSATs identified in the 2006 Guidelines. Furthermore, this analysis was conducted using EMFAC2007 and the UC-Davis Spreadsheet Tool, and because the methodology is similar to the use of CT-EMFAC, the results presented herein would be valid for the purpose of comparison and evaluation of the MSAT effects.

As described in Section 2.2.5.3, the UC Davis-Caltrans Project-Level MSAT Analysis Spreadsheet Tool (UC-Davis and Caltrans, 2006), was used to provide a comparison of MSAT emissions for the local roadways with and without the proposed project. The analysis was conducted for the project corridor along Ocean Boulevard and the Gerald Desmond Bridge. The traffic volumes and average speeds during peak and non-peak hours, percent of trucks, and VMT were used as input data. The spreadsheet tool applies the traffic activity data to the emission factors and estimates MSAT emissions for different scenarios.

Exhibit 2.2.5-5 and Table 2.2.5-19 present the results from the spreadsheet tool for estimated daily emissions for the analyzed roadway segment. As shown, a significant decrease in MSAT emissions can be expected for the proposed project from the base year (2005) levels through future year levels. This decrease is prevalent for all of the priority MSATs, and it is consistent with EPA's study. For all studied roadways, MSAT emissions are projected to decline markedly in the future (i.e., compared to base year 2005). This is directly due to the improved pollution emission performance of a modernizing fleet of all diesel-fueled vehicles, which is a trend that is anticipated to continue throughout the planning horizon. The estimated emission increase along the project corridor for the opening year 2015 (3.9 percent compared to No Action) and horizon year 2030 (4.7 percent compared to No Action) is due to an increase in ADT.

2.2.5.4 Human Health Risk

The previous section presented the MSAT emissions analysis for compliance with FHWA's NEPA guidance. This section provides the HRA that is prepared for the Port to use in their CEQA analysis.

As previously discussed under Project-Level Construction Air Quality Effects and Mobile Air Source Toxics, combined emissions from project construction and operations would include TACs that could affect public health; therefore, an HRA was conducted to evaluate the health effects of project-related TAC emissions on the public.

The HRA was conducted in accordance with the *Air Quality and Health Risk Assessment Analysis Protocol for Proposed Projects at the Port of Long Beach* (HRA Protocol) (POLB, 2007c). In general, the Protocol follows the methods for preparing Tier 1 risk assessments described in *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* (OEHHA, 2003); *Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act (AB 2588)* (SCAQMD, 2005); and *Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Emissions* (SCAQMD, 2002). The methods in these guidance documents are incorporated into the Hotspots Analysis and Reporting Program (HARP) model released by CARB in December 2003 (CARB, 2003a). This HRA used the HARP model to perform all health risk calculations. The HRA estimated the individual lifetime cancer risks, cancer burden, and chronic and acute non-cancer hazard indices associated with the proposed project. The complete HRA report is provided in Appendix D of the Air Quality Technical Study (under separate cover).

The HARP model, as was originally developed, includes a hard-coded version of EPA's ISCST3 (Industrial Source Complex Short-Term Version 3) model for calculating pollutant dispersion; however, since November 2006, AERMOD (American Meteorological Society/EPA Regulatory Model Improvement Committee MODEL) became EPA's preferred dispersion model. Consequently, CARB has developed the program "HARP On-Ramp," which converts AERMOD air dispersion output files into text files that can be imported by the HARP Risk Module for performing the risk analysis (CARB 2007b). Thus, AERMOD was used for conducting the air dispersion analysis for this HRA in conjunction with the risk module in HARP.

Individual lifetime cancer risk represents the chance that an individual would contract cancer after a lifetime of exposure to the TACs of concern. The CEQA threshold for significance, used to evaluate the impact of exposure to TACs is 10 excess cancer cases per one million ($10x10^{-6}$). This threshold is recommended by SCAQMD and CARB explicitly to determine project-specific health risk impacts. Although Caltrans has not adopted HRA thresholds and is not subject to local jurisdictions or their thresholds of significance, Caltrans supports the Port's efforts and remains committed to thoroughly analyzing air quality impacts and incorporating measures to avoid, minimize and if necessary mitigate them.

Cancer burden is an estimate of the number of persons that would contract cancer from exposure to project TAC emissions within the project's zone of influence (ZOI). SCAQMD considers a cancer burden of 0.5 or higher associated with a proposed project to be significant.

For non-cancer health effects, estimates of chronic and acute hazard indices represent predicted long- and short-term health impacts from exposure to certain TACs, respectively. The hazard indices are calculated by dividing model-predicted TAC concentration by the TAC reference exposure levels (RELs) established by OEHHA. A health hazard index (HHI) equal to or greater than one indicates the potential for adverse health effects. These include cardiovascular or respiratory diseases, exacerbation of asthma, bronchitis, decrease in lung function, and mortality.

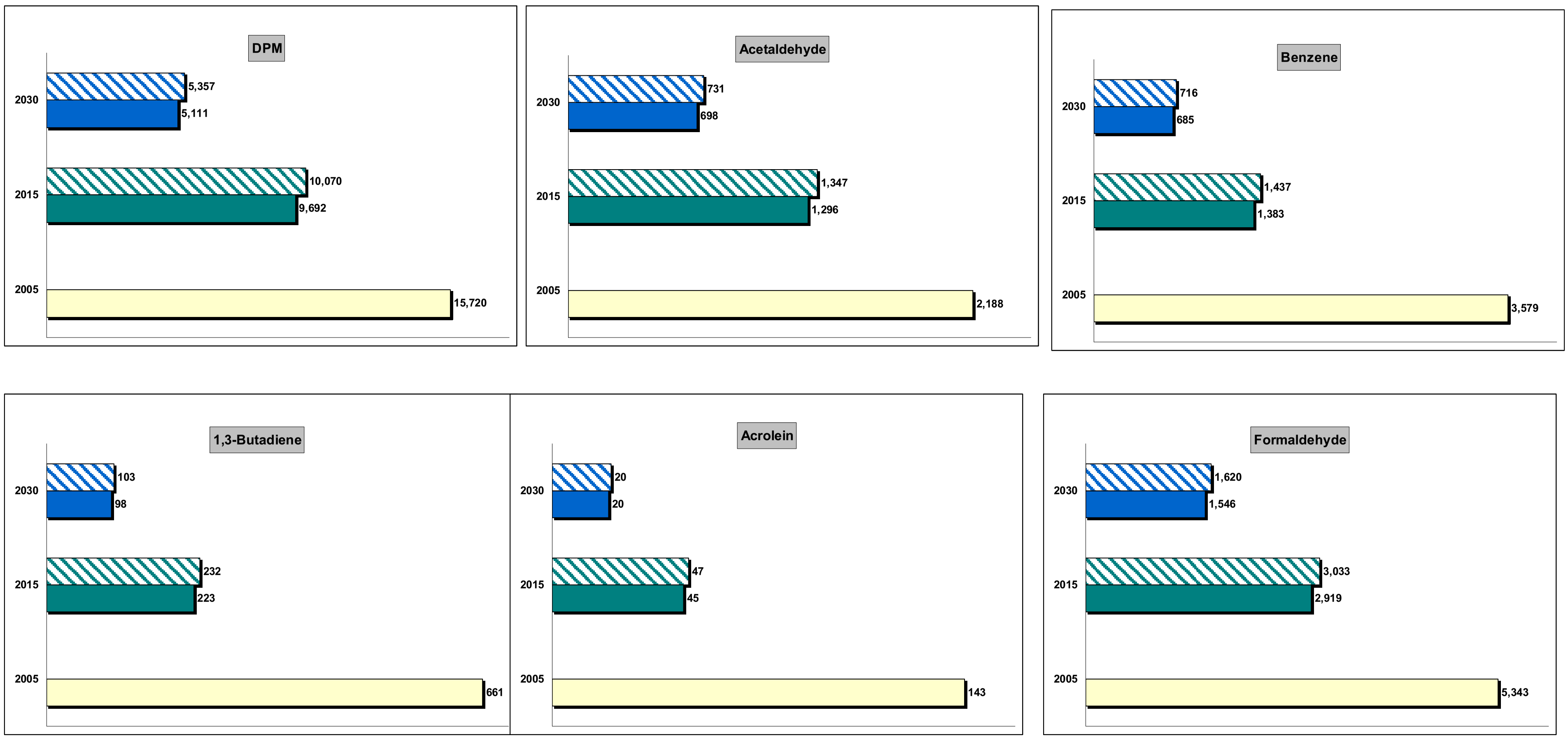
Estimates of project health effects include the evaluation of operational emissions associated with the Gerald Desmond Bridge Replacement Project.

The HRA methodology includes four procedural steps to estimate health impact results:

1. Quantify project-generated emissions;
2. Identify ground-level receptor locations that may be affected by the emissions (including a regular grid of receptors and any special sensitive receptor locations, such as schools, hospitals, convalescent homes, and child-care centers);
3. Perform dispersion modeling analyses to estimate ambient TAC concentrations at each receptor location; and
4. Use a risk characterization model (i.e., HARP) to estimate the potential health risk at each receptor location.

The following describes in detail the methods used to develop each step of the project HRA.

Exhibit 2.2.5-5
Local Area Emissions of Priority MSATs from Ocean Boulevard Segment for Scenario Years CEQA Base Year (2005), Opening Year (2015), and Horizon Year (2030)



Legends:

NOP Year 2005; Opening Year 2015 (No Action and Rehabilitation Alternative); Opening Year 2015 (Project Build Alternatives);

RTP Horizon Year 2030 (No Action and Rehabilitation Alternative); RTP Horizon Year 2030 (Project Build Alternatives);

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Table 2.2.5-19
Estimate of Priority MSATs Emissions for the Project Corridor along Ocean Boulevard (grams/day)

Year/Scenario	DPM	Benzene	1,3-Butadiene	Acetaldehyde	Acrolein	Formaldehyde	Total MSATs
Baseline – 2005	15,720	3,579	661	2,188	143	5,343	27,634
Opening Year 2015 – No Action[1]	9,692	1,383	223	1,296	45	2,919	15,558
Opening Year 2015 –Build Alternatives[2]	10,070	1,437	232	1,347	47	3,033	16,166
Horizon Year 2030 – No-Action	5,111	685	98	698	20	1,546	8,158
Horizon Year 2030 – Build Alternatives	5,357	716	103	731	20	1,620	8,547

[1] No Action Alternative MSAT emissions are equivalent to the Bridge Rehabilitation conditions.
[2] Build MSAT emissions are equivalent to North- and South-side Alignment Alternative conditions.
Source: Parsons, 2009d.

Emission Sources

The proposed project is a transportation corridor and the emission sources are vehicles traveling along the roadways affected by the project implementation. The emissions considered for HRA include vehicle engine exhaust, tire wear, and brake wear. The project corridor was modeled as a system of 12 roadway links/segments, each with uniform width, traffic volume, vehicle fleet mix, and average speed. The distinct links were selected based on the project traffic analysis report (Iteris, 2009). Table 2.2.5-20 lists the roadway links as the emission sources for the HRA.

For the determination of significance from a NEPA standpoint, this HRA determined the incremental increase in health effects values associated with the proposed project by estimating the net change in impacts between the proposed Build Alternatives and the No Action/Rehabilitation Alternative scenario (NEPA Baseline). These project increments (proposed Build Alternatives minus No Action Alternative) were compared with the SCAQMD thresholds to determine if an adverse effect on human health would occur.

The determination of health risks in this HRA required the calculation of 70-year average and

Table 2.2.5-20
Identified Project Emission Sources for HRA

Link[a] ID (as used in AERMOD)	Description of Line Source as the Vehicle Traffic along the Link
OCBL1	Ocean Boulevard Segment 1 – between Navy Way off-ramp and the EB and WB horseshoe ramps
OCBL2	Ocean Boulevard Segment 2 (includes New Bridge) – between Horseshoe ramps and SR 710 connector ramps
OCBL3	Ocean Boulevard Segment 3 – from SR 710 connector ramps to Downtown Long Beach
NWYOF	Off-ramp from WB Ocean Boulevard to Navy Way
OFFEB	Off-Ramp from EB Ocean Boulevard to EB Seaside Avenue
ONEB	Horseshoe ramp from WB Seaside Avenue to EB Ocean Boulevard
OFFWB	Horseshoe ramp from WB Ocean Boulevard to Seaside Avenue
ONWB	On-ramp from Seaside Avenue to WB Ocean Boulevard
ONPICO	Connector on-ramp, from SB Pico Avenue to WB Ocean Boulevard
OFFPICO	Connector off-ramp, from WB Ocean Boulevard to NB Pico Avenue
NBRAMP	SR 710 NB Connector Ramp – WB Ocean Boulevard off-ramp to NB SR 710
SBRAMP	SR 710 SB Connector Ramp – on-ramp to WB Ocean Boulevard from SB SR 710

[a] Roadway link is defined as a discrete segment of roadway with unique estimates for the vehicle-fleet specific population and average speed. A roadway link is classified as a highway, ramp, major arterial, minor arterial, or collector/connector.

maximum annual TAC emission rates. The HRA used 70-year annual average emission rates to determine individual lifetime cancer risks. The 70-year averaging period coincided with 2015 through 2084, or project years one through 70.

Emissions Characterization

The emissions from project sources included in the HRA are vehicle engine exhaust emissions and tire wear and brake wear. As previously described, emissions from vehicle movement along each roadway link were simulated as line source emissions in the modeling analysis and represented as a series of separated volume sources. Volume source emissions were simulated by AERMOD to mimic the initial lateral dispersion of emissions by the exhaust stack's movement through the atmosphere. Key model parameters for volume sources include emission rate, source release height, and initial lateral and vertical dimensions of volumes.

The HRA analyzed the risk from combined emissions from all individual roadway links using the link-specific data and assumptions as described above. Emissions from trucks were assigned a release height of 15 ft (4.5 m) and for automobiles an initial release height of 3 ft (0.6-m). The width of the volume sources were set equal to the width of the roadway link plus 10 ft (3 m) in each side. The base elevations were adjusted for the elevated portions of the project corridor, such as the Gerald Desmond Bridge and the Horseshoe off-ramp from WB Ocean Boulevard to Seaside Avenue.

Mobile source emissions along each link were estimated based on link-specific vehicle activity data including fleet mix, traffic volumes and VMT for each vehicle type, and peak and average travel speed. Vehicle emissions factors at the average link speed and at peak-hour speed (for acute hazard effects analysis) were obtained using the EMFAC2007 model. The total emission rate of each link (line source) was then divided by the number of volume sources in that link to obtain emissions per volume source. It should be noted that the construction emissions of DPM were not included in the health risk analysis, because of the temporary and intermittent nature of construction emissions and because, even based on the peak daily emissions of DPM, the total construction DPM emissions is only approximately 5 to 6 percent of the operational emissions of DPM.

Based on project traffic, vehicle mix within the project corridor was assumed to consist of heavy-duty diesel trucks and PCEs, for non-diesel trucks. Emissions of TACs from project operational sources include exhaust emissions from diesel trucks, gasoline-fueled PCEs, and particulate emissions from vehicles tire wear and brake wear.

For diesel truck engines, exhaust PM_{10} (modeled as DPM) is the only pollutant analyzed as a surrogate for diesel exhaust TACs. The cancer and chronic non-cancer toxicity factors established by the OEHHA for the assessment of DPM emissions include consideration of all toxic compounds associated with diesel combustive emissions. Although no specific risk factors have been developed for UFP, they are major constituents of DPM emissions resulting from transportation sources. DPM emissions are analyzed in the HRA, and they include the entire range of diesel particulate sizes, including UFP, and the risk factors established for DPM for use in health risk analysis incorporated all DPM constituents during the regulatory review process.

Gasoline vehicle exhaust TAC emissions were speciated to the MSAT pollutants benzene, acrolein, acetaldehyde, 1-3 butadiene, and formaldehyde. The TOG speciation factors for gasoline vehicles were identified and taken from the most recent Caltrans inventory tool for MSATs (UC Davis, 2006).

For vehicle tire and brake wear, fugitive PM_{10} emissions were speciated into their respective TAC components using CARB profiles.

In accordance with CARB recommendations, speciation profiles developed for the California Emission Inventory and Reporting System (CEIDARS) were used in this study (CARB 2002 and 2003b). In this study, TOG emissions were derived from VOC emissions using conversion factors provided with the TOG speciation profiles.

The estimates of TAC emissions for the No Action/ Rehabilitation Alternative and Build Alternative scenarios, and speciation profiles are provided in Appendix D.

Risk Characterization and Assessment Approach

Risk characterization involves the evaluation of potential health risks based on the amount of exposure to TACs in exposed individuals and the exposure scenario (i.e., the environment in which receptors are exposed). For this HRA, the main exposure pathway is inhalation.

Two types of cancer risks were estimated in this HRA: individual excess cancer risk and population cancer burden. The individual excess cancer risk represents the potential risk to a single maximally exposed individual who may be exposed over a 70-year lifetime to a facility's emissions for a residential exposure (or a 40-year work lifetime for occupational exposure). Population cancer burden is an estimate of the increased number of cancer cases in a population as a result of exposure to emitted substances. The excess cancer burden for a population unit is the product of the exposed population and the estimated individual risk of that population (i.e., exposure concentrations are based on the average over that population presumed to be at the population centroid) associated with exposure through all exposure routes of emissions from the facility. The effect on the public would be considered adverse if the predicted cancer burden is greater than 0.5.

To estimate the cancer risk effect, source emissions were projected over a 70-year period, from 2015 through 2084. The 70-year projection of activity levels requires incorporation of traffic volume increase based on project area development and associated changes in truck trips, and vehicle travel speeds. Traffic numbers were provided for all alternatives for 2005 (baseline year), 2015 (opening year), and 2030 (horizon year). Due to the difficulty in predicting beyond 2030 and the fact that POLB would reach build-out traffic conditions for Port-generated land uses by the year 2030, the analysis assumed build-out constant traffic activities beyond the horizon year; however, for the CEQA baseline scenario, activity levels in the baseline year of 2005 were held constant over the entire 70-year period.

Cancer burden was determined with the approach used by CARB in the HARP program (CARB, 2003a). To estimate cancer burden, the incremental cancer risk was determined for each census block within the project's ZOI, which is defined as the area within the isopleth representing a one in one million ($1x10^{-6}$) cancer risk increment.

To estimate project non-cancer effects, the HRA focused on operations in year 2015. This was determined based on annual emissions to represent the year with the greatest incremental impact between the operational and baseline conditions.

The HRA evaluated cancer risks and chronic and acute hazard indices to residential, occupational, and sensitive receptors (e.g., schools, child-care centers, and elderly care facilities). Each receptor type has specific exposure duration, breathing rate, and other parameters for risk assessment. Cancer burden was calculated using residential exposure assumptions.

Table 2.2.5-21 presents estimates of maximum individual cancer risk, and chronic and acute non-cancer hazard indices increments associated with the proposed project. The projected values for each receptor type correspond to the receptor with the maximum increment. All other incremental health impacts within the modeling domain would be less than those shown in Table 2.2.5-21. Estimation of project-related incremental cancer burdens is also included in the table.

Table 2.2.5-21
Estimate of Maximum Heath Impacts due to the Proposed Project

Health Impact	Receptor Type	Proposed Project	No Action	Project-Related Increment	CEQA[1] Baseline	CEQA Increment	Significance Threshold
Cancer Risk	Residential	2.9×10^{-6}	2.1×10^{-6}	0.8×10^{-6}	5.2×10^{-6}	-2.3×10^{-6}	10×10^{-6}
	Occupational	1.4×10^{-6}	1.1×10^{-6}	0.3×10^{-6}	2.8×10^{-6}	-1.4×10^{-6}	
	Sensitive	1.2×10^{-6}	0.8×10^{-6}	0.4×10^{-6}	2.1×10^{-6}	-0.9×10^{-6}	
Chronic Hazard Index	Residential	0.0029	0.0021	0.0008	0.0033	-0.0004	1.0
	Occupational	0.009	0.007	0.002	0.011	-0.006	
	Sensitive	0.0012	0.0009	0.0003	0.013	-0.001	
Acute Hazard Index	Residential	0.0004	0.0003	0.0001	0.0034	-0.003	1.0
	Occupational	0.0006	0.0005	0.0001	0.0057	-0.005	
	Sensitive	0.0002	0.0002	0.00	0.0017	-0.0015	
Cancer Burden				0.003		-0.011	0.5

[1] Health Impacts Pursuant to CEQA are discussed in Chapter 3.
Source: Parsons, 2009.

Health Risk Effects

Table 2.2.5-20 shows that the maximum project-related increment for residential cancer risk at the nearest residential area (northeast of project corridor) is predicted to be less than one in one million (0.8×10^{-6}). This risk value is well below the adverse effect criterion of 10 in one million (10×10^{-6}) excess cancer risk; therefore, no adverse effect on any residential receptor is anticipated.

Similarly, the maximum project-related increment for occupational (workers) cancer risk is projected to be less than one in one million (0.3×10^{-6}), and the maximum increment for cancer risk at a sensitive receptor is also estimated to be less than 1 in a million (0.4×10^{-6}). Both of these values are well below the adverse effect criterion of 10 in one million (10×10^{-6}) excess cancer risk.

Table 2.2.5-21 also shows that the estimated maximum project-related increments for the chronic and acute hazard indices are substantially (by orders of magnitude) less than one at all receptors; therefore, the non-cancer short- or long-term health effects of the proposed project would be negligible and are not adverse. Additionally, as presented in Table 2.2.5-21, the cancer burden for all receptors would also be well below the adverse effect threshold of 0.5.

As Table 2.2.5-21 shows, the future health risk compared to the base year 2005 show significant reduction. This is primarily attributed to the reduction in TAC emissions from the use of new controls and regulations.

Uncertainties in Risk Evaluation Results

Risk assessment procedure requires the integration of many variables and assumptions. Uncertainties in HRAs arise from the limitations of methodologies and data accuracy used in estimating health risks. The estimated TAC concentrations and risk levels produced by a risk assessment are based on assumptions, many of which are designed to be health protective so that potential risks to individuals are not underestimated. They are also the product of many factors affecting each component of the risk assessment process, including: (1) projection of emission rates; (2) air dispersion modeling uncertainties; (3) exposure assessment, and (4) toxicity assessment uncertainties. These factors generally include, at a minimum, measurement errors, conservative exposure and modeling assumptions, and uncertainty and variability of the toxicity values used in the assessment. The compounding effects of these uncertainties can be two orders of magnitude or more.

Furthermore, the cancer risk values of the 70-year average emissions scenario are likely overestimated due to the conservative assumptions used in the analysis. The analysis used traffic projections and the regulatory programs that were approved by the time of performing this analysis. It is highly likely that over the next 70 years additional regulations will be adopted, mandating increasingly stringent motor vehicle emissions standards that will substantially reduce emissions profiles. The 70-year average emissions scenario did not consider the emergence of new technology for goods movement transport aimed at reducing vehicle traffic and combustion emissions, although it can be anticipated that technology will improve over the next decades and that emission profiles will be substantially reduced.

In conclusion, a quantitative assessment of the effects of air toxic emission impacts on human health cannot be made with a high level of confidence at the project level. Risk estimates generated by an HRA should not be interpreted as the expected rates of disease in the exposed population, but rather as estimates of potential risk based on current knowledge and many assumptions. Additionally, the uncertainty factors integrated within the estimates of non-cancer RELs are meant to overestimate the risk on the side of public health protection. Risk assessment is best used as a tool to compare one source with another and to prioritize concerns. Consistent approaches to risk assessment are necessary to fulfill this function (OEHHA, 2003).

Caltrans believes that in the future some of this uncertainty may be overcome and the value and/or confidence in the use of results of HRAs may be increased through an analysis of this study, along with other recent and future project-level HRAs that are completed using different analytical approaches. The approaches and results can be compared and assessed as to their explanatory value, as well as the time and cost involved with their preparation. Caltrans believes that this process will help to establish the outlines of a broader HRA analysis framework for transportation projects that can be used to gather multi-agency input and to gain consensus from other regional, state, and federal partner agencies on the need for these studies and the usefulness of different HRA options.

2.2.5.5 Avoidance, Minimization and/or Mitigation Measures

Temporary Measures

North- and South-side Alignment Alternatives

AQ-C1: Construction processes shall adhere to all applicable SCAQMD rules and regulations concerning the operation of construction equipment and dust control.

Emissions of NO_X are mainly associated with exhaust emissions from the heavy-duty construction equipment that would operate simultaneously onsite. Because the analysis assumes that the use of alternative clean fuels for off-road (i.e., construction) equipment would be incorporated as a project feature, few feasible mitigation measures are available to reduce exhaust emissions in a more efficient manner. The following mitigation measures include the best management practices (BMP) for construction equipment use and maintenance. These measures would provide a further 5 to 15 percent reduction.

AQ-C2: Construction equipment shall be properly tuned and maintained in accordance with manufacturer's specifications.

AQ-C3: During construction, trucks and vehicles in loading and unloading queues must be kept with their engines off when not in use to reduce vehicle emissions. Construction emissions shall be phased and scheduled to avoid emissions peaks, where feasible, and discontinued during second-stage smog alerts.

AQ-C4: To the extent feasible, use electricity from power poles rather than temporary diesel or gasoline power generators.

AQ-C5: As part of the Port's commitment to promote the Green Port Policy and implement CAAP, the proposed project construction would employ all applicable control measures included in the CAAP and relevant clean air technologies. Project heavy-duty construction equipment would use clean fuels, such as ultra-low sulfur fuel, or compressed natural gas and oxidation catalysts.

AQ-C6: Construction activities that affect traffic flow on the arterial roadways shall be scheduled to off-peak hours to the extent possible. Additionally, construction trucks shall be directed away from congested streets or sensitive receptor areas.

AQ-C7: During the construction period, temporary traffic controls, such as flaggers and improved signal flow for synchronization to maintain smooth traffic flow, shall be provided.

The following mitigation measures would further reduce the combustive emissions from construction equipment.

AQ-C8: Trucks used for construction prior to 2015 shall use engines with the lowest certified NO_X emission levels, but not greater than the 2007 NO_X emission standards.

AQ-C9: Where feasible, construction equipment shall meet the EPA Tier 4 non-road engine standards. The equipment with Tier 4 engine standards becomes available starting in year 2011.

Rehabilitation Alternative

No measures required.

Permanent Measures

- No permanent measures required; however, the Port is committed to promote the Green Port Policy and implement CAAP. The proposed project would employ all applicable control measures included in the CAAP and relevant clean air technologies. On-road heavy-duty trucks that call at the Port's terminals would comply with the CAAP control measure HDV1, which would replace or retrofit the existing Port's truck fleet by 2012 to comply with the "clean" truck measure.

As described earlier, the POLB CTP, which aims to reduce truck emissions, includes measures that will provide further reduction than CARB's current requirements for clean trucks. The CTP has set a replacement/retrofit program as follows:

- Ban pre-1993 trucks by January 2010;
- Ban un-retrofitted trucks of model years 1994-2003 by January 2010; and
- Ban all trucks that do not meet the EPA *2007 Heavy-Duty Highway Rule* emission standards by January 2012.

Although not quantified in the analysis of the operational emissions mitigation for the project, these programs would result in reduction in air pollutants from project corridor operation.

2.2.6 Noise

This section addresses potential noise effects associated with the construction and operation of the proposed Gerald Desmond Bridge Replacement Project. Noise discussion is based on the 2009 Noise Technical Study (Parsons, 2009).

2.2.6.1 Regulatory Setting

NEPA and CEQA provide the broad basis for analyzing and abating highway traffic noise effects. The intent of these laws is to promote the general welfare and to foster a healthy environment. The requirements for noise analysis and consideration of noise abatement and/or mitigation, however, differ between NEPA and CEQA.

California Environmental Quality Act

CEQA requires a strictly baseline versus build analysis to assess whether a proposed project will have a noise impact. If a proposed project is determined to have a significant noise impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless such measures are not feasible. The rest of this section will focus on the NEPA 23 CFR 772 noise analysis; please see Chapter 3 for further information on noise analysis under CEQA.

National Environmental Policy Act and 23 CFR 772

For highway transportation projects with FHWA (and Caltrans, as assigned) involvement, the Federal-Aid Highway Act of 1970 and the associated implementing regulations (23 CFR 772) govern the analysis and abatement of traffic noise impacts. The regulations require that potential noise impacts in areas of frequent human use be identified during the planning and design of a highway project. The regulations contain noise abatement criteria (NAC) that are used to determine when a noise impact would occur. The NAC differ depending on the type of land use under analysis. For example, the NAC for residences (67 A-weighted decibels [dBA]) is lower than the NAC for commercial areas (72 dBA). The closest noise-sensitive receptors are located to the east of the project area, across the Los Angeles River. Land use within these areas falls within Activity Category B. All other potentially affected areas to the north, south, and west of the project area are characterized predominantly by Port or Port-related industrial/ commercial developments. Land use within these areas fall within Activity Category C. Table 2.2.6-1 lists the NAC for use in the NEPA 23 CFR 772 analysis.

Table 2.2.6-1
Noise Abatement Criteria

Activity Category	Noise Abatement Criteria (dBA) L_{eq}	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	–	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: 23 CFR Part 772, 2001.

Exhibit 2.2.6-1 lists the noise levels of common activities to enable readers to compare the actual and predicted highway noise-levels discussed in this section with common activities.

In accordance with the Caltrans *Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects* (2006), a noise impact occurs when the future noise level with the project results in a substantial increase in noise level (defined as a 12 dBA or more increase) or when the future noise level with the project approaches or exceeds the NAC. Approaching the NAC is defined as coming within 1 dBA of the NAC.

If it is determined that the project will have noise impacts, then potential abatement measures must be considered. If noise abatement measures are determined to be reasonable and feasible, then they would be incorporated into the project plans and specifications during final design.

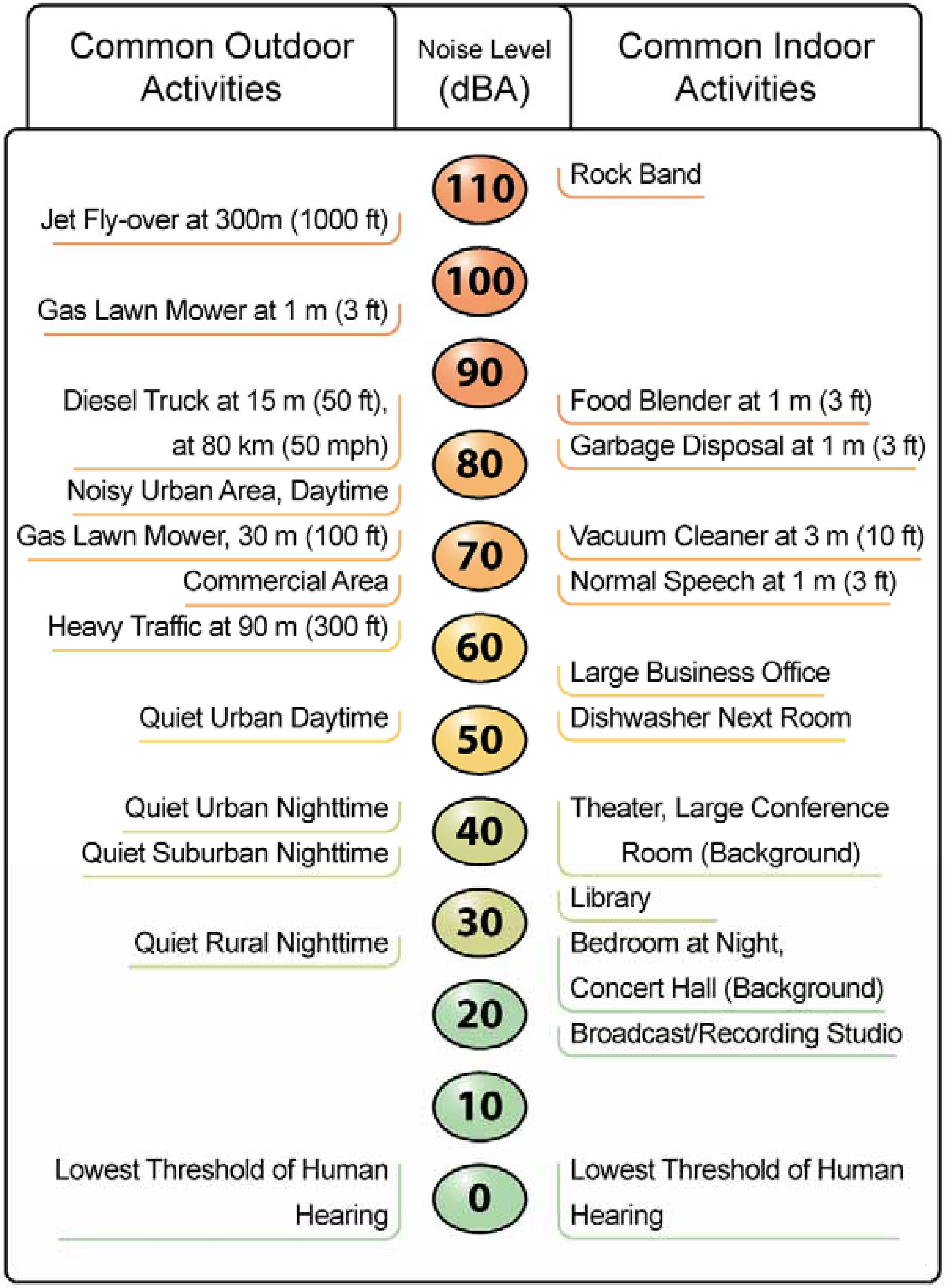

Exhibit 2.2.6-1
Typical Sound Levels from Indoor and Outdoor Noise Sources

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The Caltrans *Traffic Noise Analysis Protocol* sets forth criteria for determining when an abatement measure is reasonable and feasible. A minimum 5-dBA reduction in the future noise level must be achieved for an abatement measure to be considered feasible. Other considerations include topography, access requirements, other noise sources, and safety considerations. The reasonableness determination is primarily a cost-benefit analysis. Factors used in determining whether a proposed noise abatement measure is reasonable include residents' acceptance, the absolute noise level, build versus existing noise, environmental impacts of abatement, public and local agencies input, newly constructed development versus development pre-dating 1978, and the cost per benefited residence.

City of Long Beach Noise Ordinance

According to the City of Long Beach Noise Control Ordinance, within any area of the Port (i.e., industrial land use), a noise level of 70 dBA L_{eq} is considered the threshold for construction and operational impacts during any time of the day or night. For predominantly residential areas with other land uses also present, defined in the ordinance as Land Use District One, the presumed noise limit during daytime hours is 50 dBA. For areas where the ambient noise levels already exceed the presumed permissible noise limits, the allowable noise exposure limits for the appropriate land use districts shall be increased by 5-dB increments to encompass or reflect the ambient noise level. For example, if the existing ambient noise level at a residential area were measured at 62 dBA, then the allowable noise limit would be increased to 65 dBA. In addition, it is stated in the ordinance that construction activities should occur only during the hours of 7:00 a.m. to 7:00 p.m. on weekdays, 9:00 a.m. to 6:00 p.m. on Saturdays, and no construction activities should occur on Sunday except for emergency work authorized by the building official or for work authorized by a permit issued by the noise control officer.

2.2.6.2 Affected Environment

Noise is often defined as unwanted sound. Sound is easily measured with instruments, but the human variability in subjective and physical responses to sound complicates the understanding of its impact on people. People judge the relative magnitude of sound by subjective terms such as "loudness" or "noisiness."

Physically, sound-pressure magnitude is measured and quantified in terms of a logarithmic scale in decibels (dB). Research on human hearing sensitivity has shown that a 3-dB increase in sound is barely noticeable and a 10-dB increase would be perceived as twice as loud. The human hearing system, however, is not equally sensitive to sound at all frequencies; therefore, a frequency-dependent adjustment called "A-weighting" has been devised so that sound may be measured similar to the way the human hearing system responds. The A-weighted sound level is often abbreviated "dBA" or "dB (A)." Exhibit 2.2.6-1 provides typical A-weighted sound levels of various common indoor and outdoor activities.

Community noise levels usually change continuously during the day; however, community noise exhibits a daily, weekly, and yearly pattern. Several descriptors have been developed to compare noise levels over different time periods. One of the most common descriptors is the energy equivalent sound level (L_{eq}). The L_{eq} is the equivalent steady-state A-weighted sound level that would contain the same acoustical energy as the time-varying A-weighted sound level during the same time interval. To adjust for the increased sensitivity to noise during evening (7:00 p.m. to 10:00 p.m.) and nighttime hours (10:00 p.m. to 7:00 a.m.), the Community Noise Equivalent Level (CNEL) is often used in California. CNEL adjusts for the increased sensitivity by adding factors of 5 dBA and 10 dBA to noises generated during the evening and nighttime periods, respectively.

The maximum sound level (L_{max}) is the highest instantaneous sound level measured during a single noise measurement interval no matter how long this sound may persist and whether the noise source is ambient or project related. Another sound descriptor is the Percentile-Exceeded Sound Level (L_{xx}), which represents the sound level exceeded a percent of a specific time period. L_{10} is the sound level exceeded 10 percent of the time.

Existing Noise Environment. The project is located in the middle of an industrial district within the POLB. Laborers that work outdoors at adjacent facilities within areas of close proximity to the project site are the only identified potential noise-sensitive receptors. The only other noise-sensitive receptors are located at a distance of approximately 1,300 to 1,500 ft (396 to 457 m) across the river; they include Cesar Chavez Park and Cesar Chavez Elementary School, as well as several condominium buildings. The existing noise environment in the vicinity of the proposed project consists primarily of typical noise sources related to port operations and associated transportation traffic noise. Noise-sensitive receptors, discussed above, located outside of the Port's boundaries may be affected by traffic noise generated by local freeways and major surface streets.

A major freeway, such as the adjacent Long Beach Freeway (SR 710), usually is the dominant noise source for adjacent land uses in urbanized areas. SR 710 generates noise levels greater than 75 dBA CNEL within 100 ft (30 m) of the freeway and approximately 65 dBA at 700 ft (213 m) from the freeway (URS, 2001).

Per noise measurements conducted by the POLB for the Middle Harbor Project, existing peak daytime ambient noise levels (Year 2005) within the noise-sensitive areas on the east side of the Los Angeles River ranged from 61 to 67 dBA; nighttime noise levels ranged from 58 to 65 dBA (POLB, 2009). Additional noise measurements were conducted on July 16, 2009, to evaluate existing ambient noise levels at the noise-sensitive receptors. The 2009 measurements were collected at two locations. These measurements are representative of existing noise levels at: (1) Cesar Chavez Park and adjacent condominium buildings; and (2) the outdoor use areas at Cesar Chavez Elementary School. At the park and adjacent condominium buildings, the measured daytime L_{eq} was 61 dBA. At the outdoor use area of the school, the measured daytime L_{eq} was 64 dBA.

2.2.6.3 Environmental Consequences

Evaluation Criteria

Neither the federal government nor the state has specific regulations for community noise. FHWA and Caltrans have established noise standards for traffic noise. The State of California requires that counties and cities prepare and implement noise elements as part of their mandated general plans. Counties and cities also have noise ordinances protecting the public from potential hearing damage and various other possible adverse psychological and social effects associated with noise. Noise impacts associated with the project may be considered adverse if:

- There is a substantial noise increase;
- The predicted operational noise levels at noise-sensitive locations with frequent outdoor use areas approach or exceed the NAC; or
- Construction or operational noise levels exceed the City of Long Beach Noise Control Ordinance thresholds during construction or operation.

No Action Alternative

Under the No Action Alternative, only increases in ambient noise levels associated with increases in future traffic or from surrounding land use activities are anticipated.

Construction and Demolition Impacts

North-side Alignment Alternative

Normally, construction activities are carried out in phases, and each phase has its own noise characteristics based on the mix of construction equipment in use. The maximum construction noise levels for this project are expected to be generated during the demolition phases. Table 2.2.6-2 presents the noise level of individual equipment and the overall noise level for each of the construction phases. Distances referenced in the table are at 50 ft (15 m) from the center of the construction activity, as well as, at 500, 1,300, and 1,500 ft (152, 396, and 457 m). All surrounding land uses in the immediate project vicinity are zoned industrial, except for sensitive land uses east of the Los Angeles River. In computing the L_{eq} for equipment noise, it was assumed that during use most of the equipment would be operating at, or near, maximum sound levels 30 percent of the time and the pile driver would be operating at maximum sound levels 20 percent of the time.

All construction activities are assumed to occur Monday through Friday 7:00 a.m. to 7:00 p.m. and on Saturday 9:00 a.m. to 6:00 p.m. No construction activity is expected to occur on Sundays or on legal holidays. As shown in Table 2.2.6-2, at 500 ft (152 m) from the construction activity, the highest noise levels when all equipment is operating simultaneously are expected to reach approximately 68 dBA (i.e., below the threshold for allowable construction noise for the industrial land use district) during demolition of the existing bridge main span and side span. At 1,300 and 1,500 ft (396 and 457 m) from the construction activity, which corresponds to the distances from the nearest demolition activity to the nearest noise-sensitive receptors at Cesar Chavez Park and Cesar Chavez Elementary School, the noise levels are expected to be approximately 60 and 59 dBA, respectively. Consistent with the Long Beach municipal code, given the measured ambient noise level of 61 to 64 dBA, the allowable noise exposure limit would be 65 dBA. Demolition noise levels at these receptor locations would be below the allowable limit in accordance with the City of Long Beach ordinance.

Table 2.2.6-2
Estimated Construction Noise Levels

Construction Activity Equipment	Number of Equipment Vehicles	Max Sound Level at 50 ft [15 m], dBA	Effective Usage Factor	L_{eq}(h) at 50 ft [15 m], dBA	L_{eq}(h) at 500 ft [152 m], dBA	L_{eq}(h) at 1300 ft [396 m], dBA	L_{eq}(h) at 1500 ft [457 m], dBA
CONSTRUCTION OF NEW BRIDGE							
Piling Operation							
Pile Driver	1	97	0.15	89	69	60	59
Drill Rig	1	80	0.30	75	55	46	45
140T Crane	1	83	0.30	78	58	49	48
Flat Bed Truck	1	80	0.15	72	52	43	42
Portable Generator (5 kw)	1	71	0.30	66	46	37	36
			Overall L_{eq} =	**89**	**69**	**61**	**60**
Footing Construction							
140T Crane	1	86	0.30	81	61	52	51
Hydraulic Excavator	1	85	0.30	80	60	51	50
Dump Truck	2	80	0.23	74	54	45	44
Main Generator (15 kw)	1	76	0.15	68	48	39	38
			Overall L_{eq} =	**82**	**62**	**53**	**52**
Column Construction							
140T Crane	1	86	0.30	81	61	52	51
Main Generator (15 kw)	1	76	0.30	71	51	42	41
			Overall L_{eq} =	**81**	**61**	**53**	**52**
Tower Construction							
Tower Crane	1	84	0.30	79	59	50	49
Main Generator (15 kw)	1	76	0.30	71	51	42	41
			Overall L_{eq} =	**79**	**59**	**51**	**50**
Approach Span Erection							
275T Crane	1	88	0.15	80	60	51	50
Segment Delivery Truck	2	85	0.30	80	60	51	50
Service Crane	1	83	0.30	78	58	49	48
Flat Bed Truck	1	80	0.15	72	52	43	42
Forklift	1	67	0.15	59	39	30	29
Main Generator (15 kw)	1	76	0.30	71	51	42	41
Portable Generators (5 kw)	2	71	0.30	66	46	37	36
			Overall L_{eq} =	**84**	**64**	**56**	**55**
Main Span Erection							
Segment Lifters	4	83	0.60	81	61	52	51
Delta Frame Lifters	2	83	0.30	78	58	49	48
Segment Delivery Truck	2	85	0.30	80	60	51	50
Service Crane	1	83	0.15	75	55	46	45
Flat Bed Truck	1	80	0.15	72	52	43	42
Forklift	1	67	0.15	59	39	30	29
Main Generator (15 kw)	1	76	0.30	71	51	42	41
Portable Generators (5 kw)	2	71	0.30	66	46	37	36
			Overall L_{eq} =	**85**	**65**	**57**	**56**

Source: Parsons

Table 2.2.6-2 (continued)
Estimated Construction Noise Levels

Construction Activity Equipment	Number of Equipment Vehicles	Max Sound Level at 50 ft [15 m], dBA	Effective Usage Factor	L_{eq}(h) at 50 ft [15 m], dBA	L_{eq}(h) at 500 ft [152 m], dBA	L_{eq}(h) at 1300 ft [396 m], dBA	L_{eq}(h) at 1500 ft [457 m], dBA
DEMOLITION OF EXISTING BRIDGE							
Main Span and Side Span Deck Demolition							
100T Derrick	2	84	0.30	79	59	50	49
Backhoe w/Breaker	2	90	0.30	85	65	56	55
Concrete Saws	2	83	0.60	81	61	52	51
Dump Trucks	4	80	1.20	81	61	52	51
Generator (15 kw)	2	76	0.60	74	54	45	44
			Overall L_{eq} =	**88**	**68**	**60**	**59**
Truss Demolition - Main Span							
100T Crane	2	84	0.60	82	62	53	52
65T R/T Crane	2	85	0.60	83	63	54	53
Flat Bed Truck	4	80	1.20	81	61	52	51
Generator (15kw)	2	76	0.60	74	54	45	44
			Overall L_{eq} =	**85**	**65**	**56**	**55**
Truss Demolition - Side Span							
100T Crane	2	84	0.60	82	62	53	52
200T Crane	2	88	0.60	86	66	57	56
Flat Bed Truck	4	80	1.20	81	61	52	51
Generator (15kw)	2	76	0.60	74	54	45	44
			Overall L_{eq} =	**85**	**65**	**56**	**55**
Approach Span Deck Demolition							
Backhoe w/Breaker	2	90	0.60	88	68	59	58
Concrete Saws	2	83	0.60	81	61	52	51
Dump Trucks	4	80	1.20	81	61	52	51
Generator (15kw)	2	76	0.60	74	54	45	44
			Overall L_{eq} =	**89**	**69**	**61**	**60**
Demolition of Approach Span Girders							
200T Crane	2	88	0.60	86	66	57	56
Flat Bed Truck	4	80	1.20	81	61	52	51
Generator (15kw)	2	76	0.60	74	54	45	44
			Overall L_{eq} =	**82**	**62**	**53**	**52**
Concrete Pier Demolition							
Backhoe w/Breaker	2	90	0.60	88	68	59	39
200T Crane	2	88	0.60	86	66	57	37
Concrete Saws	2	83	0.60	81	61	52	51
Dump Trucks	4	80	1.20	81	61	52	51
Generator (15kw)	2	76	0.60	74	54	45	44
			Overall L_{eq} =	**89**	**69**	**61**	**60**
Concrete Footing Demolition							
Backhoe w/Breaker	2	90	0.60	88	68	59	58
Dump Trucks	4	80	1.20	81	61	52	51
Generator (15kw)	2	76	0.60	74	54	45	44
			Overall L_{eq} =	**89**	**69**	**60**	**59**
REHABILITATION OF EXISTING BRIDGE							
Deck Replacement, Steel Column Casings, and other Retrofits							
Excavator	1	76	0.30	71	51	42	41
Crawler	1	80	0.30	75	55	46	45
Mobile Crane	1	84	0.30	79	59	50	49
Concrete Saws	2	83	0.60	81	61	52	51
Genie Lifts	2	75	0.60	73	53	44	43
Haul Trucks	2	80	0.60	78	58	49	48
Concrete Trucks	2	80	0.30	75	55	46	45
			Overall L_{eq} =	**85**	**65**	**57**	**56**

Source: Parsons

During the period when there is piling activities, hourly L_{eq} noise levels are expected to be approximately 69 dBA at a distance of 500 ft (152 m). Other than the port/harbor workers who may be working outdoors in areas close to the construction sites, no other noise-sensitive receptors closer than 1,300 ft (396 m) are expected to be in the vicinity of the nearest piling activity. Port workers working in areas closer than 450 ft (137 m) during a piling activity would potentially be affected by these intermittent elevated noise levels that exceed the City of Long Beach threshold for construction activities.

Noise levels during piling activities at the nearest sensitive receptors outside of the industrial land use district (i.e., Cesar Chavez Park [1,300 ft] and Cesar Chavez Elementary School [1,500 ft]) are predicted to be 61 and 60 dBA, respectively. Piling activity noise levels at these receptor locations would be below the allowable limit in accordance with the City of Long Beach ordinance of 65 dBA, as previously described.

Even though no adverse construction noise impacts are anticipated, potential measures to reduce noise effects on Port workers adjacent to demolition and pile driving activities could be considered during final project planning.

Where applicable, the following construction noise reduction practices may be incorporated into the project:

- Comply with all appropriate provisions of the City Noise Ordinances including, but not limited to, the restrictions on hours of construction and mechanical equipment noise levels; however, in the event that construction schedule necessitates construction activities to occur outside of the hours allowed by the City's noise ordinance, a variance/permit would be obtained from the noise control officer.
- Where applicable, alternative construction methods or equipment, (i.e., alternative pile driving methods) that generate the lowest noise levels should be considered.
- Whenever possible, schedule construction in a manner that would reduce the amount of concurrent noise sources.
- Install temporary noise barriers, as feasible, between piling activities and sensitive receptors.
- Schedule the duration and timing of construction activities to minimize noise impacts on potentially exposed individuals.
- Incorporate a noise monitoring program during construction, particularly during use of heavy equipment. The program would include corrective actions in the event elevated noise levels are measured (i.e., using temporary noise barriers, shutting off idling equipment, restricting the duration of the construction activity, using alternative construction methods).
- Keep area residents and businesses informed of the schedule, duration, and progress of the construction to minimize public objections of unavoidable noise. Notify potentially affected parties in advance of high noise construction activities.

Temporary increases in noise on terrestrial special-status species at existing falcon and bat nesting/roosting areas associated with construction and demolition activities could influence nesting/roosting site selection. No substantial effect on aquatic species is anticipated because all work would occur outside of the channel (at least 150 ft [45 m]). Subsequent to completion of the proposed project, no long-term effects on special-status terrestrial or aquatic wildlife species are anticipated (see Section 2.3.5 [Threatened and Endangered Species]). There would be no adverse noise effects associated with the North-side Alignment Alternative construction and demolition activities.

<u>South-Side Alignment Alternative</u>

The construction and demolition scope, as well as the overall project magnitude, would be essentially the same as discussed for the North-side Alignment Alternative. There would be no discernable difference in overall construction activities, the types or amount of construction equipment, or the noise effects on Port/harbor workers, sensitive receptors, or on protected wildlife between the North- and South-side Alignment Alternatives. This alternative would comply with the City of Long Beach noise ordinance and would incorporate all other measures as discussed under the North-side Alignment Alternative. There would be no adverse noise effects associated with the South-side Alignment Alternative construction and demolition activities.

<u>Rehabilitation Alternative</u>

Construction activities for the Rehabilitation Alternative would result in improvements to the existing facility only. This alternative would have a shorter construction duration and would eliminate the need for the bridge demolition phase. This alternative would require less construction equipment and less pile driving; therefore, the Rehabilitation Alternative would result in reduced construction noise effects when compared with the North- and South-Side Alignment Alternatives. Most of the retrofit activities would occur during normal daytime construction hours; however, bridge deck replacement activities would occur between the hours of 7:00 p.m. and 7:00 a.m. Nighttime construction noise levels at the nearest sensitive receptor are predicted to be 56 to 57 dBA, which is below ambient conditions; however, construction activity would still require a variance/permit from the City noise control officer.

As shown in Table 2.2.6-2, the predicted construction noise levels associated with this alternative would not be higher than 65 dBA at a distance of 500 ft (152 m) and further. Additionally, the nighttime bridge deck replacement activities would be located on the Gerald Desmond Bridge, more than 0.3-mi (1,500 ft) from the nearest potential sensitive receptor, which is Cesar Chavez Elementary School, located at 730 West Third Street. This alternative would comply with the City of Long Beach construction noise threshold. There would be no adverse noise effects associated with the Rehabilitation Alternative construction activities.

Operational Impacts

<u>North Side-Alignment Alternative</u>

According to the Caltrans Noise Analysis Protocol, this project is considered a Type 1 project. A Type 1 project is defined as construction on a roadway that substantially changes its horizontal or vertical alignment, or which increases the number of through-traffic lanes. The major source of operational noise would be associated with vehicular traffic within the project area and on other nearby roadways. The predominant traffic noise sources within the project area are the vehicular traffic on Ocean Boulevard, which includes the Gerald Desmond Bridge, and the I-710 freeway.

The segments of Ocean Boulevard were analyzed using a computer noise prediction model. Noise levels for the future conditions with and without the project were predicted using the FHWA Traffic Noise Model (FHWA-RD-77-108).

Freeway traffic noise is not expected to increase. SR 710 is congested and already operating at its capacity. Maximum (i.e., worst-case) traffic noise is generated when traffic is operating at the highest capacity under free-flowing conditions. Because the project would not increase capacity on SR 710, no increase in vehicle speed is anticipated; therefore, freeway traffic noise would not increase during operation of the proposed project.

The closest noise-sensitive areas to SR 710 potentially affected by operation of the proposed project include Cesar Chavez Park and adjacent residences and Cesar Chavez Elementary School. Cesar Chavez Park, the nearest sensitive land use, is located a minimum of 1,200 ft (366 m) east of the I-710 ROW across the Los Angeles River. Future noise levels were modeled to assess potential noise impacts at the sensitive receptors. An analysis of the worst-case scenario was modeled based on 2030 predicted AM peak-hour traffic volumes on the SR 710 mainlines, which included the highest percentage of trucks throughout the day (4,203 cars and 2,262 trucks on the NB side; 4,066 cars and 2,110 trucks on the SB side). For the worst-case scenario, all trucks were assumed to be heavy trucks, and no intervening terrain or natural barriers were taken into account. Based on the analysis, the predicted peak-hour L_{eq} noise levels at a distance of 1,200 ft (366 m) from SR 710 are not expected to exceed 64 dBA. This is below the NAC and would not be considered a substantial noise increase (i.e., when the existing noise level is exceeded by 12 dB or more as a result of the project); therefore, no adverse noise impacts at the sensitive receptors are anticipated.

Ocean Boulevard traffic data for 2005 was used for the existing baseline condition. The existing and future vehicular traffic noise levels generated by Ocean Boulevard were assessed by analytical procedures using a computer noise prediction model. Vehicular traffic noise levels for the future conditions with and without the project were predicted using procedures in the FHWA Traffic Noise Model (FHWA-RD-77-108).

Predicted Ocean Boulevard traffic data for 2030 were used to calculate future noise levels. Table 2.2.6-3 presents the traffic data used for the traffic noise analysis, and Table 2.2.6-4 summarizes the results of the traffic noise analysis. Traffic modeling output files are available for review in the Appendix of the Noise Technical Study.

Table 2.2.6-3
Traffic Data Used for Noise Analysis

Roadway	Traffic Volumes											Speed
	ADT		A.M. Peak Hr		A.M.	Mid-day Peak Hr		Mid.	P.M. Peak Hr		P.M	
Segment	Total Vol.	Trucks*	Cars	Trucks*	Peak Hr %	Cars	Trucks*	Peak Hr %	Cars	Trucks*	Peak Hr %	(mph)
Year 2005 Existing Condition												
Ocean Boulevard												
Navy Way to Pier S	62,000	17,500	2,530	1,038	5.8%	1,977	1,329	5.3%	3,485	983	7.2%	45
Pier S to Route 47	67,000	18,700	2,510	1,178	5.5%	1,917	1,438	5.0%	3,414	1,145	6.8%	45
Route 47 to Terminal Island East Interchange (Pier T)	62,400	17,000	2,386	947	5.3%	1,804	1,255	4.9%	3,211	886	6.6%	45
Terminal Island East Interchange (Pier T) to Pico Ave	59,700	15,200	2,836	1,104	6.6%	2,239	1,101	5.6%	3,373	855	7.1%	45
Year 2030 Without Project												
Ocean Boulevard												
Navy Way to Pier S	117,260	44,670	3,941	2,754	5.7%	2,598	3,229	5.0%	5,099	2,204	6.2%	45
Pier S to Route 47	97,540	32,270	2,348	1,517	4.0%	1,720	1,393	3.2%	3,244	1,134	4.5%	45
Route 47 to Terminal Island East Interchange (Pier T)	110,380	41,140	2,662	1,780	4.0%	2,254	1,979	3.8%	4,113	1,438	5.0%	45
Terminal Island East Interchange (Pier T) to Pico Ave	124,670	54,360	2,468	2,052	3.6%	2,045	2,288	3.5%	3,619	1,771	4.3%	45
Year 2030 With Project												
Ocean Boulevard												
Navy Way to Pier S	122,030	44,800	4,138	2,760	5.7%	2,813	3,214	4.9%	5,435	2,240	6.3%	50
Pier S to Route 47	103,030	39,430	2,616	1,643	4.1%	1,902	1,580	3.4%	3,596	1,288	4.7%	50
Route 47 to Terminal Island East Interchange (Pier T)	117,170	40,970	2,647	1,958	3.9%	2,237	2,219	3.8%	4,015	1,611	4.8%	50
Terminal Island East Interchange (Pier T) to Pico Ave	135,930	59,730	2,770	2,464	3.9%	2,312	2,810	3.8%	4,244	2,055	4.6%	50

* All trucks are considered heavy trucks.
ADT - Average daily traffic

Source: Iteris, 2009

Table 2.2.6-4
Predicted Traffic Noise Levels

Location	Distance from Roadway Centerline, Feet [meters]	Predicted Noise Levels, Hourly Leq, dBA [1,2]								
		Existing Conditions			Future Conditions - Design Year 2030					
					Ambient w/o Project			With Project		
		A.M. Peak Hr.	Mid-day Peak Hr.	P.M. Peak Hr.	A.M. Peak Hr.	Mid-day Peak Hr.	P.M. Peak Hr.	A.M. Peak Hr.	Mid-day Peak Hr.	P.M. Peak Hr.
Ocean Boulevard										
Navy Way to Pier S	300 [91]	67	68	67	72	72	71	72	73	71
	500 [152]	63	64	64	68	69	68	69	69	68
	1000 [305]	58	59	59	63	64	63	64	64	63
Pier S to Route 47	300 [91]	68	69	68	69	69	68	70	70	69
	500 [152]	65	66	65	66	65	65	67	66	66
	1000 [305]	60	60	60	61	60	60	62	61	61
Route 47 to Pier T Interchange	300 [91]	67	68	67	70	70	69	71	71	70
	500 [152]	64	65	64	66	67	66	67	68	67
	1000 [305]	59	60	59	61	62	61	62	63	62
Pier T Interchange to Pico Avenue	300 [91]	68	68	67	71	71	70	72	72	71
	500 [152]	65	65	64	67	67	67	68	69	68
	1000 [305]	60	59	59	62	62	62	63	64	63

Notes
1 - All noise levels are expressed in hourly Leq, which is an average level in dBA (dB re: 20 μ Pa)
2 - All noise levels calculated assuming that all trucks are heavy trucks.

Source: Parsons

No substantial increases in future noise levels were predicted. Based on the expected increase in traffic volumes, the noise study results indicate that the future traffic noise levels with the project at all other modeled distances from the roadway centerline would not exceed the applicable noise standards for the proposed project. At a 500-ft (152-m) distance from the roadway centerline, the noise contribution from Ocean Boulevard is not expected to exceed 69 dBA. At 1,000 ft (305 m), the highest noise level expected from the roadway would be 64 dBA. The expected increase in overall noise levels due to operation of the North-side Alignment Alternative, when compared to the overall future ambient noise levels without the project, would be no more than 1-dBA (2030 No Action versus Build). This difference in noise levels would normally be imperceptible to the human hearing; therefore, no adverse operational noise effects are anticipated as a result of the project.

No substantial operational noise effects on falcons and bats within the project area are expected. Operational effects on falcons and bats would be mainly associated with the demolition of their existing nesting/roosting locations. The North-side Alignment Alternative includes creation of nesting/ roosting locations on the new bridge (see Section 2.3.5 [Threatened and Endangered Species]). Assuming that falcons and bats find the new nesting/roosting locations suitable for use, these species would acclimate to the new noise environment just as they have to past noise increases associated with the adjacent industrial/ commercial area where the ambient noise level is already high. It is not anticipated that the predicted increase of 1-dB, would be a main factor in future use of the new bridge by falcons and bats. No adverse noise effects on falcons and bats associated with the long-term operation of the North-side Alignment Alternative are anticipated.

South-side Alignment Alternative

The operational noise analysis for the North-side Alignment Alternative is based on noise levels associated with forecasted traffic volumes and vehicle fleet composition. Implementation of the South-side Alignment Alternative would not result in a discernable difference in operational characteristics, forecasted volumes, or fleet composition compared to the North-side Alignment Alternative. The operational noise effects for the South-side Alignment Alternative would be the same as discussed under the North-side Alignment Alternative. There would be no adverse noise effects associated with the long-term operation of the South-side Alignment Alternative.

Rehabilitation Alternative

This alternative would not result in any changes to the profile, lane configuration, or roadway capacity. The operational noise effects associated with this alternative would be the same as discussed/ modeled for the future No Action Alternative. The Rehabilitation Alternative would result in increased ambient noise levels associated with increased future traffic volumes and surrounding land use activities. There would be no adverse noise effects associated with the long-term operation of the Rehabilitation Alternative.

2.2.6.4 Avoidance, Minimization and/or Mitigation Measures

No measures required.

2.2.7 Energy

This section addresses the potential impacts to energy resources, including fossil fuels, associated with implementation of the proposed project.

2.2.7.1 Regulatory Setting

The CEQA Guidelines, Appendix F, Energy Conservation, states that EIRs are required to include a discussion of potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy.

NEPA (42 U.S.C. Part 4332) requires consideration of all potentially significant impacts to the environment, including energy impacts.

2.2.7.2 Affected Environment

Southern California has had the benefit of sufficient energy supplies to serve the rapid growth that has taken place over the past 50 years. Much of the energy consumed in the region is for residential, commercial, and transportation purposes. SCAG tracks and forecasts energy use in the southern California area. Transportation energy for motor vehicles is primarily by direct combustion of petroleum fuels (i.e., gasoline and diesel), with smaller contributions from compressed natural gas. Electricity is used in a relatively small number of electric-powered vehicles.

According to the California Energy Commission (CEC), in addition to hydrocarbon energy sources, 300 operational power plants are located in the counties of Los Angeles, Orange, Riverside, and San Bernardino that produce at least 100 kW (0.1-MW) of electricity each (CEC, 2007a). Electric energy in the region is provided primarily through SCE and LADWP distribution networks, along with 3 municipalities that have their own power plants located in the region (i.e., Glendale, Burbank, and Pasadena). Imperial Irrigation District and San Diego Gas & Electric provide service to the extreme southern areas of Riverside and Orange counties, respectively. Because of the recent restructuring of the electric energy industry throughout California, many of the facilities owned by investor-owned utilities have been divested. Twenty-three (23) new power-generating facilities are planned for the Los Angeles region, and they are currently going through the permitting process (CEC, 2007a).

Most of the electric energy used in southern California is imported to the region from coal-fired and hydroelectric generating facilities located elsewhere in California and out of state. Utilities in southern California participate in power-sharing arrangements with many other entities throughout the western United States. In 2005, the SCAG region consumed almost 128,000 gigawatt-hours (GWh) of electricity, which was approximately 48 percent of the total consumption in the state. Electricity consumption has been increasing approximately 1.3 percent per year (SCAG, 2007).

In 2005, the region consumed approximately 8.8 billion gallons of vehicle fuels, which was an increase of more than 20 percent from 1995 (SCAG, 2007). CEC predicts that the natural gas demand in on-road vehicles will increase from 75 million therms in 2003 to 200 million therms in 2025. Transportation electricity will grow from 600 million kilowatt-hours (kWh) in 2003 to 1,800 kWh in 2025.

2.2.7.3 Environmental Consequences

Evaluation Criteria

Potential energy consumption of the Build Alternatives is compared to the No Action Alternative to assess the project's potential energy impacts within the vicinity of the Port (as defined by I-110 to the west, I-405 to the north, I-/SR 710 to the east, and the Pacific Ocean to the south). The proposed project may result in substantial impacts if it would:

- Use fuel, water, or energy in a wasteful manner; or
- Result in the loss of availability of a known mineral resource that would be of future value to the region and residents of the state.

No Action Alternative

The No Action Alternative would not cause any immediate increase in demands on energy and fuel consumption in the project area.

Construction and Demolition Impacts

<u>North- and South-side Alignment Alternatives</u>

Construction equipment and construction worker vehicles operated during project construction of the Bridge Replacement Alternatives and during demolition of the Gerald Desmond Bridge and supporting structures would use fossil fuels. This increased fuel consumption would be temporary and cease at the end of the construction activities, and it would not have a residual requirement for additional energy input. The marginal increases in fossil fuel use resulting from project construction are not expected to have appreciable impacts on energy resources.

Bridge demolition would also result in the accumulation of large amounts of scrap bridge materials. These materials may be reused if disposed of properly (see Section 2.1.4 [Utilities and Service Systems] for further discussion of waste disposal and recycling).

Rehabilitation Alternative

Construction equipment and construction worker vehicles operated during rehabilitation of the existing bridge and supporting structures would use fossil fuels. This increased fuel consumption would be temporary and cease at the end of the rehabilitation activities, and it would not have a residual requirement for additional energy input. The marginal increase in fossil fuel use resulting from the bridge rehabilitation is not expected to have appreciable impacts on energy resources.

Operational Impacts

Operational energy impacts of the proposed project are primarily related to fuel consumption. The anticipated effects on energy use associated with the operation of the proposed alternatives are discussed below.

No Action/Rehabilitation Alternative

Forecasts by CEC indicate that statewide VMT for all on-road vehicles will increase annually by an average of 1.7 percent between 2005 and 2030 (CEC, 2007b). Even though VMT is predicted to increase, forecasted gasoline consumption is variable for the period and ranges from an annual average decrease of 0.5 percent to an increase of 0.6 percent. Diesel fuel average annual consumption would increase from 2.1 to 3.0 percent. The variability is primarily related to modeling variables related to price and implementation of greenhouse gas (GHG) standards.

Statewide gasoline use for 2030 would be 14 to 18.6 billion gallons; forecast diesel use would be 6.7 to 8.3 billion gallons CEC, 2007b).

Daily VMT within the vicinity of the Port from the traffic study was used in combination with the average fuel efficiencies to estimate the energy use for the opening and horizon years. The VMT data and associated fuel consumption is provided below in Table 2.2.7-1.

Determining the future (2015 and 2030) fuel consumption requires estimation of future fuel efficiencies for gasoline and diesel vehicles. It is assumed that fuel efficiency would improve with advances in alternative fuel and engine technology. This forecast in future fuel efficiency is difficult to accurately predict, so this analysis will consider the “worst-case scenario,” which utilizes the current fuel efficiencies and assumes that there are no improvements in alternative fuel or engine technology or increases in alternative fuel use.

Consumption was calculated by dividing future auto VMT by the average gasoline (20.75 miles per gallon [mpg]) fuel efficiency and future truck

Table 2.2.7-1
Daily VMT and Fuel Consumption in Project Vicinity

	No Action/ Rehabilitation Alternative	Bridge Replacement Alternative	Increase/ (Decrease)	No Action/ Rehabilitation Alternative	Bridge Replacement Alternative	Increase/ (Decrease)
	2015 Daily VMT Project Vicinity			**2015 Daily Fuel Consumption**		
Total Autos - Gasoline	4,475,415	4,466,876	(8,539)	215,683	215,271	(412)
Total Trucks - Diesel	850,846	847,881	(2,964)	167,820	167,235	(585)
Total All Vehicles-Gallons	5,326,260	5,314,757	(11,503)	383,503	382,506	(997)
	2030 Daily VMT Project Vicinity			**2030 Daily Fuel Consumption**		
Total Autos - Gasoline	4,950,124	4,937,966	(12,157)	238,560	237,974	(586)
Total Trucks - Diesel	1,144,522	1,138,963	(5,560)	225,744	224,647	(1,097)
Total All Vehicles-Gallons	6,094,646	6,076,929	(17,717)	464,304	462,621	(1,683)

Source: Iteris, 2009.

VMT by the average diesel (5.07 mpg) fuel efficiency. Gasoline and diesel use associated with the No Action/Rehabilitation Alternative in 2015 yields a daily use estimate of 215,683 gallons and 167,820 gallons, respectively. Estimates for 2030 gasoline and diesel consumption yield a total daily use estimate of 238,560 gallons and 225,744 gallons, respectively. Operation of the Rehabilitation Alternative would be identical to the No Action Alternative. No adverse effects on energy supplies resulting from operation of the Rehabilitation Alternative are anticipated.

North- and South-side Alignment Alternatives

Energy use (fuel consumption) for the Bridge Replacement Alternatives was also calculated as previously discussed utilizing the VMT data shown in Table 2.2.7-1 and average fuel efficiencies. Gasoline and diesel use associated with the Bridge Replacement Alternatives in 2015 yields a daily use estimate of 215,271 gallons and 167,235 gallons, respectively. In 2030, the daily use estimate of gasoline and diesel yields 237,974 gallons and 224,647 gallons, respectively. Overall daily VMT and energy use associated with operation of the Bridge Replacement Alternatives would decrease compared to the No Action/ Rehabilitation Alternative. The decrease in energy use is due to the associated decrease in VMT resulting from the redistribution of traffic as motorists modify their travel paths to take advantage of the congestion-relief benefits of these alternatives (see Section 2.1.5 [Traffic and Circulation]).

Total daily VMT in 2015 and 2030 would decrease by 11,503 and 17,717 miles traveled, respectively. This corresponds to a reduction of total daily energy use in 2015 and 2030 of 996 and 1,683 gallons of fuel, respectively.

The Bridge Replacement Alternatives are expected to result in a net daily decrease in energy use. Fossil fuels will continue to have future value to the region and residents of the state. Although the estimated energy savings associated with these alternatives may be considered minor, the reduced energy use would have a beneficial affect on energy supplies.

2.2.7.4 Avoidance, Minimization and/or Mitigation Measures

No measures are required.

Section 2.3

Biological Environment

2.3 BIOLOGICAL ENVIRONMENT

Information within this section is summarized from the 2008 Revised Natural Environment Study Report.

2.3.1 Natural Communities

2.3.1.1 Regulatory Setting

This section of the document discusses natural communities of concern. The focus of this section is on biological communities, not individual plant or animal species. This section also includes information on wildlife corridors (including fish passage as appropriate) and habitat fragmentation. Wildlife corridors are areas of habitat used by wildlife for seasonal or daily migration. Habitat fragmentation includes the potential for dividing sensitive habitat and thereby lessening its biological value.

Critical habitat areas designed under the Federal Endangered Species Act (ESA) are discussed in Section 2.3.5 (Threatened and Endangered Species). Habitat areas related to Wetlands and Other Waters of the U.S. are Section 2.3.2.

2.3.1.2 Affected Environment

Literature Review

Terrestrial and marine biological resources within the project vicinity were first examined in existing documents, including:

- Final Environmental Impact Statement/ Environmental Impact Report for the Disposal and Reuse of Long Beach Naval Complex, Long Beach, California. Volume I (U.S. Navy/ City of Long Beach, 1998).
- Baseline Biological Studies of the Los Angeles and Long Beach Harbors conducted in 2000-2001 (MEC, 2002).
- Biological Baseline Study of Selected Areas of Long Beach Harbor: Final Report (SAIC and MEC, 1997).
- Peregrine Falcon Monitoring and Mitigation for the Desmond Bridge Widening Project. (BioResource Consultants, 1998).
- Foraging Surveys of the California Least Tern at the Shallow Water Habitat Area Long Beach Outer Harbor Port of Long Beach. (Keane Biological Consulting, 2001).
- California Least Tern Breeding Survey, 2005 Season (Marschalek, 2006).
- Documents providing information on special-status species that may occur in the Biological Study Area (BSA) and its vicinity; these are further discussed in Section 2.3.5 (Threatened and Endangered Species).

The study methodology also included consultation with state and federal resource agencies and the Port. Agency coordination took place through e-mail, fax, mail, and telephone correspondence, as summarized in Table 2.3.1-1. In addition, agencies were sent an NOP/Preliminary Environmental Assessment Report (PEAR) in November 2002 and the December 2005 revised NOP.

Table 2.3.1-1
Agency Coordination for Gerald Desmond Bridge Replacement Project
Biological Resources

Name (Agency)	Date	Subject
Annie (Hoecker) Little, Biologist, USFWS	July 25, 2002	Peregrine falcons, special-status bats, and birds in the BSA
Kerri Davis, Biologist (USFWS)	August 6, 2002	
Warren Wong, Biologist, CDFG	August 8, 2003	
Stephanie Remington, Bat Specialist	November and December 2005	
Stacey Crouch, Senior Environmental Specialist, POLB	July 31, 2002 August 2, 2002 August 23, 2002	Peregrine falcon nesting in the BSA
Carl G. Thelander, Biologist and Peregrine Falcon Specialist Expert Specialist, BioResource Consultants	July 31, 2002 March 30, 2006	
Jeffery Sipple, Peregrine Falcon Specialist	April 6, 2006 April 10, 2006	

The Biological Study Area (BSA)

The BSA for the proposed project is located entirely within the Inner Harbor portion of the Long Beach Harbor (Exhibit 2.3.1-1). It includes the area potentially affected by the proposed bridge replacement, as well as areas potentially affected by the proposed realignment of transmission lines (part of the North- and South-side Alignment Alternatives) from the Terminal Island generating station, across the Cerritos Channel up to the proposed Anaheim Substation north of Anaheim Street (see Exhibit 1-5). Specifically, the BSA includes existing terrestrial environment on both sides of the bridge extending approximately 0.25-mi (0.4-km) to the north and 0.25-mi (0.4-km) to the south. This area would include new bridge piers and footings, and adjacent areas for construction staging. In addition to terrestrial resources, the BSA includes marine resources beneath the bridge in the Back Channel and transmission lines over the Cerritos Channel, as well as nesting, roosting, and perching habitat for birds and bats provided by the existing bridge (Exhibit 2.3.1-2). Habitats of the outer Long Beach and Los Angeles Harbors (Exhibit 2.3.1-2) are not within the BSA because they would not be directly affected by the proposed project; however, threatened and endangered species known to occur in the outer harbor are discussed in this section because they may be indirectly affected by the proposed project.

Field surveys of the BSA's terrestrial resources were conducted on October 25, 2002, by Parsons staff environmental specialists and biologists Jay Officer and Rosemarie Crisologo. Surveys examined the vegetation of the BSA within the approaches to and beneath the bridge, including the shoreline of the Back Channel and the Cerritos Channel. Surveys also documented wildlife species observed in the BSA. In addition to general surveys, Parsons staff biologist John Martin conducted diurnal and nocturnal bat surveys, along with other biological resources surveys, to detect use of the bridge by bats. Bats were visually observed and audibly detected using a Skye Instruments Sonic Bat Detector beneath and adjacent to the bridge from 5:00 p.m. to 11:00 p.m. from July 31 through August 2, 2003.

No surveys of the BSA's marine resources were conducted because the literature review described above provided sufficient recent information on the marine resources of the BSA and vicinity.

The literature review also provided sufficient information on special-status species[8] in the BSA, and the field survey indicated that aside from some foraging opportunities, no habitat[9] to support special-status species was present in the BSA; therefore, aside from bat surveys described above, no focused surveys for special-status species were conducted.

Development of Long Beach Harbor through dredging, filling, and channelization over the past 100 years has altered the original physiography and habitats of the area. Once an estuary of the Los Angeles and San Gabriel Rivers, development of Long Beach Harbor has been transformed from a shallow estuarine habitat into mainly deepwater habitat. Dredge-and-fill operations to deepen channels to accommodate deep draft vessels and to develop terminals have eliminated former habitats.

Since the early 1900s, fills of land in the site area were constructed by hydraulic placement of material dredged from the harbor floor. The hydraulic fill deposits range from soft silt and clay to fine-grained, loose, silty sand and sand. These deposits were then overlain by 4 to 8 ft (1.2 to 2.5 m) of compacted hydraulic fill retained by rock dikes. These dikes may consist of several lifts of quarry waste containing sandy gravel with cobbles (typically less than 12 in. [304 mm] in diameter) and some silt. No sandy beach or salt marsh habitat and very little shallow-water habitat remain in the Port.

2.3.1.3 Environmental Consequences

Evaluation Criteria

The following criteria are the basis for evaluating whether there are substantial adverse effects to natural communities resulting from project development. Would the project:

- Have a substantial adverse effect on any sensitive natural community identified in any federal plans, policies, or regulation, or by the U.S. Fish and Wildlife Service (USFWS).

[8] Species that have been afforded special recognition by state and federal resource agencies and resource conservation organizations due to declining or limited population sizes.

[9] A place exhibiting environmental conditions under which a given species would normally and naturally live. Generally, these conditions include food availability (i.e., soil nutrients for plants), water, shelter (i.e., escape cover, protection from weather), and space requirements.

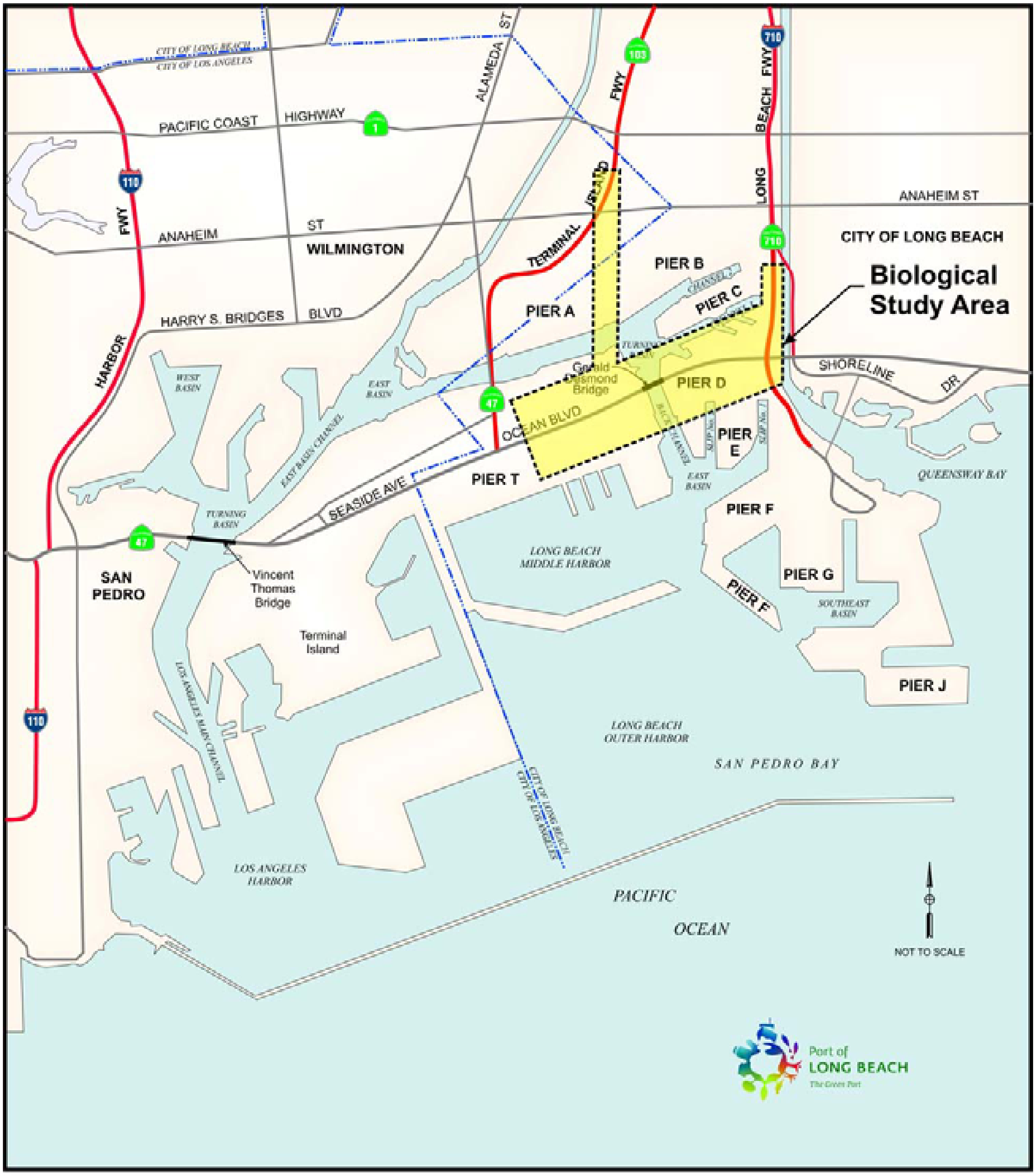

EXHIBIT 2.3.1-1
Biological Study Area

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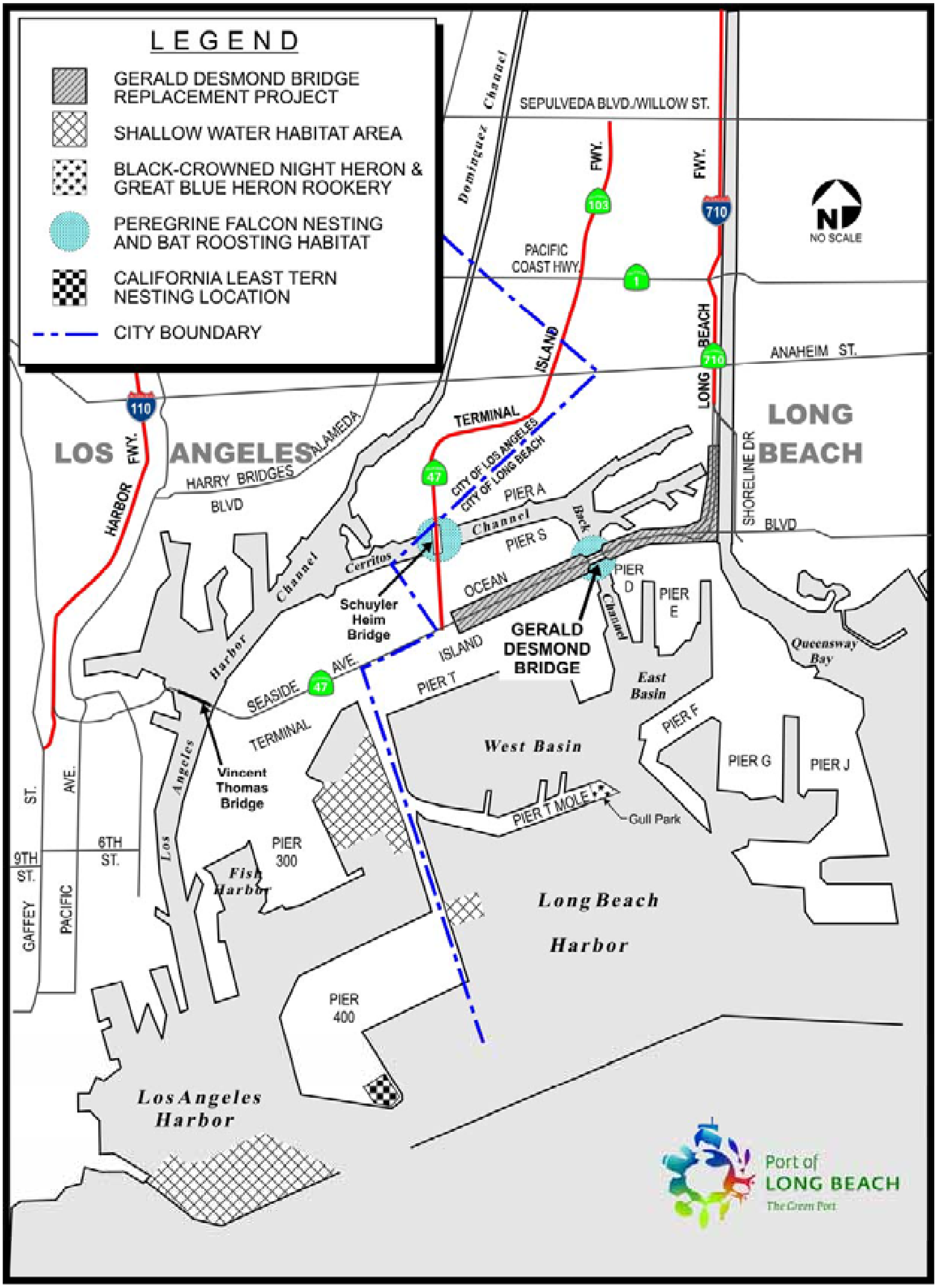

Exhibit 2.3.1-2
Sites of Sensitive Habitats in the Area of the Gerald Desmond Bridge Replacement Project

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- Conflict with any other federal policies or ordinances protecting biological resources, such as the Migratory Bird Treaty Act of 1918 (MBTA).

No Action Alternative

No natural communities of concern were identified within the study area. Under the No Action Alternative, the existing bridge would continue to be in service, and no construction activities would occur. The No Action Alternative would not affect any sensitive natural communities.

Construction and Demolition Impacts

North and South-side Alignment Alternatives

No natural communities of concern were identified within the BSA. Construction of these alternatives would not affect any sensitive natural communities.

Rehabilitation Alignment Alternative

No natural communities of concern were identified within the BSA. Construction of the Rehabilitation Alternative would have no effect on sensitive natural communities.

Operational Impacts

North- and South-side Alignment Alternatives

No natural communities of concern were identified within the BSA. Operation of these alternatives would not affect any sensitive natural communities.

Rehabilitation Alignment Alternative

No natural communities of concern were identified within the BSA. Operation of the Rehabilitation Alternative would have no effect on sensitive natural communities.

2.3.1.4 Avoidance, Minimization and/or Mitigation Measures

No measures are required.

2.3.2 Wetlands and Other Waters

2.3.2.1 Regulatory Setting

Wetlands and other waters are protected under a number of laws and regulations. At the federal level, the CWA (33 U.S.C. 1344) is the primary law regulating wetlands and waters. The CWA regulates the discharge of dredged or fill material into waters of the United States, including wetlands. Waters of the United States include navigable waters, interstate waters, territorial seas, and other waters that may be used in interstate or foreign commerce. To classify wetlands for the purposes of the CWA, a three-parameter approach is used that includes the presence of hydrophytic (water-loving) vegetation, wetland hydrology, and hydric soils (soils subject to saturation/inundation). All three parameters must be present, under normal circumstances, for an area to be designated as a jurisdictional wetland under the CWA.

Section 404 of the CWA establishes a regulatory program that provides that no discharge of dredged or fill material can be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be substantially degraded. The Section 404 permit program is run by the U.S. Army Corps of Engineers (USACE) with oversight by EPA.

The Executive Order for the Protection of Wetlands (EO 11990) also regulates the activities of federal agencies with regard to wetlands. Essentially, this executive order states that a federal agency, such as FHWA, cannot undertake or provide assistance for new construction located in wetlands unless the head of the agency finds that (1) there is no practicable alternative to the construction and (2) the proposed project includes all practicable measures to minimize harm.

At the state level, wetlands and waters are regulated primarily by CDFG and RWQCBs. In certain circumstances, the CCC (or Bay Conservation and Development Commission) may also be involved. Sections 1600-1607 of the Fish and Game Code require any agency that proposes a project that will substantially divert or obstruct the natural flow of or substantially change the bed or bank of a river, stream, or lake to notify CDFG before beginning construction. If CDFG determines that the project may substantially and adversely affect fish or wildlife resources, then a Lake or Streambed Alteration Agreement will be required. CDFG jurisdictional limits are usually defined by the tops of the stream or lake banks, or the outer edge of riparian vegetation, whichever is wider. Wetlands under jurisdiction of USACE may or may not be included in the area covered by a Streambed Alteration Agreement obtained from CDFG.

The RWQCBs were established under the Porter-Cologne Water Quality Control Act to oversee water quality. RWQCB also issues water quality certifications in compliance with Section 401 of the CWA. See Section 2.2.1 (Water Resources and Hydrology) for additional details.

2.3.2.2 Affected Environment

Wetlands do not occur within the project area; therefore, no wetlands will be affected by this project. More information on effects to water resources within the Cerritos Channel, Back Channel, and Dominguez Channel is discussed in the Section 2.2.1 (Water Resources and Hydrology). Effects to marine life within the study area are discussed in Sections 2.3.3.2 (Marine Communities and Plants [Algae]) and Section 2.3.4.2 (Marine Animals and Plankton).

2.3.2.3 Environmental Consequences

Evaluation Criteria

The criterion below is the basis for evaluating whether there are substantial adverse effects to wetlands and other waters resulting from project development. Would the project:

- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal) through direct removal, filling, hydrological interruption, or other means.

No Action Alternative

Under the No Action Alternative, the existing bridge would continue to be in service and no construction activities would occur. The No Action Alternative would not affect any wetlands or other waters of the U.S.

Construction and Demolition Impacts

North- and South-side Alignment Alternative

No wetlands were identified within the BSA, and all construction activities would be located outside of the Back Channel. The North- and South-side Alignment Alternatives would have no effect on wetlands or other waters of the U.S.

Rehabilitation Alternative

No wetlands were identified within the BSA, and all construction activities would be located outside of the Back Channel. The Rehabilitation Alternative would have no effect on wetlands or other waters of the U.S.

Operational Impacts

North- and South-side Alignment Alternative

Operation of the North- and South-side Alignment Alternatives would have no effect on wetlands or other waters of the U.S.

Rehabilitation Alternative

Operation of the Rehabilitation Alternative would have no effect on wetlands or other waters of the U.S.

2.3.2.4 Avoidance, Minimization, and/or Mitigation Measures

No measures are required.

2.3.3 Plant Species

2.3.3.1 Regulatory Setting

USFWS and CDFG share regulatory responsibility for the protection of special-status plant species. "Special-status" species are selected for protection because they are rare and/or subject to population and habitat declines. Special status is a general term for species that are afforded varying levels of regulatory protection. The highest level of protection is given to threatened and endangered species; these are species that are formally listed or proposed for listing as endangered or threatened under the ESA and/or the California Endangered Species Act (CESA). See Section 2.3.5 (Threatened and Endangered Species) for detailed information regarding these species.

This section of the document discusses all of the other special-status plant species, including CDFG fully protected species and species of special concern, USFWS candidate species, and non-listed California Native Plant Society (CNPS) rare and endangered plants.

The regulatory requirements for ESA can be found at 16 U.S.C. Section 1531, *et. seq.* (see also 50 CFR Part 402). The regulatory requirements for CESA can be found at California Fish and Game Code, Section 2050, *et. seq.* Port projects are also subject to the Native Plant Protection Act, found at Fish and Game Code, Section 1900-1913, and CEQA, PRC Sections 2100-21177.

2.3.3.2 Affected Environment

Terrestrial Plant Communities

Overall, the BSA's terrestrial habitats are developed and industrialized in the form of container terminals and ancillary port uses on Terminal Island and Pier D; therefore, native vegetation communities that once occurred in the area are fragmented and disturbed.

Other than a few isolated areas of ornamental plantings, vegetation consists of exotic (non-native) annual weeds that proliferate at curbs and asphalt cracks with occasional ornamental tree species. This habitat type is termed ruderal-disturbed (termed *non-native grasslands* by Holland, 1986; *annual grassland series* by Sawyer and Keeler-Wolf, 1995).

The following was observed during surveys of the BSA on October 25, 2002:

- A row of approximately 15 introduced evergreens (*Pinus*[10] spp.) is present along the roadway at the corner of SR 710 and Ocean Boulevard, west of Pico Avenue on the north side of the approach to the bridge. Approximately 20 ft (6 m) high, these pines line the north side of a triangular property at this location.
- On either side of the bridge, the shoulders of Ocean Boulevard are vegetated with eucalyptus (*Eucalyptus* spp.), a non-native tree common in the California landscape. Approximately 11 mature fan palms (*Washingtonia* spp.) roughly 50 ft (15 m) high are located along the south shoulder of Ocean Boulevard at the west end of the bridge. Other exotic plants observed at various locations included iceplant (*Carpobrotus* spp.), oleander (*Nerium oleander*), tree tobacco (*Nicotiana glauca*), and non-native yucca (*Yucca* spp.).
- Fan palms are also found at the northeast and southeast approach to the bridge on the shoulders of Ocean Boulevard.
- The northern facing underside of the bridge east of the Back Channel contains a steep, sloped road shoulder across from the LBGS. This sandy, sloped face is vegetated with exotic weedy species that include horseweed (*Conyza canadensis*) and an isolated fan palm. Surface water runoff has eroded this area, and it is highly disturbed from debris that falls from the bridge above. This sloped face does not appear to have been treated for erosion control or otherwise landscaped, setting it apart from other soil surfaces within the zone of effect.
- Vegetation along the eastern edge of the Back Channel, observed from Pier D Avenue under the bridge, was limited to isolated plantings used for landscaping (*Crassula* spp. and oleander). Exotic weedy species and annual grasses are growing through cracks in asphalt, concrete, and riprap sidewalls on the west side of the Back Channel north of the bridge.

Marine Communities and Plants (Algae)

Marine communities in the BSA are limited to open water on the surface, benthic (the harbor floor), and pelagic[11] (between the surface and the harbor floor), as well as human-created habitats such as riprap. Kelp and macroalgae are anchored in the benthic community, but they extend into the pelagic and open water community. Kelp and macroalgae are narrowly distributed within the BSA because they are restricted principally to shallow hard-bottom environments associated with riprap shorelines, breakwaters, pier structures, and other harbor debris. Riprap supports giant kelp communities in the Outer Harbor; and riprap habitat occupies much of the shoreline under the bridge and the remainder of the BSA. Some kelp habitat is present in the BSA, particularly in the Back Channel near the bridge.

2.3.3.3 Environmental Consequences

Evaluation Criteria

The following criterion is the basis for evaluating whether there are substantial adverse effects to plant species resulting from project development. Would the project:

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in any federal plans, policies, or regulations, or by USFWS.

No Action Alternative

Under the No Action Alternative, the existing bridge would continue to be in service and no construction activities would occur. The No Action Alternative would not affect any terrestrial or marine plant communities.

Construction and Demolition Impacts

North-side Alignment Alternative

Terrestrial Plant Communities and Habitat. Construction of the proposed project would not

[10] Scientific names are provided only after the first mention of the common name for the species in this section. Scientific nomenclature and common names follow taxonomy, and nomenclature in this report follow Hickman (1993) for plants, Robins *et al.* (1991) for fish, Committee on Standard English and Scientific Names (2003) for herpetofauna, American Ornithologists' Union (1983; 1998) for birds, and Wilson and Cole (2000) for mammals.

[11] Occurring in or over the open ocean.

result in direct effects on any natural terrestrial communities. The proposed widening of Ocean Boulevard on Terminal Island and on Pier D would occur entirely within developed areas that are devoid of natural habitats. Installation of new transmission towers would include placement of towers alongside the existing towers on Pier A in a developed area devoid of natural habitat. No loss of habitat would be expected because of construction, operation, or demolition activities.

Marine Plant Communities and Habitat. All construction would occur outside of the channel. No substantial effects on marine plant communities or habitat is anticipated.

South-side Alignment Alternative

Construction and demolition effects associated with the South-side Alignment Alternative would also occur in areas devoid of natural habitats and outside of the channel. Construction and demolition effects would be the same as those described under the North-side Alignment Alternative.

Rehabilitation Alternative

Work required to rehabilitate the existing bridge would occur within the current bridge footprint and outside of the channel. Bridge rehabilitation activities would not affect terrestrial or marine plant communities or habitats.

Operational Impacts

North- and South-side Alignment Alternatives

Neither the North- nor South-side Alignment Alternative would result in operational effects to terrestrial or marine plant communities.

Rehabilitation Alternative

The Rehabilitation Alternative would not result in any operational effects to terrestrial or marine plant communities.

2.3.3.4 Avoidance, Minimization, and/or Mitigation Measures

No measures are required.

2.3.4 Animal Species

2.3.4.1 Regulatory Setting

Many state and federal laws regulate effects to wildlife. USFWS, the National Oceanic and Atmospheric Administration (NOAA) Fisheries and CDFG are responsible for implementing these laws. This section discusses potential impacts and permit requirements associated with wildlife not listed or proposed for listing under CESA or ESA. Species listed or proposed for listing as threatened or endangered are discussed in Section 2.3.5 (Threatened and Endangered Species). All other special-status animal species are discussed here, including CDFG fully protected species and species of special concern, and USFWS or NOAA Fisheries candidate species.

Federal laws and regulations pertaining to wildlife include the following:

- NEPA
- MBTA
- Fish and Wildlife Coordination Act

State laws and regulations pertaining to wildlife include the following:

- CEQA
- Sections 1600 through 1603 of the Fish and Game Code
- Sections 4150 and 4152 of the Fish and Game Code

2.3.4.2 Affected Environment

Terrestrial Animals

As described above, the BSA is dominated by a ruderal/disturbed plant community[12]; therefore, terrestrial wildlife species in the BSA are limited to species well-adapted to this type of human-modified community. Such species include house mouse (*Mus musculus*), Norway rat (*Rattus norvegicus*), feral cat (*Felis domesticus*), rock dove (*Columba livia*), mourning dove (*Zenaida macroura*), American crow (*Corvus corax*), European starling (*Sturnus vulgaris*), house finch (*Carpodacus mexicanus*), and house sparrow (*Passer domesticus*) (U.S. Navy/City of Long Beach, 1998).

Despite the lack of native plant communities, 18 bird species are known to nest within the harbor area, including the California least tern (*Sternula antillarum browni*), great blue heron (*Ardea herodias*), black-crowned night heron (*Nycticorax nycticorax*), and black oystercatcher (*Haematopus bachmani*) (MEC, 2002). From 1997 through 2005, Caspian terns (*Sterna caspia*), elegant terns (*Sterna elegans*), and, during some years,

12 Assemblages of plant species living in an area under the same or similar biological and environmental factors. Plant community categories discussed in this report are based on Holland (1986), although Zeiner *et al.* (1988; 1990a; 1990b), and Sawyer and Keeler-Wolf (1995) were also used.

black skimmer (*Rhynchops niger*) also nested within the harbor area (MEC, 2002; Keane Biological Consulting, 2007); however, aside from nesting by these species on barges in the outer Long Beach Harbor during 2006 and 2007, no terns other than California least terns have nested in the harbor area since 2005 (Keane Biological Consulting, 2007). These species are further discussed under Special-Status Species[13].

Within the BSA, nesting bird species are limited to great blue heron and black-crowned night heron in Gull Park at the end of the Navy Mole. Nesting by double-crested cormorants (*Phalacrocorax auritus*) has also been documented during previous years on the transmission towers of Piers S and A north of the Gerald Desmond Bridge (U.S. Navy/City of Long Beach, 1998). The BSA also provides nesting opportunities for house sparrows on light poles and in eaves, American crows in trees and tall buildings, and American kestrels (*Falco sparverius*), which commonly use cavities in structures and under dead palm tree leaves. Habitat for several species of marine birds is also present in the BSA, although some of these, such as gulls, commonly roost or forage on land. These are discussed under Marine Animals and Plankton, following this section.

A pair of peregrine falcons has nested within the supporting structure below the Gerald Desmond Bridge off and on for the past several years, and they have successfully fledged young each year (Sipple, 2006). Peregrine falcons have also nested on the Schuyler Heim Bridge, which separates the Ports inner harbors (MEC, 2002). Peregrine falcons and other special-status species of the harbor area are further discussed in Section 2.3.5 (Threatened and Endangered Species).

Terrestrial wildlife observed during the October 25, 2002, survey and July 31 through August 2, 2003, survey included grebes (*Podiceps* spp.), gulls (*Larus* spp.), northern mockingbird (*Mimus polyglottos*), European starling, and house sparrow. Other terrestrial birds expected to occur in the BSA include American kestrel, mourning dove, Anna's hummingbird (*Calypte anna*), barn swallow (*Hirundo rustica*), American crow, and house finch. Several birds associated with marine habitats were also observed during surveys; these are discussed under Marine Animals and Plankton, following this section.

The MEC (2002) surveys recorded foraging by 8 percent of all birds observed in the Inner Harbor that includes the BSA, compared to 13 percent in the outer Long Beach Harbor (MEC, 2002), suggesting that the abundance and/or diversity of prey for birds is lower in the Inner Harbor and BSA than the Outer Harbor. Bats were observed during the July 31 through August 2, 2003, surveys, and although they could not be identified to species, bat specialist Stephanie Remington determined that they were most likely *Myotis.* Because they were observed only in singles or pairs and the understructure of the bridge is not conducive to support large numbers of bats, roosting bat colonies are unlikely (see Section 2.3.5 [Threatened and Endangered Species]).

No other terrestrial mammals, amphibians, or mammals were observed during the field surveys; however, Norway rat, house mouse, opossum (*Didelphis virginiana*), and feral cat are expected to be present in the BSA, and several species of bats may roost on the bridge and/or forage in the BSA.

Marine Animals and Plankton

Although the Port is a highly industrialized setting, the Long Beach, and adjacent Los Angeles, harbor (harbor area) supports marine habitats encompassing a range of species. More than 130 fish species have been collected in the harbor area, and several of them use the harbor area as a nursery (MEC, 2002). The open water and other habitats of the Outer Harbor support important nesting, foraging, and resting habitat for numerous avian species. More than 100 species of birds forage and roost in the various habitats within the Ports. Some of these species are year-round residents of the area; others may winter inside the Ports (MEC, 2002). Some of these are special-status species, which are further discussed under Special-Status Species. Within the BSA, habitat for marine animals is limited, as described below.

Riprap habitat, which is present under the bridge, provides substrate for a variety of sessile invertebrates (MEC, 2002). Other marine organisms that potentially occur in the harbor area include marine mammals, marine birds, sea turtles, fish, benthic and epibenthic invertebrates, and plankton (MEC, 2002), which are further discussed below.

[13] Species that have been afforded special recognition by state and federal resource agencies and resource conservation organizations due to declining or limited population sizes.

Marine Mammals. Whales have been observed in the outer waters beyond the breakwaters and very rarely in the Outer Harbor. The California sea lion (*Zalophus californianus*) and harbor seal (*Phoca vitulina*) are commonly observed within the harbor. The bottle-nosed dolphin (*Tursiops truncatus*) has also been observed in the outer harbor (MEC, 2002); however, due to marine vessel traffic, observance of marine mammals is less common in the BSA than in the outer harbor.

Marine Birds. The open water and other habitats in the harbor area support nesting, foraging, and resting habitat for numerous bird species. Some bird species are present year-round, while others are seasonal (i.e., winter or summer breeders) or seasonal migrants, remaining only for a few days each year. More than 100 bird species have been documented foraging and roosting in the harbor (MEC, 2002). Of these, 69 are considered saltwater-obligates and dependent on the waters of the harbor for food and cover. During MEC's 2000-2001 surveys (MEC, 2002), 99 species were observed. Gulls were the most abundant birds, followed by terns and pelicans, waterfowl, and upland birds (dominated by rock doves). Shorebirds and marshbirds were the least numerous birds in the harbor area.

Sea Turtles. Sea turtles are infrequently seen in the harbor. Most sightings have been of the green sea turtle (*Chelonia mydas*), but loggerhead (*Caretta caretta*) and leatherback (*Dermochelys coriacea*) turtles have occasionally been seen (MEC, 2002). Sea turtles are further discussed under Special-Status Species.

Fish. The five most-abundant species of fishes occurring in the Los Angeles-Long Beach Harbor are northern anchovy (*Engraulis mordax*), white croaker (*Genyonemus lineatus*), queenfish (*Seriphus politus*), Pacific sardine (*Sardinops sagax*), and topsmelt (*Atherinops affinis*) (MEC, 2002). These five species account for nearly 92 percent of the total fish population in the harbor. Other abundant species include specklefin midshipman (*Porichthys notatus*), arrow goby (*Clevelandia ios*), yellowfin goby (*Acanthogobius flavimanus*), California halibut (*Paralichthys californicus*), shiner surfperch (*Cymatogaster aggregata*), diamond turbot (*Hypsopsetta guttulata*), speckled sandab (*Citharichthys stigmaeus*), salema (*Xenistius californiensis*), barred sand bass (*Paralabrax nebulifer*), and bat rays (*Myliodatis californica*). Seventy-six (76) taxa, representing 74 species, were collected during the baseline study (MEC, 2002).

Benthic and Epibenthic Invertebrates. The MEC 2000-2001 surveys documented 400 taxa, representing 361 species, of infauna in the Los Angeles-Long Beach Harbor (MEC, 2002). Infauna are marine invertebrates that live in soft sediments – a community is dominated by polychaetes (i.e., sand, tube, and clamworms), which comprise approximately 65 percent of the infaunal population in the harbor. Crustaceans (i.e., crabs and shrimp) comprise 23 percent, mollusks (i.e., clams, mussels, and snails) comprise 9 percent, echinoderms (i.e., starfish, sea urchins, sand dollars, and sea cucumbers) comprise less than 1 percent, and other minor phyla make up 2 percent of the infaunal community. Benthic organisms found in the harbor include polychaete worms, bay mussels, barnacles, limpets, and algae. Dominant species of macroinvertebrates include the black spotted shrimp (*Crangon nigromaculata*), tuberculate pear crab (*Pyromaia tuberculata*), Xantus' swimming crab (*Portunus xantusii*), and invasive species including the introduced New Zealand bubble snail (*Potamopyrgus antipodarium*) and Spotwrist hermit crab (*Pagurus spilocarpus*) (MEC, 2002).

Plankton. Plankton is most abundant in mid-spring and early autumn. Diatoms and dinoflagellates are the dominant phytoplankton. Zooplankton is characterized by high concentrations of copepods. The Los Angeles-Long Beach Harbor area is considered a nursery for fish and ichthyoplankton (i.e., planktonic fish eggs and larvae) in comparison to open coastal waters (MEC, 2002).

2.3.4.3 Environmental Consequences

Evaluation Criteria

The criteria shown below are the basis for evaluating whether there are substantial adverse effects to animal species resulting from project development. Would the project:

- Conflict with any federal policies or ordinances protecting biological resources, such as the migratory bird protection regulations.
- Interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- Have a substantial adverse effect on any riparian habitat or other sensitive natural

community identified in any federal plans, policies, or regulations, or by USFWS.

No Action Alternative

Under the No Action Alternative, the existing bridge would continue to be in service, and no construction activities would occur. The No Action Alternative would not affect any terrestrial or marine animal species or habitats.

Construction and Demolition Impacts

North-side Alignment Alternative

Terrestrial and Marine Habitats and Species

- **Terrestrial Wildlife.** As discussed in Section 2.3.4.2, common terrestrial wildlife species in the BSA are generally well adapted to construction and other human activities. They are expected to avoid construction vehicles; however, some mortality of terrestrial wildlife species, including primarily non-native species (e.g., rock doves and opossums) and some native species (e.g., American crows and house finches) may result due to project construction activities (e.g., effects with construction vehicles or due to removal of ruderal-disturbed vegetation adjacent to the existing bridge or related structures). The potential for increased mortality of common terrestrial wildlife would not be considered a substantial effect because the likelihood of occurrence is low and species are considered generally abundant within the project vicinity. Additionally, because the terrestrial species in the BSA are primarily well adapted to human-modified habitat and disturbances, noise and vibration generated by construction activities are not expected to result in any substantial effects on terrestrial wildlife of the BSA.
- **Marine Wildlife.** The proposed project would be constructed without dredging or other intrusion in the Back Channel of the Inner Harbor. No pilings or piers would be placed into Back Channel waters. New bridge piers and footings would be constructed on land on either side of the bridge along Ocean Boulevard. Towers for new transmission lines would be placed on land; no work would be conducted within the Cerritos Channel. No construction in the marine environment would be required, and no direct effects on marine wildlife during construction are anticipated. Additionally, marine animal species in the waterways of the BSA are not expected to be affected by the noise and vibration generated by project construction activities due to the prevalence of noise and vibration from existing container shipping and other human activities in those waterways. Similarly, marine birds (i.e., gulls, terns, skimmers, marine waterfowl) would likely avoid the BSA during construction due to higher levels of construction disturbance. It is possible that some mortality of marine wildlife species may occur during construction; however, this would not be considered a substantial effect because gulls (even California gulls, a California Species of Special Concern [CSSC]) are numerous in the BSA and its vicinity. Construction and demolition effects on marine animals resulting from the proposed project are not expected to be substantial.
- **Marine.** BMPs that are part of the Port's construction protocol would be implemented to prevent construction debris, litter, and sediment from entering the channel. No indirect effects to marine biological resources are anticipated to result from construction of the project.

South-side Alignment Alternative

Construction and demolition impacts to terrestrial and marine habitats and species would be the same under the South-side Alignment Alternative as described under the North-side Alignment Alternative.

Rehabilitation Alternative

All work required for the Rehabilitation Alternative would occur within the existing footprint of the Gerald Desmond Bridge. As previously discussed, terrestrial wildlife species in the BSA are primarily species well adapted to human-modified habitat and disturbances; therefore, construction disturbance (e.g., vibration, noise, construction equipment) resulting from bridge rehabilitation activities are not expected to result in substantial construction effects on terrestrial or marine habitats or species.

Operational Impacts

North-side Alignment Alternative

Direct Impacts of Project Operation on Terrestrial and Marine Habitats and Species

Project operation includes use of the bridge by traffic and bridge maintenance (i.e., painting, repairs). No direct effects on marine communities (i.e., loss of marine habitat, mortality of marine animals due to collisions with vessel traffic) are expected to occur during project operation. No direct effects on existing terrestrial and marine habitats or species due to project operation and maintenance are anticipated.

Indirect Impacts of Project Operation on Terrestrial and Marine Habitats and Species

Several wildlife and marine species use the BSA and its vicinity. Use of the BSA and its vicinity by terrestrial and marine species is expected to continue similar to its current level. The new bridge would support higher levels of traffic, which could result in higher levels of noise, air, and water pollutants. Because of project mitigation measures that would reduce air and water pollutants, and the fact that wildlife and marine species of the BSA and its vicinity are tolerant of operational effects due to traffic, indirect effects of project operation on terrestrial and marine habitats and species due to possible increased noise and pollutants are not expected to be substantial (see also Section 2.3.6 [Invasive Species]).

<u>South Side-Alignment Alternative</u>

Operational impacts to terrestrial and marine habitats and species would be the same under the South-side Alignment Alternative as described under the North-side Alignment Alternative.

<u>Rehabilitation Alternative</u>

The Rehabilitation Alternative would result in seismic improvements to the Gerald Desmond Bridge. No operational impacts to terrestrial and marine habitats and species are anticipated.

2.3.4.4 Avoidance, Minimization, and/or Mitigation Measures

No measures are required for common terrestrial and marine habitats and species; see Section 2.3.5.4 for mitigation/minimization measures regarding Threatened and Endangered Species.

2.3.5 Threatened and Endangered Species

2.3.5.1 Regulatory Setting

The primary federal law protecting threatened and endangered species is the ESA: 16 U.S.C., Section 1531, *et seq.* (see also 50 CFR Part 402). This Act and subsequent amendments provide for the conservation of endangered and threatened species and the ecosystems upon which they depend. Under Section 7 of this Act, federal agencies, such as FHWA, are required to consult with USFWS and NOAA Fisheries to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat is defined as geographic locations critical to the existence of a threatened or endangered species. The outcome of consultation under Section 7 is a Biological Opinion or an incidental take permit. Section 3 of ESA defines take as “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or any attempt at such conduct.”

California has enacted a similar law at the state level, the CESA, California Fish and Game Code, Section 2050, *et seq.* The CESA emphasizes early consultation to avoid potential effects to rare, endangered, and threatened species and to develop appropriate planning to offset project-caused losses of listed species populations and their essential habitats. CDFG is the agency responsible for implementing CESA. Section 2081 of the Fish and Game Code prohibits "take" of any species determined to be an endangered species or a threatened species. Take is defined in Section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA allows for take incidental to otherwise lawful development projects; for these actions, an incidental take permit is issued by CDFG. For projects requiring a Biological Opinion under Section 7 of the ESA, CDFG may also authorize effects to CESA species by issuing a Consistency Determination under Section 2080.1 of the Fish and Game Code.

A plant or wildlife species is defined as having “special status” when it has been afforded recognition by federal, state, or local resources conservation agencies (e.g., USFWS, CDFG), and/or resource conservation organizations (e.g., CNPS or National Audubon Society). Special-status species include:

- Species officially listed as threatened or endangered species (TES) or proposed for such listing under ESA or CESA.
- Species considered a candidate for possible listing under CESA or ESA.
- Species listed as CSSC, which are animal species with declining or limited populations, or with restricted nesting requirements. Separate lists for birds, amphibians and reptiles, and mammals were developed by CDFG with input, respectively, from Remsen (1978), Jennings and Hayes (1994), and Williams (1986). These documents provide information

on the distribution[14] and habitat preferences for special-status species.

- Species considered rare or in danger of extinction by non-governmental agencies, including CNPS or National Audubon Society.
- Species considered a Bird of Conservation Concern by USFWS (USFWS, 2002a).

Several other lists of special-status species are maintained by other governmental agencies (i.e., United States Forest Service, United States Bureau of Land Management, and California Department of Forestry), but they were not considered in this report because these agencies have no jurisdiction in the BSA.

2.3.5.2 Affected Environment

Study Methodology and Special-Status Species Search Results

The study methodology included consultation with sate and federal resource agencies and review of available literature. CDFG, USFWS, POLA, and POLB were contacted to obtain pertinent information, including direct contact or indirect contact through Internet databases. A listing of threatened, endangered, and candidate species has been acquired from the USFWS Carlsbad and Ventura Field Offices, which share joint jurisdiction over Los Angeles County. CDFG has been contacted regarding the occurrence of special-status species within the project area. As recommended by CDFG, a search for the California Natural Diversity Database (CNDDB) and the CDFG home page provided identification of state threatened, endangered, and special-status species. Additionally, the database for rare plants was reviewed.

Several special-status species are reported by the CNDDB for the United States Geological Survey (USGS) Long Beach quadrangle; however, as noted previously, the BSA's terrestrial habitats are degraded to such a degree that they provide little value for native plants or wildlife. Most special-status species identified by the CNDDB within the USGS Long Beach quadrangle, which includes the BSA, are not likely to be present because (1) species-specific habitat requirements are not present; (2) species are transitory and occur in the area rarely during migration; and (3) species are not tolerant of disturbance or proximity to human activities that are currently present in the BSA. Tables 2.3.5-1 and 2.3.5-2 summarize only special-status species known or expected to occur in the BSA or its vicinity (i.e., in the City of Long Beach or in the harbor area) based on the results of the literature reviews and field reconnaissance surveys. No special-status terrestrial natural communities are listed for the USGS Long Beach quadrangle.

In summary, special-status species of the BSA are limited to the state-listed peregrine falcon, CSSC double-crested cormorant, and several CSSC bat species that may be considered routine residents of the BSA (Exhibit 2.3.1-1). Other special-status species that may use the BSA occasionally for foraging include the federally and state-listed California brown pelican and California least tern; however, even these species generally forage at locations distant from the BSA.

2.3.5.3 Environmental Consequences

Evaluation Criteria

The following criterion is the basis for evaluating whether there are substantial adverse effects to plant species resulting from project development:

- An adverse impact to natural resources would involve the loss of the TES plant or wildlife species, or degradation of their habitat.

No Action Alternative

The No Action Alternative would not result in any effects on TES in the project area.

Construction and Demolition Impacts

<u>North-side Alignment Alternative</u>

Peregrine Falcon: During construction of the North-side Alignment Alternative, no work would occur on the existing bridge until the final demolition stage of construction. During most of this project (approximately 48 months of the 60-month schedule), existing peregrine nesting ledges would be available for use. Use of the existing perches may be affected by construction disturbances (i.e., noise and vibration or visual disturbances) and, although not anticipated, could result in nest abandonment. Major construction associated with the main span, including pile driving and bridge deck construction, would occur within the vicinity of the existing ledge locations. Bridge deck and pile driving construction activities would occur within approximately 50 ft (15 m) and 300 ft (91 m), respectively. Due to the existing nesting ledge location (i.e., beneath Gerald Desmond Bridge in substructure [see Exhibit 2.3.5-1]), construction activities would be mostly screened from view by the existing bridge because the new bridge deck would be

[14] The geographic limits that define the total area occupied by a given species.

Table 2.3.5-1
Special-Status Plant Species Potentially Present in the Gerald Desmond Bridge Biological Study Area

Scientific Name and Common Name	Status		General Habitat Requirements and Known Occurrence	Potential for Occurrence in the BSA
	USFWS	CDFG CNPS		
southern tarplant *(Centromadia parryi ssp. australis)*	--	1B	Occurs in coastal salt and freshwater estuary edges; seasonally and in disturbed soils near saltwater; known to occur in the City of Long Beach near the Marine Stadium (Keane Biological Consulting, 2007; flowers May-November (CNPS, 2002; CDFG, 2002a).	No suitable habitat[15] in the BSA.

1B: rare, threatened, or endangered in California or elsewhere (CNPS, 2001).

Table 2.3.5-2
Special-Status Wildlife Species Potentially Present in the Gerald Desmond Bridge Biological Study Area

Common Name and Scientific Name	Status		General Habitat Requirements and Known Occurrence	Potential for Occurrence in the BSA
	Federal USFWS	State CDFG		
Reptiles				
Leatherneck turtle *(Demochelys coriacea)*	FE	--	Occasionally observed off the southern California coast.	May occur rarely in the Outer Harbor and very rarely in the Inner Harbor.
Loggerhead turtle *(Caretta caretta)*	FT	--	Most abundant turtle observed off the coast of southern California.	May occur rarely in the Outer Harbor and very rarely in the Inner Harbor.
Green turtle *(Chelonia mydas)*	FE for Florida & Mexico breeding sites; FT other areas	--	Nests on Pacific coast beaches of Baja California, Mexico, occasionally observed off southern California coast.	Observed in Long Beach Alamitos Bay. Observed occasionally in the Outer Harbor and expected rarely in the Inner Harbor.
Olive ridley turtle *(Lepidochelys olivacea)*	FE for Mexico breeding sites; FT other areas	--	Nests on Pacific coast beaches of Baja California, Mexico, occasionally observed off southern California coast.	May occur rarely in the Outer Harbor and very rarely in the Inner Harbor.

[15] A place exhibiting optimal environmental conditions for support of a given species. Availability of suitable habitat is critically important to species that are sedentary, especially invertebrates. The presence of species with high mobility, such as flying insects and birds, may not necessarily infer presence of suitable habitat. For example, gulls are often observed in vehicle parking lots, but this does not imply that parking lots are suitable habitat. The same is true for raptors and other predators, which may forage over a variety of areas to exploit hunting opportunities, or big game, which require large areas to support a range of seasonal diets.

Table 2.3.5-2
Special-Status Wildlife Species Potentially Present in the Gerald Desmond Bridge Biological Study Area

Common Name and Scientific Name	Status		General Habitat Requirements and Known Occurrence	Potential for Occurrence in the BSA
	Federal USFWS	State CDFG		
Birds				
Common loon *(Gavia immer)*	--	CSC	Winters along the California coast, including harbors and estuaries; nests in Canada and Alaska; no nesting in southern California.	Occasionally observed swimming and foraging in the Outer Harbor (MEC, 2002)
California brown pelican *(Pelecanus occidentalis californicus)*	FE BCC	SE CFP	Forage in West Basin; colonial ground-nester in isolated, undisturbed coast beaches, offshore islands, and interior lake margins; forages for fish in fresh, brackish, or marine waters (U.S. Navy/City of Long Beach, 1998; MEC, 2002; Shields, 2002).	Foraging and day-resting habitat present; individuals may be observed in project area.
double-crested cormorant *(Phalacrocorax auritus)*	---	CSC	Prefers coasts, inland lakes, and estuaries for foraging; nests on offshore islands and on tall mainland trees and structures. Nests on transmission towers at Piers S and A in the BSA (Exhibit 2.3.1-2); also forages throughout the harbor area waters. A total of 78 (and a maximum of 13) individuals was observed in the Back Channel of the BSA during 2000-2001 surveys (MEC, 2002).	Suitable nesting habitat present; Back Channel and Cerritos Channel also provides foraging habitat, but better foraging habitat present in Outer Harbor.
great blue heron *(Ardea herodias)*	--	--	Colonial nester; nests in tall trees, including palm trees; forages on fish and other marine animals, as well as small terrestrial mammals; observed nesting at Gull Park in the Navy Mole (Exhibit 2.3.1-2) (U.S. Navy/City of Long Beach, 1998). 8 nests at Gull Park in 2006 and 2007 (MBC, 2007).	No nesting habitat present in BSA; some foraging and roosting habitat present; individuals may be observed occasionally foraging in BSA.
black-crowned night heron *(Nycticorax nycticorax)*	--	--	Former nesting colony at Gull Park in the Navy Mole (Exhibit 2.3.1-2) (U.S. Navy/ City of Long Beach, 1998; MEC, 2002). 423 nests in 2000, 81 nests in 2001 during Navy soil remediation activities; no nesting at Gull Park since 2002 due to Navy disturbance (MBC, 2007). Nesting was also observed in ficus trees adjacent to the Vincent Thomas Bridge during 2008 surveys for POLA.	No nesting habitat present in BSA; only foraging and roosting habitat present, may occasionally forage in Back Channel and Cerritos Channel.
American peregrine falcon *(Falco peregrinus anatum)*	BCC	SE[16]	Resident; documented as using the Gerald Desmond and Schuyler Heim bridges for nesting (Exhibit 2.3.1-2) since 1993; assumed to have occupied project area since the 1980s (U.S. Navy/City of Long Beach, 1998; MEC, 2002).	Known nesting habitat present in BSA; also expected to forage on rock doves in BSA and occasionally on marine birds in Back Channel.

[16] On August 6, 2009, the California Fish and Game Commission voted to remove the peregrine falcon from the State's list of endangered species. Currently, the ruling is under review by the State Office of Administrative Law. Pending approval of the ruling, the peregrine falcon would be removed from the endangered species list, but it would remain a "fully protected" species. The final ruling on the matter may or may not result in a change in either the impact findings and/or proposed mitigation pertaining to the species. This information is expected to be available in time for inclusion in the final environmental document.

Table 2.3.5-2
Special-Status Wildlife Species Potentially Present in the Gerald Desmond Bridge Biological Study Area

Common Name and Scientific Name	Status		General Habitat Requirements and Known Occurrence	Potential for Occurrence in the BSA
	Federal USFWS	State CDFG		
western snowy plover *(Charadius alexandrinus nivosus)*	FT BCC	CSC	Prefers undisturbed sandy marine or estuary beaches, shores of large alkali lakes; may use road shoulders or salt pond levees; nests on fine gravel (Page *et al.,* 1995; U.S. Navy/City of Long Beach, 1998; MEC, 2002). Occasionally observed as a migrant at Pier 400 (Keane Biological Consulting, 2007).	No suitable nesting or foraging habitat in BSA.
black oystercatcher *(Haematopus bachmani)*	BCC	--	Nests on rocky offshore islands, including a nesting colony on the Outer Harbor breakwater (U.S. Navy/City of Long Beach, 1998; MEC, 2002). Observed foraging on riprap in several areas of the harbor (MEC, 2002).	No nesting habitat present in BSA; some foraging habitat along riprap of BSA.
Long-billed curlew *(Numenius americanus)*	--	CSC (nesting habitat)	Winters along the California coast. Nests in northeastern California and north; no nesting in southern California. Forages in fields, mudflats, and sometimes on riprap (MEC, 2002).	Occasionally observed foraging on riprap at the Seaplane Lagoon west of the Navy Mole (MEC, 2002).
California gull *(Larus californicus)*	--	CSC (nesting habitat)	Small numbers present year-round on the California coast. Forages in open ocean, harbors, and estuaries. Nests at Mono Lake, northeastern California, and further north; no nesting in southern California.	Observed in the Outer and Inner Harbors, including more than 50 individuals in the Inner Harbor including the BSA (MEC, 2002).
Caspian tern (nesting colony) *(Sterna caspia)*	BCC	--	Colonial nesting species; formerly nested (1997-2005) near the least tern nesting site on Pier 400 in the Los Angeles Harbor (Keane Biological Consulting, 2007); forages in harbor waters. 27 individuals observed in Back Channel over 20 surveys (MEC, 2002). 53 Caspian terns successfully nested on “Arctic Challenger” barge in Long Beach Harbor in 2007 (Ross, 2007).	Aside from occasional use of harbor barges for nesting, no nesting habitat is present in BSA; some foraging and roosting habitat present; individuals may occasionally forage in Back Channel and Cerritos Channel.
elegant tern *(Sterna elegans)*	BCC	CSC	Colonial nesting species with relatively restricted distribution; 90 percent of total population breeds in 5 southern California sites (U.S. Navy/City of Long Beach, 1998; Burgess *et al.,* 1999; MEC, 2002). Formerly nested (1998-2005) near the least tern nesting site on Pier 400 in the Los Angeles Harbor; occasionally forages the harbor, but primarily outside harbor; 2 individuals observed in Back Channel over 20 surveys (MEC, 2002). High numbers use breakwater and adjacent harbor waters for foraging with newly fledged young late June to early August.	Aside from unsuccessful nesting on harbor barges in 2006, no nesting habitat is present in BSA; some foraging and roosting habitat present in Back Channel and Cerritos Channel.

Table 2.3.5-2
Special-Status Wildlife Species Potentially Present in the Gerald Desmond Bridge Biological Study Area

Common Name and Scientific Name	Status		General Habitat Requirements and Known Occurrence	Potential for Occurrence in the BSA
	Federal USFWS	State CDFG		
California least tern *(Sternula antillarum browni)*	FE BCC	SE	Breeds on Pacific coast from San Francisco Bay to southern Baja California, Mexico, and forages offshore and in harbors, bays, and estuaries. Preferred nesting habitat is sandy beaches and mudflats bordering shallow water in estuaries (Thompson *et al.,* 1997; CDFG, 2002a). Nests in a protected nesting site on Pier 4000 in the Los Angeles Harbor (Exhibit 2.3.1-2) and forages throughout the harbor area waters, including the Inner Harbor, as well as outside the harbor (Keane Biological Consulting, 2004).	No nesting habitat exists in BSA. Designated shallow-water habitat for least tern foraging present west of Pier T Mole and in a 26-acre (10-ha) area of shallow water adjacent to Pier 400, but forages in many areas of the harbor, including the East Basin, Cerritos Channel, and Back Channel (MEC, 2002) near the BSA.
black skimmer *(Rynchops niger)*	BCC	CSC	Nested 1998-2000 on Pier 400 in the Los Angeles Harbor; forages in harbor area waters of the Outer Harbor (U.S. Navy/City of Long Beach, 1998; MEC, 2002). Not observed in the Inner Harbor during 20 surveys in 2000-2001 (MEC, 2002).	No nesting habitat present in BSA; only foraging and roosting habitat present; individuals may be observed rarely foraging in Back Channel and Cerritos Channel.
western burrowing owl *(Athene cunicularia hypugea)*	BCC	CSC	Open, dry grasslands, deserts, scrublands, and open fields with low-growing, often non-native vegetation; dependent upon burrowing mammals, most notably of California ground squirrel *(Spermophilus beechyi),* for burrow nests; forages on small mammals and insects (Haug *et al.,* 1993; U.S. Navy/City of Long Beach, 1998; MEC, 2002). 5 individuals observed and live-trapped from the California least tern nesting area on Pier 400 in 2007 (Keane Biological Consulting, 2007).	No nesting or foraging habitat in BSA.
loggerhead shrike *(Lanius ludovicianus)*	FSC BCC	CSC	Prefers open habitats such as grasslands and deserts; also known to use golf courses, pastures, and suburban parks. Observed on riprap and dockpiling habitat of Inner Harbor during surveys for this report. Not observed nesting during the 2000-2001 surveys, but reported to nest in previous years within harbor area (USACE, 1984). This species' numbers in coastal southern California and throughout the United States have declined in recent years.	Little nesting habitat and some foraging habitat present in BSA; individuals may be occasionally observed perching and foraging in BSA.
Mammals				
Gray whale *(Eschrichtius robustus)*	Delisted as FE June 1994	--	Migrates off the coast of southern California November through February to and from wintering/birthing grounds in Baja California, Mexico.	Observed in Outer Harbor off Pier 400 July 2004 (Keane, 2007); expected rarely in the Outer Harbor and not at all in the narrow channels of the BSA.

Table 2.3.5-2
Special-Status Wildlife Species Potentially Present in the Gerald Desmond Bridge Biological Study Area

Common Name and Scientific Name	Status		General Habitat Requirements and Known Occurrence	Potential for Occurrence in the BSA
	Federal USFWS	State CDFG		
Blue Whale (Balaenoptera musculus)	FE	--	Migrates off the coast of southern California. Spends summers in Alaska and wintering/birthing grounds in southern California/ Baja California, Mexico.	Recently observed off the coast of Long Beach.
Townsend's big-eared bat *(Corynorhinus townsendii)*	--	CSC	Primarily occurs in humid coastal regions of California; occupies wide variety of habitats; roosts in caves, buildings, bridges; highly sensitive to human disturbance at roosting and maternity sites (Kunz and Martin, 1982).	Individuals may occasionally occur in BSA, roosting under the Gerald Desmond Bridge.
long-legged bat *(Myotis volans)*	--	WBWG	Commonly associated with forest communities above 4,000 ft (1,220 m); also forages from sea level to higher elevations in chaparral, coastal scrub habitats; roosts in rock crevices, buildings, under tree bark, in snags, mines, and caves (Warner and Czaplewski, 1984).	Individuals or small colonies may occasionally occur in BSA roosting under the Gerald Desmond Bridge.
Yuma bat *(Myotis yumanensis)*	--	WBWG	Optimal environments include open forests in proximity to bodies of water used for foraging; maternity colonies occur in caves, mines, crevices, buildings, and bridges. One of the most numerous bat species roosting under bridges in southern California.	Individuals or small colonies expected to occur in BSA, roosting under the Gerald Desmond Bridge; some foraging habitat also present in BSA.
Mexican free-tailed bat *(Tadarida brasiliensis)*	--	WBWG	One of the most widely distributed mammalian species in the Western Hemisphere. Uses caves and rock crevices on cliff faces for roosting. One of the most numerous bat species roosting under bridges in southern California.	Small to large colonies expected to roost under the Gerald Desmond Bridge; foraging habitat also present in BSA.

Federal Status:

FE: Listed as endangered under ESA
FT: Listed as threatened under ESA
BCC: Bird of Conservation Concern (USFWS, 2002a)

State Status:

SE: Listed as endangered under CESA
CFP: California Fully Protected Species
CSC: Species of concern as identified by CDFG
WBWG: A species of concern for the Western Bat Working Group, a conservation group comprised of organizations, agencies, and private individuals

Exhibit 2.3.5-1
Peregrine Falcon Nesting Ledge on the Existing Gerald Desmond Bridge

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approximately 50 ft (15 m) higher than the existing bridge deck. Construction disturbances would include the presence of equipment, noise, and humans in close proximity (i.e., less than 250 ft [76 m] [Parsons, 2008b]) to perches and/or nesting ledges frequented by peregrine falcons). Construction activity during the 1 to 2 months prior to initiating nesting (approximately January through February) could create sufficient disturbances for peregrines to seek alternate nesting sites within their territory. Other known nesting sites in the project environs include Schuyler Heim Bridge, Vincent Thomas Bridge, Koch Carbon, and Long Beach City Hall. Only the Long Beach City Hall location has been unused for the last several years, and the new bridge proposed to replace the Schuyler Heim Bridge will not have nesting ledges.

Peregrine falcons have demonstrated a high tolerance to human activities, including construction, and the falcons nest in urban settings throughout North America, and in particular on bridges (Bell *et al.,* 1996; Cade *et al.,* 1996). Early in the 1997 breeding season, biologists documented a move of resident peregrines from a nesting site on the Gerald Desmond Bridge to a new nesting site on the Schuyler Heim Bridge in response to construction activities on the Gerald Desmond Bridge (BioResource Consultants, 1998); however, it is rare for a peregrine falcon to abandon a nest due to construction disturbance (Sipple, 2006). It is unlikely that the effects of construction would substantially affect nesting productivity or overall behavior. Peregrine nesting and behavior would be monitored throughout construction of the project, and visual barriers or similar devices acceptable to CDFG would be installed, as necessary, to minimize construction disturbances to nesting peregrine falcons. If monitoring indicated that nesting attempts were being initiated but construction disturbance was discouraging nesting at the current ledges, then the Port, in coordination with CDFG, would install temporary ledges on the Gerald Desmond Bridge at locations that would minimize potential construction disturbance. Successful use of artificial nest boxes was documented in 1997, when a nesting pair of peregrine falcons was disrupted by construction on the Gerald Desmond Bridge. The pair almost immediately reinitiated nesting at a gravel-filled, artificial nesting box placed on an existing ledge of the Schuyler Heim Bridge (BioResource Consultants, 1998).

Construction disturbance could also result in shifts in perch preferences and increased aggressive territorial behaviors to neighboring peregrines or other species, including increased predation (Sipple, 2006).

New nesting ledges would be incorporated into the design of the new bridge. They would be installed last or their use would be excluded prior to completion of the new bridge. Once the new ledges and boxes are available for occupancy, and prior to demolition activities, CDFG exclusion devices would be used on existing nest sites. If upon completion of the new bridge no peregrines are nesting on the Gerald Desmond Bridge, then exclusion devices would be immediately installed under the supervision of a CDFG-approved raptor biologist prior to initiation of demolition of the old bridge. Otherwise, exclusion devices would be installed subsequent to the nesting and prior to the nest site selection seasons.

With implementation of the avoidance and minimization measures in Section 2.3.5.4, there would be no adverse construction or demolition effects associated with the North-side Alignment Alternative on the peregrine falcons.

Bats: As previously discussed, no work would occur on the existing bridge until the final demolition stage of construction. During most of this project (approximately 48 months of the 60-month schedule), existing roosts or other areas would remain available for use by bats. Additionally, it is anticipated that this alternative would be constructed mainly during daytime hours and would have little impact on night feeding or behaviors. It is possible that construction disturbance would result in abandonment of the Gerald Desmond Bridge. If this roost abandonment did occur, there are other suitable bridges and buildings within the Port area for the bats to utilize during construction.

All monitoring would be completed by a CDFG-approved bat biologist. Preconstruction surveys would be initiated approximately 1-year prior to construction. Surveys would focus on species identification, roosting areas, and roost characteristics. Surveys would include at least one breeding season. Information obtained during the surveys would provide necessary information for monitoring during construction, determining roost characteristics for re-creation on the new bridge and species information to determine if additional coordination with CDFG is necessary. If CDFG sensitive bat species are present on the bridge, then the Port would coordinate with CDFG regarding species observations and incorporate additional measures to minimize effects on the species, as applicable.

Monitoring during construction would be completed to document construction effects on bats. If CDFG sensitive species are present, then monitoring would focus on those species, and depending on the bat response, additional coordination with CDFG or measures to minimize construction disturbance on sensitive species may be required.

Bat boxes and/or bat friendly engineering features would be installed/incorporated into the new bridge and would be available for bat occupancy prior to excluding bats from the existing bridge before demolition. Roost information obtained during monitoring would be utilized in recreating roosts on the new bridge. Once the new boxes are installed, bat exclusion could begin at all areas, except at maternity roosts. If feasible, all exclusion would occur before or after the bat breeding season. If maternity roosts are present, then bat exclusion would not occur at these locations until after the bats have been weaned. All exclusion activities would be completed under the supervision of a CDFG-approved bat biologist. During bridge demolition, the new bridge would be monitored to document use of the bat boxes. The Gerald Desmond Bridge would be monitored to determine if additional areas require exclusion. The exclusion devices would also be monitored to ensure that they are properly installed and not resulting in injury to the bats. Subsequent to demolition, the use of the new bridge would be monitored.

With implementation of the avoidance and minimization measures in Section 2.3.5.4, there would be no adverse construction or demolition effects associated with the North-side Alignment Alternative on bat species.

Double-crested Cormorants: Cormorants have been observed nesting on the SCE transmission towers on both sides of the Cerritos Channel, north of the LBGS, and they could be affected during construction of new transmission towers/ lines. The new towers would be constructed adjacent to the existing towers and potentially could result in abandonment of nests on the towers during construction activities; however, construction of the new towers would be initiated outside of the cormorant nesting season. Subsequent to construction of the new towers, the old towers would remain in place, and cormorants could nest on both the new and old towers.

Cormorant nesting may also be indirectly affected by visual and auditory disturbance associated with construction and demolition activities on the new and old bridge. However, the towers are approximately 1,837 ft (560 m) from the bridge; therefore, the potential for nest abandonment as a result of construction disturbances associated with bridge construction and demolition activities is low, and potential indirect effects on nesting double-crested cormorants would not be substantial. Construction of the proposed project would not affect cormorant feeding or roosting in the BSA because these birds are known to feed and roost in areas of the Inner Harbor subject to high human activity and disturbance (Table 2.3.5-2).

With implementation of the avoidance and minimization measures in Section 2.3.5.4, there would be no adverse construction or demolition effects on cormorants associated with the North-side Alignment Alternative.

Other sensitive Species: The California least tern and California brown pelican use the BSA rarely compared to other areas of the harbor, and they will likely avoid the construction zone during periods of high noise and high human activity; however, these species have been observed roosting and foraging in areas adjacent to construction areas and are apparently little disturbed by construction effects. Indirect effects of project construction on adjacent user areas are not anticipated to be substantial.

The only other special-status wildlife species expected to be present in the BSA during construction, albeit occasionally, are elegant tern, Caspian tern, and black skimmer. The BSA is not considered to be important foraging habitat for these species (see Table 2.3.5-2). With the exception of during pile driving activities, these species would likely continue to utilize the BSA during construction at similar levels as prior to and following construction.

Construction night lighting could result in indirect effects on special-status species, as well as on migratory birds and other birds using the BSA. Artificial lighting may disrupt resident bird behavior (International Dark-Sky Association, 2002; Longcore and Rich, 2004). Birds are known to occasionally become disoriented in bright lights and collide with power lines and towers, including coastal lighthouses (Martin, 1990). These collisions have been documented extensively (Trapp, 1998), but they do not include bird collisions with bridges. This could be due to a variety of factors, but generally, bird kills in these areas have factors (e.g., high-wattage lighting pointing upward, invisible power lines, or tall towers that are difficult to detect) that would likely not be associated with the North-side Alignment Alternative. Given these considerations, including the extent and brilliance of ambient night time lighting of the harbor areas adjacent to the bridge, lighting on the existing bridge, and the industrialized nature of the BSA, the potential for bird collisions with the new bridge and related structures due to night lighting during construction would not represent a substantial effect on bird migration or bird use within the bridge vicinity; however, measures outlined in Section 2.3.5.4 include BMPs for bridge lighting during project construction.

<u>South-side Alignment Alternative</u>

Construction and demolition effects to sensitive species would be the same under the South-side Alignment Alternative as described under the North-side Alignment Alternative. With implementation of the avoidance and minimization measures in Section 2.3.5.4, there would be no adverse construction and demolition effects associated with the North-side Alignment Alternative.

<u>Rehabilitation Alternative</u>

Peregrine Falcon: During construction of the Rehabilitation Alternative, most of the project (approximately 40 months) would require major construction activities at night above the existing nest ledges during replacement of the bridge deck, and during the day directly on and adjacent to the ledges at the time of adjacent structure seismic upgrades and painting operations. To ensure no mortality of peregrines due to construction-related mishaps, CDFG-approved exclusion methods would be installed at existing nest sites under the supervision of a CDFG-approved raptor biologist before initiating rehabilitation activities and prior to or following the nest site selection and nesting seasons. During the final design phase, the Port, in coordination with CDFG, would select locations for alternate nesting ledge sites that would minimize the amount of activity within 250 ft (76 m) of new perch locations. The project would be phased to complete seismic retrofit activities at the selected locations first. Subsequent to completion of the seismic retrofit activities at the alternate nesting ledge locations, new nesting ledges would be created. If feasible, the work would be completed prior to the nest site selection period. If the work adjacent to the alternate nest locations could not be completed prior to the following nest site selection period, then it could result in loss of nesting ledges for a maximum of two breeding seasons (i.e., one during adjacent seismic work and one during adjacent painting work). As discussed under the North-side Alignment Alternative, the peregrine falcons do not always nest on the Gerald Desmond Bridge, and alternate nesting sites are believed to exist within the vicinity of the project for peregrines to utilize (e.g., hotels, silos, bridges, Long Beach City Hall) (Sipple, 2006). With implementation of the avoidance and minimization measures in Section 2.3.5.4, there would be no adverse construction effects associated with the Rehabilitation Alternative on falcons.

Bats: As previously discussed, construction of the Rehabilitation Alternative would require seismically upgrading the existing structure and would involve both day and night construction for most of the project (approximately 40 months). Night lighting would be focused onto the bridge surface to minimize lighting effects on night feeding. Construction would be staged to ensure that some roosting areas would be available at all times and/or would be completed first to minimize the potential effects on bats. If roost abandonment due to construction disturbance occurs, there are other suitable bridges and buildings within the Port area for the bats to utilize during rehabilitation activities.

All monitoring would be completed by a CDFG-approved bat biologist. Preconstruction surveys would be initiated approximately 1-year prior to construction. Surveys would focus on species identification and roosting areas. Surveys would include at least one breeding season. Information obtained during the surveys would provide necessary information for staged exclusion during construction. If preconstruction surveys identify that CDFG species of concern are utilizing the Gerald Desmond Bridge, then the Port would coordinate with CDFG regarding species observations and incorporate additional measures to minimize effects on the species, as applicable.

All exclusion activities would be completed under the supervision of a CDFG-approved bat biologist. The approved bat biologist would monitor all of the exclusion devices to ensure that they are properly installed and not resulting in injury to the bats. The monitor would also look for new areas that the bats might use and ensure exclusion from those areas, as applicable.

Subsequent to completion of the rehabilitation activities, all exclusion devices would be removed, and these areas on the bridge would again be made available for bat use.

With implementation of the avoidance and minimization measures in Section 2.3.5.4, there would be no adverse construction effects associated with the Rehabilitation Alternative on bats.

Double-crested Cormorants: The Rehabilitation Alternative does not include construction of replacement transmission towers/lines. Conceivably, nesting could be indirectly affected by visual, auditory and night lighting construction disturbance associated with bridge rehabilitation activities. However, the towers are approximately 1,837 ft (560 m) from the bridge; therefore, the potential for nest abandonment as a result of construction disturbances or potential indirect effects on nesting Double-crested Cormorants as a result of rehabilitation activities would be low. Construction of the Rehabilitation Alternative would not affect cormorant feeding or roosting in the BSA because these birds are known to feed and roost in areas of the Inner Harbor subject to high human activity and disturbance (Table 2.3.5-2).

Other sensitive Species: The California least tern and California brown pelican use the BSA rarely compared to other areas of the harbor, and they will likely avoid the construction zone during periods of high noise and high human activity; however, these species have been observed roosting and foraging in the project vicinity and are apparently little disturbed by construction effects. Indirect effects of project construction on nearby areas utilized by these species are not anticipated to be substantial.

The only other special-status wildlife species expected to be present in the BSA during construction, albeit occasionally, are elegant tern, Caspian tern, and black skimmer. Because the BSA does not represent important foraging habitat for these species (see Table 2.3.5-2), disturbances generated by construction activity would not substantially effect foraging. These species would likely continue to forage in the BSA during construction at similar levels as prior to and following construction.

Night lighting during bridge rehabilitation activities may result in indirect effects on special-status species, as well as on migratory birds and other birds using the BSA. Artificial lighting may disrupt resident bird behavior (International Dark-Sky Association, 2002; Longcore and Rich, 2004). Birds are known to occasionally become disoriented in bright lights and collide with power lines and towers, including coastal lighthouses (Martin, 1990). These collisions have been documented extensively (Trapp, 1998), but they do not include bird collisions with bridges. This could be due to a variety of factors, (e.g., high-wattage lighting pointing upward, invisible power lines, or tall towers that are difficult to detect) that would likely not be associated with the bridge Rehabilitation Alternative. Given these considerations, including the extent and brilliance of ambient nighttime lighting of the harbor areas adjacent to the bridge, lighting on the existing bridge, and the industrialized nature of the BSA, the potential for bird collisions with the bridge and related structures due to night lighting during construction would not represent a substantial effect on bird migration or bird use within the bridge vicinity; however, measures outlined in Section 2.3.5.4 include BMPs for bridge lighting during project construction.

Operational Impacts

<u>North-side Alignment Alternative</u>

Operation of this alternative would result in a permanent change to nighttime lighting on and adjacent to the new bridge. Lighting of the project during operation may affect special-status species and resident/migratory birds. Artificial lighting may potentially disrupt behavior, resulting in disorientation and collisions with the bridge structures (International Dark-Sky Association, 2002; Longcore and Rich, 2004); however, as previously discussed, it is not anticipated that disorientation or bird collision with the new structures would increase due to the new bridge lighting and would not represent a substantial effect on birds or special-status species migration or use within the vicinity of the bridge. The North-side Alignment Alternative would incorporate types of lighting known to minimize potential effects (i.e., low-pressure sodium lights, high-pressure sodium lights, or LED lights) and would avoid lighting types known to be disruptive to migrating wildlife (mercury vapor lamps [Jones, 2000]). Additionally, lighting would be shielded to ensure that light is focused inward, and the amount of lighting would be reduced where possible. During bridge lighting design, special attention would be given to those areas where nesting ledges or bat boxes are proposed. Lighting would be designed to focus away from these areas to minimize the effects on falcons and bats.

With implementation of the avoidance and minimization measures in Section 2.3.5.4, there would be no adverse operational effects associated with the Rehabilitation Alternative.

Use of the BSA and its vicinity by all special-status species is expected to continue similar to its current level. The special-status species of the BSA are adapted to traffic near roosting, nesting, and foraging areas; therefore, no substantial indirect effects on special-status species due to project operation are anticipated.

South-side Alignment Alternative

Operational effects to special-status species would be the same under the South-side Alignment Alternative as described under the North-side Alignment Alternative.

Rehabilitation Alternative

Operation of the Rehabilitation Alternative would not result in changes to bridge lighting, and bat and falcons could again occupy their familiar roosting and nesting areas after completion of construction. No operational effects to any species are anticipated under the Rehabilitation Alternative. Subsequent to completion of the bridge rehabilitation activities, operational impacts would be the same as the No Action Alternative.

2.3.5.4 Avoidance, Minimization, and/or Mitigation Measures

Temporary Measures

North- and South-side Alignment Alternatives

Peregrine Falcons

BR-2 ***Precluding Nesting on the Existing Bridge:*** Once the nest boxes are in place on the new bridge, and a minimum of 2 months prior to initiation of demolition activities within 500 ft (152 m) of the existing nesting locations, measures and/or structures approved by CDFG to discourage nesting at the previously used nest sites would be implemented under the supervision of a CDFG-approved raptor biologist. If existing nest sites are occupied, then exclusion activities could not occur until 30 days after the last young leaves the nest, or until nest abandonment, whichever occurs first (see No Work Zone under BR-3 Monitoring Program).

BR-3 ***Monitoring Program:*** The proposed monitoring program is based on measures from the Peregrine Falcon Monitoring and Mitigation Program (PFMMP) for the Gerald Desmond Bridge (BioResource Consultants, 1998) used from 1998 through 2004. Modified measures from the 1998 PFMMP, as proposed for the North- and South-side Alignment Alternatives, are provided below. A mitigation and monitoring plan will be prepared and submitted to CDFG for concurrence prior to initiation of construction activities.

- *Timing of Monitoring:* A raptor biologist will initiate monitoring at least 1-year prior to the beginning of construction and at least 2 months prior to nest site selection, generally January to mid-February. Monitoring will continue through the breeding season, which generally extends through mid-July. Monitoring will occur at the existing and new bridge and begin prior to the placement of artificial nest boxes on the new bridge and prior to attempts to preclude nesting at the existing bridge. Monitoring during construction will continue once weekly during the breeding season until the breeding season or construction is complete, whichever occurs first.

  Post-construction monitoring will occur for 3 years after construction. Surveys will be conducted once monthly from January through July to document peregrine falcon nesting at the new bridge.

- *Biological Monitor:* A raptor biologist with several years of experience observing peregrine falcon behavior and approved by the Port, Caltrans, and CDFG will be selected to conduct the monitoring.

- *Monitoring Effort:* All monitoring will be conducted with the use of binoculars and/or spotting scope and document peregrine falcon activity in the vicinity of the existing and new bridge. Monitoring during construction will require an average of 8 to 12 hours of observation per week to determine whether peregrine falcons are exhibiting normal breeding behavior and are nesting on the old bridge, or if they have relocated to an alternate nesting site.

  If peregrines attempt to nest on the existing bridge while construction activities are occurring, then a qualified peregrine monitor will observe the pair for a minimum of 16 hours per week to determine the effect of the construction on peregrine behavior. This level of effort will continue as long as incubating peregrines or nestlings under the care of adults occupy the nesting site. If the young fledge, then the observations will continue for a minimum of 30 days after the last young leaves the nest ledge. If the raptor biologist reports that the peregrines are exhibiting behavior that may indicate potential nest abandonment, then visual screens or other methods, as approved by CDFG, would be implemented at the nesting locations. If nest abandonment occurs, then the Port, in coordination with CDFG, will determine the feasibility of creating temporary nesting ledges at alternate locations in areas with less intense construction activities.

Nesting on the new structures shall be discouraged until construction of the new bridge is completed. The Port, in coordination with CDFG, will develop measures to be implemented by a raptor biologist, where feasible, or under the direction of a raptor biologist, where precluded by construction site safety concerns, to discourage nesting. Such measures may include continued removal of nesting materials or installation of CDFG-approved exclusion devices.

- *No Work Zone:* During construction of the new bridge and prior to exclusion efforts for bridge demolition activities, the existing nest ledges and boxes would be available for nesting. If a nesting attempt is made on the new bridge while under construction, then a “No Work Zone” of approximately 250 ft (76 m) will be enforced until the raptor biologist implements CDFG-approved methods to discourage nesting on the areas under construction.

  Prior to exclusion activities on the existing bridge, nesting ledges on the new bridge will be available for use. During demolition, if falcons attempt to nest on the existing bridge, despite efforts to deter nesting, then a “No Work Zone” of approximately 250 ft (76 m) will be enforced until the raptor biologist implements CDFG-approved methods to further exclude nesting on the Gerald Desmond Bridge during demolition activities.

  Should a nest be successfully established within the construction area during construction of the new bridge or demolition of the Gerald Desmond Bridge, the Port will instruct construction crews to adhere to a “No Work Zone” around the nest site. The Port will coordinate with USFWS and CDFG to obtain permission to remove the nest in accordance with the MBTA. This “No Work Zone” will extend around the nest for a radius of approximately 250 ft (76 m) and be maintained until removal of the nest is authorized – 30 days after the last young leaves the nest or until nest abandonment, whichever occurs first. Demolition activities can continue at other locations outside of the “No Work Area.”

- *Reporting:* Quarterly reports summarizing monitoring observations of nesting peregrines, including breeding behavior, nest data, disturbances, and reproductive success, will be submitted during construction of the new bridge. During demolition, post-construction monitoring reports will be prepared to provide details on placement of artificial nest boxes and exclusion activities and the use of nesting ledges on the new bridge. Reports will be prepared by the raptor biologist and submitted to the Port, Caltrans, and CDFG

Bats

BR-5 ***Precluding Roosting on the Existing Bridge:*** Prior to demolition, bats must be excluded from the existing bridge. Methods for excluding bats include use of a chemical repellant (i.e., naphthalene), use of floodlights, high-frequency noise, and placement of physical barriers such as nets to prevent bats from using roost sites (Greenhall, 1982). The exclusion method will be approved by the Port, Caltrans, and CDFG. The mechanical exclusion device is considered the safest and the most reliable (Exhibits 2.3.5-2 through 2.3.5-4). These barriers are commonly screens of mesh, hardware cloth, or wire, with mesh openings no greater than 0.25-in. (0.64-cm). The best

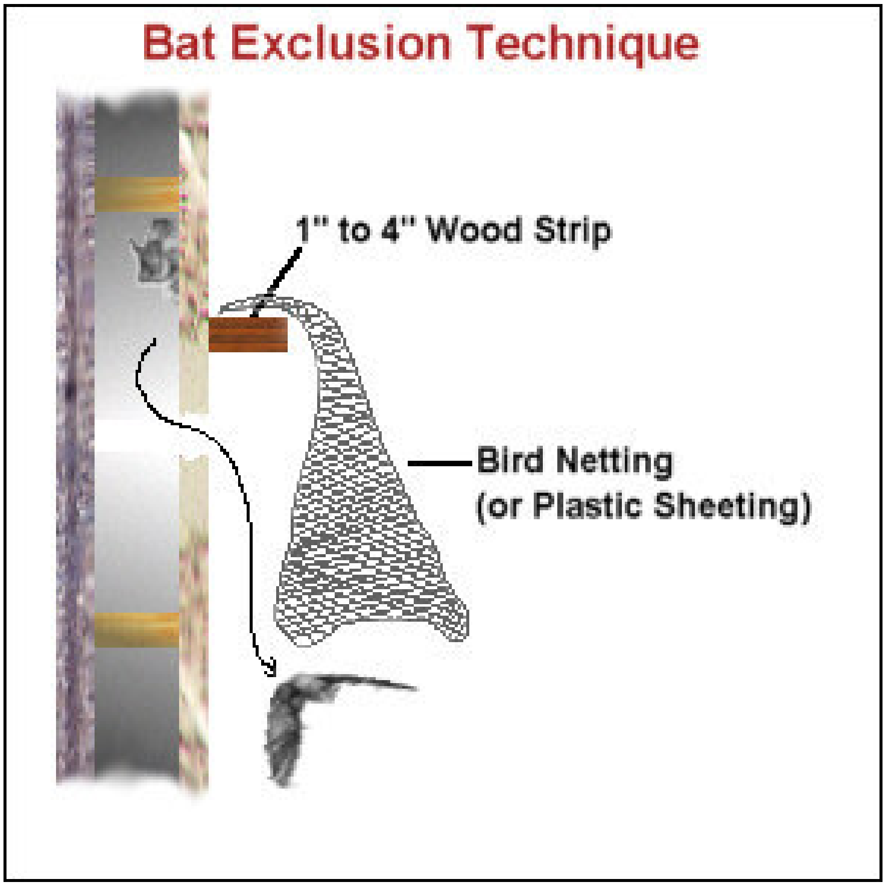

Exhibit 2.3.5-2
Mesh Exclusion for Small Openings[17]

[17] Exhibit by: http://www.batcon.org/discover/unguest.html.

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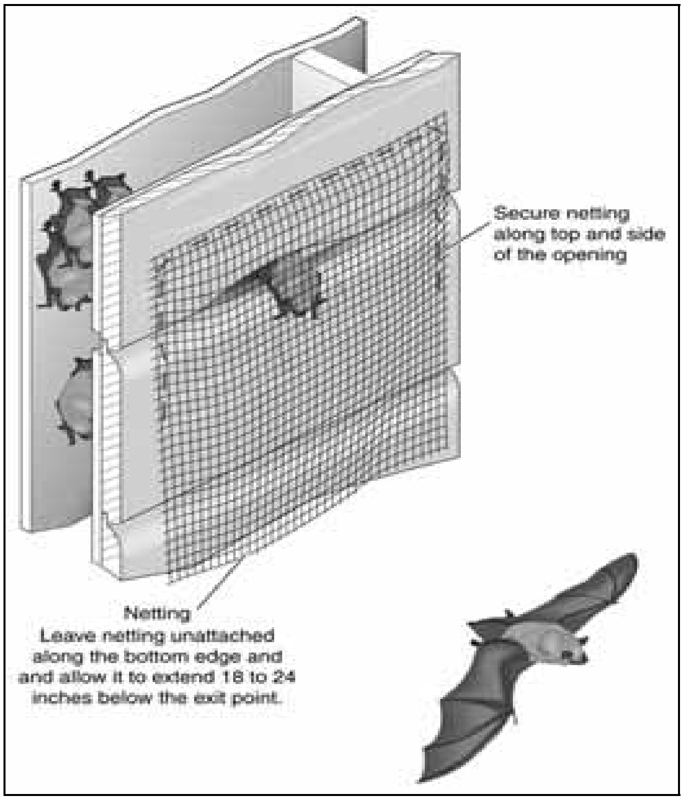

Exhibit 2.3.5-3
Mesh Bat Exclusion Method

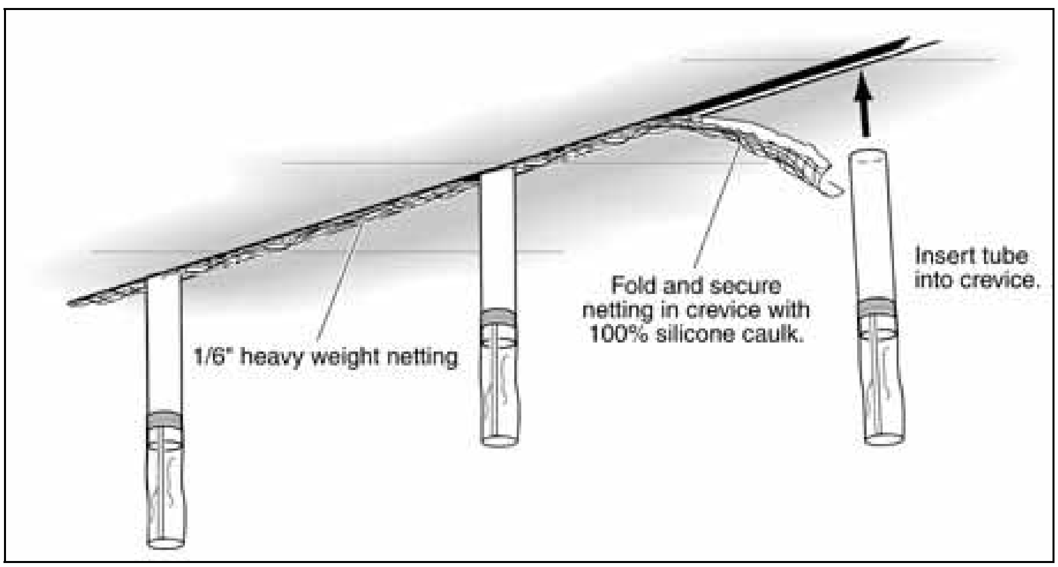

Exhibit 2.3.5-4
Collapsible One-Way Tubes[18]

[18] Exhibit by: http://batcon.org/discover/unguest.html

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time for bat proofing is November through March, after juvenile bats have learned to fly (Bat Conservation and Management, Inc., 2005). Exclusion work will be performed by contractors approved by Caltrans as experienced with excluding bats on bridges. This exclusion process may require 1 to 2 weeks, or potentially longer, given the size of the existing bridge.

Bat exclusion via netting is accomplished by first affixing mesh netting over known entry points using I-bolts, which allows bats to exit the bridge but not return. Bats returning to the bridge would first return to their normal point of entry, and then they would seek new roosts once they have determined that it is not possible to return to their old roosting site. This process will be monitored by a CDFG-approved bat biologist each night for at least 7 consecutive nights, or until no bats are observed to exit the structure from known roosting areas at nightfall. During this time, monitoring will be performed to ensure that bats do not discover and use new roosts on the existing bridge and to that no bats become entangled in netting. If any new roosts are discovered on the existing bridge, they will be covered with mesh according to the above procedure. Very small crevices or fissures in the bridge may be sealed using caulk or a similar filling agent. Should numerous bats still be observed exiting the bridge at night after installation of exclusion cloth, it may be necessary to add another exclusion method, such as floodlights illuminating access points or crevices used by attract bats (bats will not roost in a well-lit area).

BR-6 ***Bat Monitoring Program:*** A monitoring program will be implemented throughout the construction phases of the project, as applicable. CDFG concurrence on the proposed monitoring program will be obtained prior to initiation of bat monitoring/survey activities. All surveys/ monitoring will be conducted by an approved CDFG bat biologist. Preconstruction monitoring will focus on bat species identification, locations of bat roosts, and documentation of roost characteristics based on Fenton (2003) and O'Shea *et al.* (2003). If CDFG species of special concern are identified, then the Port will coordinate with CDFG and incorporate additional monitoring/ protection measures as applicable.

- *Timing of Monitoring:* Bat preconstruction surveys will be initiated a minimum of 1-year prior to the initiation of construction. The surveying and monitoring regime will consist of quarterly monitoring surveys, including a survey in June (i.e., prime bat roosting season). Each survey will include daytime and nighttime surveys (see Monitoring Effort) focused on identifying specific locations of bat roosts and roost access points.

  One month prior to the initiation of demolition of the existing bridge, the frequency of preconstruction surveys at the existing bridge and new bridge will increase to once weekly. This will coincide with placement of bat roosts on the new bridge. Quarterly construction monitoring will be completed. If CDFG sensitive bat species are identified during the preconstruction surveys or during quarterly surveys, then monthly monitoring during the bat breeding season will be completed and will focus on construction effects on bats. If it is determined that construction disturbance is affecting CDFG sensitive species, then the Port will coordinate with CDFG to incorporate additional protection measures, as applicable.

  Monitoring during the demolition phase will focus on ensuring that all bats have been excluded after installing the bat boxes on the new bridge and prior to initiating demolition activities. Subsequent to installation of exclusion devices, roosting areas will be monitored for 7 consecutive nights or until no bats are observed to exit the structure from known roosting areas at nightfall. During this time, monitoring will be performed to ensure that no bats become entangled in netting and that the bats do not discover and use new roost areas on the existing bridge. If any new roosts are discovered, then exclusion netting will be installed and the monitoring process will continue until bats have been excluded from the bridge.

Post-construction monitoring will be conducted quarterly for 3 years and will document the use of new bat roosts.

- *Biological Monitor:* A qualified bat biologist thoroughly familiar with Anabat™ equipment and approved by CDFG, Caltrans, and the Port will conduct all bat monitoring and supervise the design and placement of new bat roosts and bat exclusion methods and devices.
- *Monitoring Effort:* The quarterly surveys will be performed during appropriate lunar/weather conditions and focus on identifying active bat roosts on the existing bridge. Each quarterly survey will include one survey during the day to search for urine staining and accumulation of bat feces or guano, and one evening/night survey period using a sonic bat (i.e., Anabat™ or Sonobat™). Several visits may be required per survey to determine specific roost locations and roost access points, and information necessary for designing bat exclusion devices on the existing bridge.

  During the quarterly preconstruction surveys, once the specific locations of bat roosts are determined, temperatures of existing roosting sites will be recorded so that selection of the location and type of artificial roosts on the new bridge can ensure duplication to the extent feasible of the thermal regime at existing bat roosts.

  Monitoring during construction and demolition will focus on whether construction activities are disturbing bats at the existing and new bridge. If disturbances to bats are documented, and monitoring has identified the presence of maternity roosts or CDFG sensitive species, then the Port will coordinate with CDFG to identify measures to minimize effects on the maternity roosts and sensitive species.
- *Reporting:* Quarterly reports summarizing the monitoring efforts and observations at the new and existing bridge will be prepared and submitted to the Port, Caltrans, and CDFG. Following construction, a final report will be prepared and include the name of the bat monitor, survey methods and dates, survey times and weather conditions, the type of artificial bat roosts used at the new bridge, and exclusion devices at the existing bridge. The final report will also include photos and detailed observations, and a conclusions and recommendations section for agency use in future projects.

Cormorants

BR-7 Initial construction activities for the new transmission towers/lines shall not begin during the nesting season (April through August) if double-crested cormorants have active nests on the transmission towers. Construction activities associated with the transmission tower/lines will be initiated prior to or after the breeding season or after the young have fledged.

Migratory Birds

BR-8 Construction and operational bridge lighting during and following construction will be designed to minimize the potential for bird collisions with the bridge structure. Lighting types known to minimize adverse effects (i.e., low-pressure sodium lights, high-pressure sodium lights, or light-emitting diode [LED] lights) will be used, and lighting types known to be disruptive to migrating wildlife, such as mercury vapor lamps (Jones, 2000), will be avoided. Additionally, lighting will be shielded to ensure that light is focused where it is needed, focusing lighting inward and minimizing the amount of lighting used to the maximum extent possible.

<u>Rehabilitation Alternative</u>

BR-1b ***Artificial Nest Boxes:*** Prior to the final design phase, the Port, in coordination with CDFG, will select temporary locations for alternate nesting sites on the Gerald Desmond Bridge that would minimize the amount of disturbance within 250 ft [76 m]) of new perch locations. Construction will be phased to complete adjacent seismic retrofit activities and painting operations at the new nesting locations outside of the nest site selection and breeding periods. Subsequent to completing the adjacent seismic retrofit activities, the temporary nesting ledges will be installed and be continually available for use.

BR-2b ***Precluding Nesting on the Existing Bridge:*** To ensure no mortality of peregrines due to construction-related mishaps associated with bridge deck replacement, CDFG-approved exclusion methods will be installed at existing nest sites under the supervision of a CDFG-approved raptor biologist before initiating rehabilitation activities. Exclusion will occur prior to the nest site selection or after the breeding season. Due to the proximity of the bridge deck replacement activities to the existing nest sites, exclusion devices will remain until completion of the rehabilitation activities.

BR-3b ***Monitoring Program:*** The proposed monitoring program is based on measures from the PFMMP for the Gerald Desmond Bridge (BioResource Consultants, 1998) used from 1998 through 2004. Modified measures from the 1998 PFMMP, as proposed for the Rehabilitation Alternative, are provided below. A mitigation and monitoring plan will be prepared and submitted to CDFG for concurrence prior to initiation of rehabilitation activities.

- *Timing of Monitoring:* A raptor biologist will initiate monitoring at least 1-year prior to the beginning of rehabilitation and at least 2 months prior to nest site selection, generally January to mid-February. Monitoring will continue through the breeding season, which generally extends through mid-July. Monitoring will occur at the existing nesting locations and at the alternate nesting locations after placement of artificial nest boxes. Monitoring during construction will continue once weekly during the breeding season until the breeding season or construction is complete, whichever occurs first.

  Post-construction monitoring will occur for 3 years after construction. Surveys will be conducted once monthly from January through July to document peregrine falcon nesting at the existing sites.

- *Biological Monitor:* A raptor biologist with several years of experience observing peregrine falcon behavior and approved by the Port, Caltrans, and CDFG will be selected to conduct the monitoring.

- *Monitoring Effort:* All monitoring will be conducted with the use of binoculars and/or spotting scope and will document peregrine falcon activity in the vicinity of the bridge. Monitoring during bridge rehabilitation will require an average of 8 to 12 hours of observation per week to determine whether peregrine falcons are exhibiting normal breeding behavior and are nesting at the temporary locations, or if they have relocated to an alternate nesting site.

  If peregrines attempt to nest at the temporary nesting locations during rehabilitation activities, then a qualified peregrine monitor will observe the pair for a minimum of 16 hours per week to determine the effect of the construction on peregrine behavior. This level of effort will continue as long as incubating peregrines or nestlings under the care of adults occupy the nesting site. If the young fledge, then the observations will continue for a minimum of 30 days after the last young leaves the nest ledge. If the raptor biologist reports that the peregrines are exhibiting behavior that may indicate potential nest abandonment, then visual screens or other methods, as approved by CDFG, would be implemented at the nesting locations.

  Nesting on the Gerald Desmond Bridge in locations other than the temporary nesting locations shall be discouraged until rehabilitation activities are complete. The Port, in coordination with CDFG, will develop measures to be implemented by a raptor biologist, where feasible, or under the direction of a raptor biologist where precluded by construction site safety concerns to discourage nesting within areas under construction. Such measures may include continued removal of nesting materials or installation of additional CDFG-approved exclusion devices.

- *No Work Zone:* During bridge rehabilitation activities, alternate nest ledges and boxes will be available for nesting. If a nesting attempt is made at a new location that would be under construction during the nesting season, a "No Work Zone" of approximately 250 ft (76 m) will be enforced until the raptor biologist implements CDFG-approved methods to discourage nesting at the new location.

  Should a nest be successfully established within the construction area during bridge rehabilitation, then the Port will instruct construction crews to adhere to a "No Work Zone" around the nest site. The Port will coordinate with USFWS and CDFG to obtain permission to remove the nest in accordance with the MBTA. This "No Work Zone" will extend around the nest for a radius of approximately 250 ft (76 m) and be maintained until removal of the nest is authorized or 30 days after the last young leaves the nest, or until nest abandonment, whichever occurs first. Rehabilitation activities can continue at other locations outside of the "No Work Area."

  Reporting: Quarterly reports summarizing monitoring observations of nesting peregrines, including breeding behavior, nest data, disturbances, and reproductive success, will be submitted during bridge rehabilitation activities. During post-construction monitoring, quarterly reports will provide details on nesting attempts and breeding behavior and reproductive success. Reports will be prepared by the raptor biologist and submitted to the Port, Caltrans, and CDFG.

Bats

BR-5b Precluding Roosting on the Existing Bridge: Prior to beginning construction activities on each section of the bridge, bats will need to be excluded from that section. Bat proofing will occur outside of the breeding season (October 30 through March 1) after juvenile bats have learned to fly. Bat exclusion will be staged to ensure that roosting sites in areas not currently under construction will be available at all times during the project to minimize the potential effects on bats. Exclusion methods for the Rehabilitation Alternative will be the same as discussed under BR-5.

BR-6b ***Bat Monitoring Program:*** A monitoring program will be implemented throughout the project, as applicable. CDFG concurrence on the proposed monitoring program will be obtained prior to initiation of bat monitoring/survey activities. All surveys/monitoring will be conducted by an approved CDFG bat biologist. Preconstruction monitoring will focus on bat species identification and locations of bat roosts and access points. If CDFG species of special concern are identified during preconstruction surveys, then the Port will coordinate with CDFG and incorporate additional monitoring and protection measures as applicable. During exclusion activities, monitoring of the exclusion devices will occur to ensure that entanglement of bats is not occurring. Monitoring will continue as long as bats are observed exiting the existing bridge. Subsequent to exclusion, monitoring during bridge rehabilitation activities will continue, focusing on locations where additional exclusion may be required. Post-construction monitoring will document recolonization of the bridge and former roost areas.

- *Timing of Monitoring:* Preconstruction surveys will be initiated a minimum of 1-year prior to the initiation of bridge rehabilitation activities. The surveying and monitoring regime will consist of quarterly monitoring surveys, including a survey in June (i.e., prime bat roosting season). One month prior to rehabilitation activities, surveys will increase to weekly and consist of daytime and nighttime surveys (see Monitoring Effort) focused on species identification, identifying specific locations of bat roosts, access points, and roost characteristics.

Monitoring during the bat exclusion phase will focus on ensuring that all bats have been excluded prior to initiating bridge rehabilitation activities. Subsequent to installation of exclusion devices, roosting areas will be monitored for seven consecutive nights or until no bats are observed to exit the structure from known roosting areas at nightfall. During this time, monitoring will be performed to ensure that no bats become entangled in netting and that the bats do not discover and use new roost areas on the existing bridge. If any new roosts are discovered, then exclusion netting will be installed and the monitoring process will continue until bats have been excluded from the bridge.

Post-construction monitoring will be conducted quarterly for 3 years to document the post-construction bat recolonization of the bridge.

- *Biological Monitor:* A qualified bat biologist, thoroughly familiar with Anabat™ equipment and approved by CDFG, Caltrans, and the Port, will conduct all bat monitoring and supervise the design and placement of bat exclusion methods and devices.

  Monitoring Effort: The quarterly surveys will be performed during appropriate lunar/weather conditions and focus on identifying active bat roosts on the existing bridge. Each quarterly survey will include one survey during the day to search for urine staining and accumulation of bat feces or guano, and one evening/night survey period using a sonic bat (i.e., Anabat™ or Sonobat™). Several visits may be required per survey to determine specific roost locations and roost access points, and information necessary for designing bat exclusion devices for the bridge. Monitoring during construction will focus on the presence of bats in the bridge area and to identify areas that would require further exclusion.

  Reporting: Quarterly reports summarizing the monitoring efforts and observations will be prepared and submitted to the Port, Caltrans, and CDFG. Following construction, a final report will be prepared and include the name of the bat monitor, survey methods and dates, survey times and weather conditions, and exclusion devices used. The final report will also include photos and detailed observations, and conclusions and recommendations for agency use in future projects.

Migratory Birds

BR-8b Bridge lighting during construction will be designed to minimize the potential for bird collisions with the bridge structure. Lighting will be shielded to ensure that light is focused inward on the construction area and minimize spillover that could affect migratory birds.

Permanent Measures

<u>North- and South-side Alignment Alternatives</u>

Peregrine Falcons

BR-1 ***Artificial Nest Boxes:*** A minimum of two nesting ledges with artificial nest boxes will be installed on the new bridge in different locations prior to demolition of the existing bridge. The boxes will be available prior to the nesting season. The new nest locations will be approved by CDFG and will be selected to minimize disturbance to the extent feasible. Should the peregrine falcons not use the new bridge for nesting despite the nest boxes, alternate suitable nesting sites are available in the project vicinity (e.g., hotels, silos, bridges, Long Beach City Hall).

Bats

BR-4 ***Placement of Bat Boxes:*** Bat roosting boxes on the new bridge will be made available a minimum of 2 months prior to demolition activities within 500 ft (152 m) of active roosts at the existing bridge. Bat roosting boxes will be designed and built during construction of the new bridge, which is scheduled to occur before demolition of the existing bridge, to be ready for placement once the under-bridge structures are complete. The location and design of artificial roosts will also consider the temperature measured at roosts on the existing bridge during the preconstruction period. A variety of designs and recommendations are available (Langenstein *et al.,* 1998; Keeley and Tuttle, 1999).

In addition to, or in lieu of, bat roosting boxes, the new bridge may be designed to incorporate potential roosts as part of the structure (Exhibit 2.3.5-5), or such structures may be designed and added to the new bridge post-construction (Exhibit 2.3.5-6). Bats prefer roosting sites with crevices 0.5- to 1.25 in. (1.27 to 3.175 cm) wide (Keeley and Tuttle, 2000). Bats also use soffits if they are left open; therefore, bridge design could also include soffits that could be left open without damaging the bridge or hindering access for maintenance or other ongoing bridge work. One such type of artificial roost is the Texas bat-abode, which has an external panel on either side and 1- by 2-in. (2.5- by 5.1-cm) wooden spacers sandwiched between 0.5- to 0.75-in. (1.2- to 1.9-cm) plywood partitions (Exhibit 2.3.5-6). The internal partitions will be designed to provide crevices 0.75-in. (1.9 cm) wide and at least 12 in. (31 cm) deep. Smooth roost surfaces need to be textured to provide footholds for bats on one or both sides of each plywood partition, creating irregularities at least every 0.125-in. (0.3-cm). Footholds for bats are constructed of rough-sided paneling, or panels coated with polyurethane or epoxy paint sprinkled with rough grit, or attaching plastic mesh with silicone caulk or rust-resistant staples.

2.3.6 Invasive Species

2.3.6.1 Regulatory Setting

On February 3, 1999, President Clinton signed EO 13112 requiring federal agencies to combat the introduction or spread of invasive species in the United States. The order defines invasive species as “any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health." FHWA guidance issued August 10, 1999, directs the use of the state’s noxious weed list to define the invasive plants that must be considered as part of the NEPA analysis for a proposed project.

2.3.6.2 Affected Environment

Invasive species in the BSA include two invasive algae (*Sargassum muticum,* and *Undaria pinnatifida*), the New Zealand bubble (mud) snail, the spotwrist hermit crab, and feral cat. Some of the weedy terrestrial plant species, such as fan palm, can also be invasive; however, given the lack of native terrestrial habitat in the BSA, the invasive nature of fan palms is not a concern.

2.3.6.3 Environmental Consequences

Evaluation Criteria

The following criterion is the basis for evaluating whether there are substantial adverse effects to plant species resulting from project development. Would the project:

- Result in the introduction or promote the establishment of any noxious weed or invasive plant or animal.

No Action Alternative

The No Action Alternative would not result in any construction activities or new operational effects, and it would not increase the likelihood of occurrence or spread of invasive species within the BSA.

Construction and Demolition Impacts

<u>North- and South-side Alignment Alternatives</u>

Construction activities could result in the disturbance and spread of invasive species to adjacent areas; however, in accordance with EO 13112 and subsequent guidance from FHWA, the potential to spread or introduce invasive terrestrial species during construction would be minimized with implementation of avoidance and minimization measures.

The POLB currently receives calls from ships originating around the world. When marine vessels call on a port, they can introduce invasive species during discharge of ballast water. Invasive marine species can degrade habitat quality through competition for habitat (e.g., on docks, pilings) or cause blooms of invasive non-native algae that can degrade habitat quality for many marine species. Additional Port calls may be required by ships transporting construction materials; however, it is unlikely that Port calls associated with transporting construction materials would originate from a port that has not previously made a call at the Port. Thus, the vessels shipping construction materials entering the Inner Harbor would be similar to the vessels that

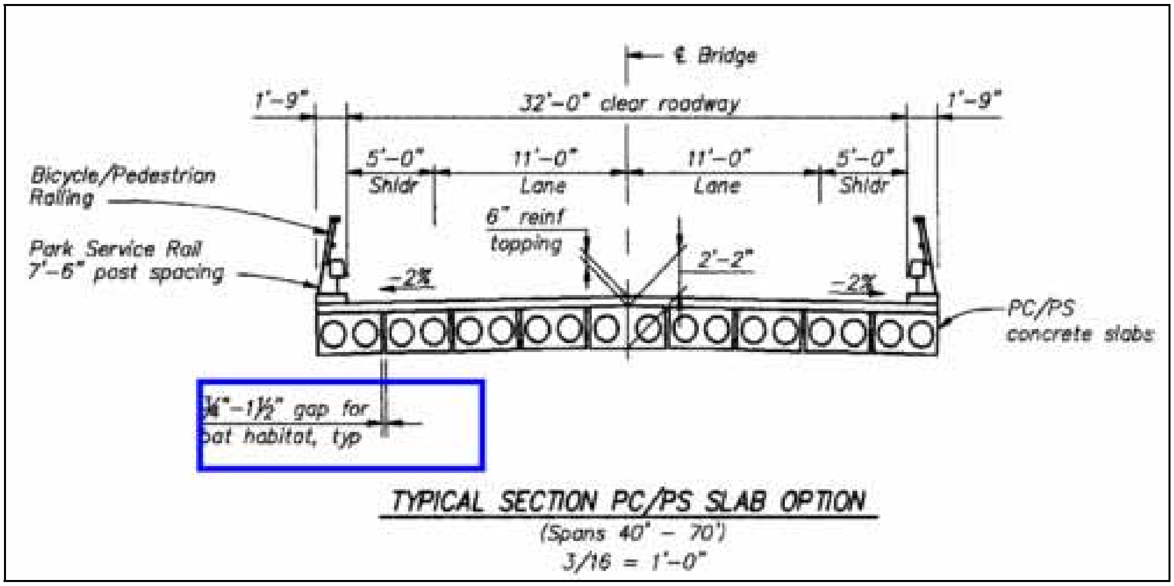

Exhibit 2.3.5-5
Bat-Friendly Bridge Specifications[19]

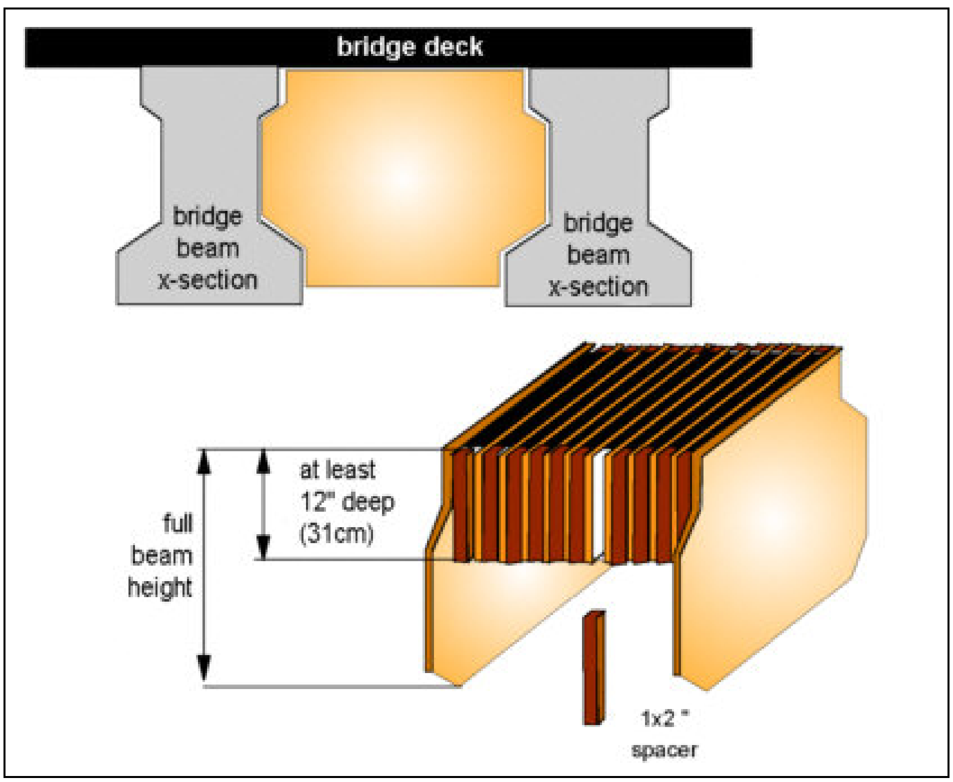

Exhibit 2.3.5-6
Postconstruction Bridge Retrofit[20]

[19] Exhibit by: http://batcon.org/discover/unguest.html
[20] Exhibit by: http://www.batcon.org/bridge/ambatsbridges/index.html.

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currently call on the Port and would not increase the potential for introduction or spread of existing or new invasive species into the Inner Harbor from ballast water discharge and would not require additional measures to minimize potential effects on marine resources.

Rehabilitation Alternative

As discussed under the North- and South-side Alignment Alternatives, implementation of avoidance and minimization measures would minimize the potential for the spread or introduction of invasive species during construction.

Operational Impacts

North-side Alignment Alternative

Landscape maintenance after construction could result in an increase in invasive species if project landscaping installed during project construction spreads into native habitats. Given the lack of native habitats in the BSA and with incorporation of the measures in Section 2.3.6.4, no adverse effects resulting from project operation to terrestrial plant or wildlife species are anticipated. Operation of the project would not result in a change in the type or number of vessels required to meet the operational requirements of the Port. Project operation would not increase the potential for spread or introduction of invasive marine species.

South-side Alignment Alternative

Operational effects on invasive species of the South-side Alignment Alternative would be the same as described under the North-side Alignment Alternative.

Rehabilitation Alternative

Construction required for the Rehabilitation Alternative would occur within the footprint of the Gerald Desmond Bridge and paved approaching roadways. Operational effects on invasive species associated with the Rehabilitation Alternative would be the same as described under the North-side Alignment Alternative.

2.3.6.4 Avoidance, Minimization, and/or Mitigation Measures

Temporary Measures

BR-9 Project landscaping will be limited to slopes near the bridge ramps and will follow the provisions set forth in EO 13112, which mandates preventing the introduction of and controlling the spread of invasive plant species on highway ROWs. No invasive species listed in the National Invasive Species Management Plan or the State of California Noxious Weed List shall be used in the landscaping plans for the proposed project, and all weedy vegetation removed during construction will be properly disposed of to prevent spread into areas outside of the construction area.

Permanent Measures

No measures are required.

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Section 2.4
Cumulative Impacts

2.4 CUMULATIVE IMPACTS

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of proposed project. A cumulative effect assessment looks at the collective impacts posed by individual land-use plans and projects. Cumulative impacts can result from individually minor, but collectively substantial, impacts taking place over a period of time.

Cumulative impacts to resources in the study area may result from residential, commercial, industrial, and highway development, These land-use activities can degrade habitat and species diversity through consequences such as displacement and fragmentation of habitats and populations, alteration of hydrology, contamination, erosion, sedimentation, and disruption of migration corridors, changes in water quality, and introduction or promotion of predators. They can also contribute to potential community impacts identified for the project, such as changes in community character, traffic patterns, housing availability, and employment.

CEQA Guidelines, Section 15130, describes when a cumulative impact analysis is warranted and what elements are necessary for an adequate discussion of cumulative impacts. The definition of cumulative impacts, under CEQA, can be found in Section 15355 of the CEQA Guidelines. A definition of cumulative impacts under NEPA can be found in 40 CFR 1508.7, of the CEQ Regulations.

To reduce redundancy within this section, the alternatives are again grouped within the following discussion, as applicable. The build alternatives refer to all build alternatives as discussed in Chapter 1 (North- and South-side Alignment Alternatives and Rehabilitation Alternative). References to the Bridge Replacement Alternatives, refers to the North- and South-side Alignment Alternatives. Only the Build Alternatives have the potential to result in cumulative impacts. The No Action Alternative would not result in any changes to the existing environment and would not contribute to cumulative impacts on any resource.

2.4.1 Related Development Projects

2.4.1.1 Methodology

Both the FHWA methodology and CEQA Guidelines list two methods of identifying related development projects. One method is based on adopted projections within a given geographic area included in an adopted general plan or certified environmental document. The other method is based on a list of past, present, and reasonably foreseeable future projects that could result in cumulative impacts in combination with the project analyzed in the environmental document.

For this Draft EIR/EA, the primary method of analyzing cumulative impacts is based on the second method. The related projects considered for this analysis have been proposed by public agencies, the Ports and adjacent cities. The projects have been proposed by formal public notices (Notice of Intent, Notice of Preparation), have pending environmental documentation, and/or are awaiting regulatory reviews or approvals. Exhibit 2.4-1 shows the project study area and the approximate locations of the projects considered within this cumulative impacts analysis. The related projects were selected for analysis because they are located within close proximity of the proposed project and/or a have the potential to impact similar resources. The potential impacts of the related projects, when considered in conjunction with the proposed project, could result in cumulative adverse impacts to resources within the study area. Related projects include, but are not limited to, other transportation projects, container terminals, schools, hotels, commercial and residential developments, and manufacturing and warehouse facilities.

Fifty-eight (58) related projects and their associated potential impacts are considered within this cumulative impact analysis. These projects may potentially result in impacts when considered cumulatively with the effects of the Build Alternatives. Table 2.4.1-1 provides a project description, the project status and associated relevant environmental factors. Identification of relevant environmental factors was based on the review of available environmental documentation, conceptual plans or applications and consultation with project applicants and government agencies. For projects with no environmental documentation or where resources were not analyzed, general assumptions were made where possible to assess if the project would have the potential to contribute to a cumulative impact.

2.4.2 Potential Cumulative Impacts

The CEQ regulations governing implementation of NEPA (40 CFR 1508.7) define a cumulative impact as:

> *The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant action taking place over a period of time.*

The analysis of the cumulative effects of the proposed project also follows the guidelines in the CEQ handbook entitled "Considering Cumulative Effects under the National Environmental Policy Act" (January 1970).

Based on the CEQ discussion of cumulative effects, the following principles can be applied to the assessment of cumulative effects of the proposed project:

- Cumulative effects typically are caused by the aggregate effects of past, present, and reasonably foreseeable future actions. These are the effects (i.e., past, present, and future) of the proposed action on a given resource and the effects (i.e., past, present, and future), if any, caused by all other related actions that affect the same resource.
- When other related actions are likely to affect a resource that is also affected by the proposed action, it does not matter who (i.e., public or private entity) has taken the related action(s).
- The scope of cumulative effects analyses can usually be limited to reasonable geographic boundaries and time periods. These boundaries should extend only as far as the point at which a resource is no longer substantially affected or where the effects are so speculative as to no longer be truly meaningful.
- Cumulative effects can include the effects (i.e., past, present, and future) on a given resource caused by similar types of actions (e.g., air emissions from several individual highway projects) and/or the effects (i.e., past, present, and future) on a given resource caused by different types of actions (e.g., air emissions and traffic from several different development projects).

The analysis that follows considers the potential cumulative effects, if any, which would result from construction and operation of the proposed project, combined with construction and operation of the related projects, listed in Table 2.4.1-1. Additional discussion of cumulative impacts pursuant to CEQA is provided in Chapter 3.

2.4.3 Environmental Resources for which No Adverse Cumulative Impacts would Result

When considering the effects of past, present, and reasonably foreseeable future projects in combination with the anticipated effects associated with the Gerald Desmond Bridge Replacement Project, cumulatively considerable impacts on resource areas that are not considered adverse are discussed below.

2.4.3.1 Land Use, Recreation, Coastal Zone

Land Use

Build Alternatives

The Long Beach General Plan states that the responsibilities for planning within legal boundaries of the harbor lie with the Board of Harbor Commissioners. Uses of land and water within the Port, including cargo handling, recreation, and other coastal zone uses, have been outlined in the PMP (POLB, 1999). Land use changes within the project area will continue to be driven by global economic demand and port-related industrial needs. The Build Alternatives would not have a direct effect on land use patterns within the port outside of the areas required for construction and operation of the build alternatives but would rather respond to the travel patterns and volumes emanating from existing and forecasted travel demands within the Port. The Build Alternatives would not require or support any additional improvements that would imply the need for land use changes outside of the Port's planning area. The pattern and rate of land development within the project area are driven more directly by the modification and expansion of port facilities and are only partially affected by ancillary transportation improvements. To the extent that transportation projects, including the Build Alternatives and other transportation improvements planned for the area, facilitate some of the Port improvements, they may be regarded as contributing, in part, to overall land development trends because they would enhance overall efficiency of transportation movements within and to/from the Port area. However, the global market forces that create the underlying demand for Port facilities far outweigh the local contribution associated with any improvements in transportation facilities. Port

1 Middle Harbor Terminal Redevelopment, Port of Long Beach	18 Berths 136-149 Marine Terminal, West Basin, Port of Los Angeles	33 Berth 302-305 (APL) Container Terminal Improvements Project, Port of Los Angeles	49 Cerritos Channel Rail Bridge, ACTA
2 Piers G & J Terminal Redevelopment Project, Port of Long Beach	19 Berths 226-236 (Evergreen) Container Terminal Improvements Project and Canners Steam Demolition, Port of Los Angeles	34 South Wilmington Grade Separation, Port of Los Angeles	50 Intermodal Container Transfer Facility Modernization and Expansion, ICTF
3 Pier S Marine Terminal, Port of Long Beach	20 Berths 97-109 China Shipping Terminal Development Project, Port of Los Angeles	35 "C" Street/Figueroa Street Interchange, Port of Los Angeles	51 Tesoro Reliability Improvement and Regulatory Compliance Project, Wilmington
4 Pier A East, Port of Long Beach	21 Channel Deepening Project/Additional Disposal Capacity, Port of Los Angeles	36 I-110/SR 47 Connector Improvement Program, Port of Los Angeles	52 BP Carson Refinery Safety, Compliance and Optimization Project, City of Carson
5 Chemoil Marine Terminal, Tank Installation, Port of Long Beach	22 Berths 171-181, Pasha Marine Terminal, Port of Los Angeles	37 Port Transportation Master Plan, Port of Los Angeles	53 Crude Logistics Optimization Project, City of Carson
6 Gerald Desmond Bridge Replacement Project, Port of Long Beach and Caltrans/FHWA	23 Plains All American (formerly Pacific Energy) Oil Marine Terminal, Pier 400, Port of Los Angeles	38 Berths 212-224 YTI Terminal Improvements, Port of Los Angeles	54 ConocoPhillips Los Angeles Refinery PM10 and Nox Reduction Projects, City of Carson
7 Administration Building and Maintenance Facility Replacement Project, Port of Long Beach	24 Berth 206-209 Interim Container Terminal Reuse Project, Port of Los Angeles	39 Berths 121-131 (Yang Ming) Container Terminal, Port of Los Angeles	55 Chevron Products Company El Segundo Refinery Product Reliability and Optimization Project, City of El Segundo
8 Pier A West Interim/Source Removal Project, Port of Long Beach/DTSC	25 Ultramar Lease Renewal Project, Port of Los Angeles	40 San Pedro Waterfront Project, Port of Los Angeles	56 Chevron Products Company - El Segundo Refinery Heavy Crude Project, City of El Segundo
9 Pier B Rail Yard Expansion, Port of Long Beach	26 SSA Outer Harbor Fruit Facility Relocation, Port of Los Angeles	41 Westway Decommissioning, Port of Los Angeles	57 ExxonMobil Rule 1105.1 Compliance Project, City of Torrance
10 Terminal Island Rail Projects, Port of Long Beach	27 Port of Los Angeles Charter School and Port Police Headquarters, San Pedro, Port of Los Angeles	42 Consolidated Slip Restoration Project, Port of Los Angeles	58 Paramount Refinery Clean Fuels Project, City of Paramount
11 Mitsubishi Cement Corporation Facility Modifications, Port of Long Beach	28 San Pedro Waterfront Enhancements Project, Port of Los Angeles	43 Wilmington Waterfront Master Plan (Avalon Blvd. Corridor Project), Port of Los Angeles	
12 Cemera Long Beach Aggregate Terminal, Port of Long Beach	29 Southern California International Gateway Project, Port of Los Angeles	44 Southwest Marine Demolition Project, Port of Los Angeles	
13 Shoreline Gateway Project, City of Long Beach	30 Cabrillo Way Marina, Phase II, Port of Los Angeles	45 Inner Cabrillo Beach Water Quality Improvement Program, Port of Los Angeles	
14 West Gateway Redevelopment Project, City of Long Beach	31 Artificial Reef, San Pedro Breakwater, Port of Los Angeles	46 Pacific Corridors Redevelopment Project, San Pedro	
15 Golden Shore Master Plan, City of Long Beach	32 Pan-Pacific Cannery Complex Demolition Project, Port of Los Angeles	47 Schuyler Heim Bridge Replacement and SR 47/ Expressway, Caltrans/ACTA	
16 Press-Telegram Mixed Use Development, City of Long Beach		48 I-710 (Long Beach Freeway) Corridor Project, Caltrans	
17 Sierra Hotel Project, City of Long Beach			

EXHIBIT 2.4-1
Related Projects in the Vicinity of the Proposed Gerald Desmond Bridge Site - Port Area

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Table 2.4.1-1
Related Projects

Number in Exhibit 2.4-1	Project Title	Project Description	Status (Project Timeframe)	Relevant Potential Cumulative Environmental Factors
Port of Long Beach				
1	Middle Harbor Terminal Redevelopment	Expansion of an existing marine container terminal. The Piers D, E, and F development project is located in the Middle Harbor area of the POLB. The project consolidates two existing container terminals into one 345-acre (140-ha) terminal. Construction includes approximately 54.6 acres (21.6 ha) of landfill, dredging, and wharf construction; construction of an intermodal rail yard; and reconstruction of terminal operations buildings.	Draft EIS/EIR released May 2008.	Air Quality Transportation Biological Resources Water Quality & Hydrology
2	Piers G & J Terminal Redevelopment Project	Redevelopment of two existing marine container terminals into one terminal in the Southeast Harbor Planning District area. The project will develop a marine terminal of up to 315 acres (127 ha) by consolidating portions of two existing terminals on Piers G and J.	Approved project. Construction underway (2005-2015).	Geology Groundwater and Soils Air Quality Biological Resources
3	Pier S Marine Terminal	Development of a 150-acre (61-ha) container terminal on Pier S and construction of navigational safety improvements to the Back Channel.	EIS/EIR to be prepared (2007-2012).	Transportation Air Quality
4	Pier A East	Conversion of 32 acres (13 ha) of existing auto storage area into container terminal uses.	EIR to be prepared.	Transportation Air Quality
5	Chemoil Marine Terminal, Tank Installation	Construction of two petroleum storage tanks and associated relocation of utilities, and reconfiguration of adjoining marine terminal uses between Berths F210 and F211 on Pier F.	EIR to be prepared (2008-2009).	Transportation Air Quality Hazards
6	Gerald Desmond Bridge Replacement Project, POLB/ Caltrans/FHWA	Replacement or rehabilitation of the existing Gerald Desmond Bridge and adjacent roadway improvements.	Analyzed in this document.	Transportation Air Quality Biological Resources
7	Administration Building and Maintenance Facility Replacement Project	Replacement of the existing Port Administration Building and Maintenance Facility with a new facility on an adjacent site on Pier G.	Approved project (2009-2012).	Transportation Air Quality
8	Pier A West Interim/ Source Removal Project, POLB/DTSC	Remediation of approximately 90 acres (36 ha) of oil production land, including remediation of soil and groundwater contamination, relocation of oil wells, filling, and paving.	Cleanup and Abatement Order (2008-2009).	Geology Hazards

Table 2.4.1-1
Related Projects

Number in Exhibit 2.4-1	Project Title	Project Description	Status (Project Timeframe)	Relevant Potential Cumulative Environmental Factors
Port of Long Beach (continued)				
9	Pier B Rail Yard Expansion	Expansion of the existing Pier B Rail Yard in two phases, including realignment of the adjacent Pier B Street and utility relocation.	EIR being prepared (2009-2015).	Transportation Air Quality
10	Terminal Island Rail Projects	Construct rail improvements on Terminal Island, including a grade separation at Reeves Avenue and additional storage tracks.	EIR being prepared (2009-2015).	Transportation
11	Mitsubishi Cement Corporation Facility Modifications	Facility modification, including the addition of a catalytic control system, construction of four additional cement storage silos, and upgrading existing cement unloading equipment on Pier F.	EIR being prepared (2009-2013).	Air Quality
12	Cemera Long Beach Aggregate Terminal	Construction and operation of a sand, gravel, and aggregate receiving, storage, and distribution terminal, and ready-mix concrete plant on Pier B.	EIR being prepared (2009-2012).	Transportation Air Quality
City of Long Beach				
13	Shoreline Gateway Project	Mixed-use development of a 22-story residential tower with retail, commercial, and office uses located north of Ocean Boulevard, between Atlantic Avenue and Alamitos Avenue.	EIR certified in 2006.	Transportation Air Quality
14	West Gateway Redevelopment Project	Redevelop nine existing parcels, including apartments, condominiums, and retail, on Broadway between Chestnut and Maine.	Under construction.	Air Quality
15	Golden Shore Master Plan	The proposed project would provide new residential, office, retail, and potential hotel uses, along with associated parking and open space.	NOP issued November 2008.	Aesthetic/Visual Air Quality Noise Transportation Water Quality Growth Inducing Cumulative Effects

Table 2.4.1-1
Related Projects

Number in Exhibit 2.4-1	Project Title	Project Description	Status (Project Timeframe)	Relevant Potential Cumulative Environmental Factors
City of Long Beach (continued)				
16	Press-Telegram Mixed Use Development	Construction of two high-rise buildings on the 2.5-acre (1-ha) Press-Telegram site. Each building would be 22 stories and 250 ft (76 m) in height. The project would be a mixed-use development with 542 residential units, and 32,300 square feet (3,000 square meters) of office and institutional space.	Draft EIR prepared August 2006.	Air Quality Cumulative Effects Growth Inducing Minerals Noise Hazard Transportation Water Quality
17	Sierra Hotel Project	Development of a 91,304-square–foot (8,482-square-meter), 7-story hotel structure with 140 rooms. Parking will be provided in the multi-level parking structure located across the street at the southwest corner of Cedar Avenue and Seaside Way.	EIR certified December 2005.	Air Quality Hazard Transportation
Port of Los Angeles				
18	Berths 136-149 Marine Terminal, West Basin	Element of the West Basin Transportation Improvement Projects. Reconfiguration of wharves and backland. Expansion and redevelopment of the TraPac Terminal.	Project approved December 2007 (2008-2015).	Transportation Air Quality
19	Berths 226-236 (Evergreen) Container Terminal Improvements Project and Canners Steam Demolition	Proposed redevelopment of existing container terminal, including improvements to wharves, adjacent backland, crane rails, lighting, utilities, new gate complex, grade crossings, and modification of adjacent roadways and railroad tracks. Project also includes demolition of two unused buildings and other small accessory structures at the former Canners Steam Plant in the Fish Harbor area of the Port.	EIS/EIR to be prepared. NOP/NOI anticipated 2008.	Transportation
20	Berths 97-109 China Shipping Terminal Development Project	Development of the China Shipping Terminal Phase I, II, and III, including wharf construction, landfill and terminal construction, and backland development.	Project approved December 2008 (2009-2015).	Transportation Air Quality

Table 2.4.1-1
Related Projects

Number in Exhibit 2.4-1	Project Title	Project Description	Status (Project Timeframe)	Relevant Potential Cumulative Environmental Factors
Port of Los Angeles (Continued)				
21	Channel Deepening Project/Additional Disposal Capacity	Dredging and sediment disposal. This project would deepen the POLA Main Channel to a maximum depth of -53 ft (-16 m) MLLW (lesser depths are considered as project alternatives) by removing between 3.9 million and 8.5 million cu yd of sediments. The sediments would be disposed at several sites. The EIR/EIS certified for the project identified significant air and noise impacts. The Supplemental EIR/EIS is being prepared to evaluate dredging 4 million cu yd of material and creating 151 acres (61 ha) of new lands from the sediments.	SEIS/SEIR released July 2008. Construction expected 2009-2011.	Biological Resources Hydrology & Water Quality Transportation Air Quality
22	Berths 171-181, Pasha Marine Terminal	Redevelopment of existing facilities at Berths 171-181 as an Omni (multi-use) facility.	Project EIR on hold.	Transportation Air Quality
23	Plains All American (formerly Pacific Energy) Oil Marine Terminal, Pier 400	Proposal to construct a Crude Oil Receiving Facility on Pier 400 with tanks on Terminal Island and pipelines between berth, tanks, and pipeline system.	SEIS/SEIR certified November 2008. Construction expected 2009-2011.	Transportation Air Quality Biological Resources
24	Berths 206-209 Interim Container Terminal Reuse Project	Proposal to allow interim reuse of former Matson Terminal.	Final EIR certified. Construction on hold.	Hydrology & Water Quality
25	Ultramar Lease Renewal Project	Lease renewal for liquid bulk (petroleum) terminal.	Final EIR anticipated in 2009.	Air Quality Hazards
26	SSA Outer Harbor Fruit Facility Relocation	Proposal to relocate the existing fruit import facility at 22nd and Miner to Berth 153.	Project on hold (2008-2010).	Transportation Air Quality
27	POLA Charter School and Port Police Headquarters, San Pedro	Proposal to develop a POLA Charter School and Port Police Headquarters.	EIR certified August 2005. Construction anticipated 2007-2008.	Transportation Air Quality
28	San Pedro Waterfront Enhancements Project	Project includes improving existing and development of new pedestrian corridors along the waterfront (4 acres [1.62 ha]), landscaping, parking, increased waterfront access from upland areas, and creating 16 acres (6.47 ha) of public open space.	MND approved in April 2006. Construction to begin in early 2008 and will be completed in 2009.	Transportation Air Quality

Table 2.4.1-1
Related Projects

Number in Exhibit 2.4-1	Project Title	Project Description	Status (Project Timeframe)	Relevant Potential Cumulative Environmental Factors
Port of Los Angeles (Continued)				
29	Southern California International Gateway Project	Construction and operation of an intermodal container transfer facility and various associated components, including relocation of an existing rail operation.	DEIR expected in 2009.	Transportation Air Quality
30	Cabrillo Way Marina, Phase II	Redevelopment of the old marinas in the Watchorn Basin and development of the backland areas for a variety of commercial and recreational uses.	Construction anticipated (2008-2009).	Transportation Air Quality
31	Artificial Reef, San Pedro Breakwater	Development of an artificial reef site south of the San Pedro Breakwater. Provides opportunity for suitable reuse of clean construction materials and to create bottom topography to promote local sportfishing.	Negative Declaration issued and certified. Project proceeding (2006-2010).	Biological Resources Hydrology & Water Quality
32	Pan-Pacific Cannery Complex Demolition Project	Demolition of two unused buildings and other small accessory structures at the former Pan-Pacific Cannery in the Fish Harbor area of the POLA.	FEIR being prepared.	Transportation Air Quality
33	Berth 302-305 (APL) Container Terminal Improvements Project	Construction and operation of a new container terminal expansion area on the east side of Pier 300. 40 acres (16 ha) of fill have been added to Pier 300. An additional 40 acres (16 ha) of fill will be evaluated in the Channel Deepening Supplemental EIS/EIR.	EIR/EIS to be prepared	Transportation Air Quality Biological Resources
34	South Wilmington Grade Separation	An elevated grade separation would be constructed along a portion of Fries Avenue over the existing rail line tracks to eliminate vehicular traffic delays that would otherwise be caused by trains using the existing rail line and the new ICTF rail yard. The elevated grade would include a connection onto Water Street. There would be a minimum 24.5-ft (7.5-m) clearance for rail cars traveling under the grade separation.	Conceptual planning stage.	Transportation Air Quality

Table 2.4.1-1
Related Projects

Number in Exhibit 2.4-1	Project Title	Project Description	Status (Project Timeframe)	Relevant Potential Cumulative Environmental Factors
Port of Los Angeles (Continued)				
35	“C” Street/ Figueroa Street Interchange	The “C” Street/Figueroa Street interchange would be redesigned to include an elevated ramp from Harry Bridges Boulevard to I-110, over John S. Gibson Boulevard. There would be a minimum 15-ft (4.5-m) clearance for vehicles traveling on John S. Gibson Boulevard. An additional extension would connect from Figueroa Street to the new elevated ramp over Harry Bridges Boulevard.	Conceptual planning stage.	Transportation Air Quality
36	I-110/SR 47 Connector Improvement Program	Program may include “C” Street/ I-110 access ramp intersection improvements, I-110 NB Ramp/John S. Gibson Boulevard intersection improvements, and SR 47 on- and off-ramp at Front Street.	IS/EA	Air Quality Noise Visual Recreation
37	Port Transportation Master Plan	Port-wide transportation master plan for roadways in and around POLA facilities. Present and future traffic improvement needs are being determined based on existing and projected traffic volumes. Some improvements under consideration include I-110/SR 47/Harbor Boulevard interchange; south Wilmington grade separations; and additional traffic capacity analysis for the Vincent Thomas Bridge.	Conceptual planning stage.	Transportation Air Quality
38	Berths 212-224 YTI Terminal Improvements	Wharf modifications at the YTI Marine Terminal Project involve wharf upgrades and backland reconfiguration, including new buildings.	NOP/NOI anticipated in 2008.	Transportation Air Quality
39	Berths 121-131 (Yang Ming) Container Terminal	Reconfiguration of wharves and backlands. Expansion and redevelopment of the APL Terminal.	NOP/NOI anticipated in 2008.	Transportation Air Quality

Table 2.4.1-1
Related Projects

Number in Exhibit 2.4-1	Project Title	Project Description	Status (Project Timeframe)	Relevant Potential Cumulative Environmental Factors
Port of Los Angeles (Continued)				
40	San Pedro Waterfront Project	Project includes construction of North Harbor and Downtown Harbor promenades, and Downtown Water Feature; enhancements to the existing John S. Gibson Park; construction of a Town Square at the foot of 6th Street, a 7th Street Pier, and a Ports O' Call Promenade; development of California Coastal Trail along the waterfront; construction of additional cruise terminal facilities; a Ralph J. Scott Historic Fireboat display; relocation of the Catalina Cruises Terminal and the SS Lane Victory; extension of the Red Car Line; and related parking improvements.	Draft EIR/EIS being prepared. Construction expected 2010-2015.	Transportation Air Quality
41	Westway Decommissioning	Decommissioning of the Westway Terminal along the Main Channel (Berths 70-71). Work includes decommissioning and removing 136 storage tanks with total capacity of 593,000 barrels.	Remedial planning underway. Decommissioning anticipated in 2009.	Air Quality Hazardous Materials
42	Consolidated Slip Restoration Project	Remediation of contaminated sediment at Consolidated Slip, including capping sediments or removal/disposal to an appropriate facility. Work includes capping and/or treatment of approximately 30,000 cubic yards of contaminated sediments.	Remedial actions being evaluated.	Air Quality Hazardous Materials
43	Wilmington Waterfront Master Plan (Avalon Blvd. Corridor Project)	Planned development intended to provide waterfront access and promote development along Avalon Boulevard.	EIR being prepared.	Transportation Air Quality
44	Southwest Marine Demolition Project	Demolition of buildings and other small accessory structures.	EIR being prepared.	Air Quality
45	Inner Cabrillo Beach Water Quality Improvement Program	Phased improvements, including sewer and storm drain work, sand replacement, bird excluders, and circulation improvements.	Construction underway.	Water Quality

Table 2.4.1-1
Related Projects

Number in Exhibit 2.4-1	Project Title	Project Description	Status (Project Timeframe)	Relevant Potential Cumulative Environmental Factors
Community of San Pedro				
46	Pacific Corridors Redevelopment Project, San Pedro	Development of commercial/retail, manufacturing, and residential components.	Construction underway. Expected completion in 2032 according to Community Redevelopment Agency of Los Angeles.	Transportation Air Quality
California Department of Transportation (Caltrans)				
47	Schuyler Heim Bridge Replacement and SR 47 Expressway, Caltrans/ACTA	Replace the Schuyler Heim Bridge with a fixed structure and improve the SR 47/ Henry Ford Avenue/Alameda Street transportation corridor by constructing an elevated expressway from the Schuyler Heim Bridge to SR 1 (PCH).	FEIR/EIS anticipated 2009	Transportation Air Quality
48	I-710 (Long Beach Freeway) Corridor Project	The study proposes to develop transportation solutions to traffic congestion and other mobility problems along approximately 18 mi (29 km) of SR 710 between the San Pedro Bay ports and SR 60.	NOP/NOI released August 2008.	Transportation Air Quality
Alameda Corridor Transportation Authority (ACTA)				
49	Cerritos Channel Rail Bridge	Construct a new rail lift-bridge with two tracks, adjacent to the existing Badge Avenue Bridge.	Conceptual project.	Air Quality Noise
ICTF Joint Powers Authority				
50	Intermodal Container Transfer Facility (ICTF) Modernization and Expansion	Modernize and expand the existing ICTF to increase capacity, and modernize existing equipment, rail yard operation methods.	NOP/IS released January 2009 (2010-2014).	Transportation Air Quality Noise
Community of Wilmington				
51	Tesoro Reliability Improvement and Regulatory Compliance Project	Tesoro projects at its Los Angeles Refinery and at its Sulfur Recovery Plant to improve the reliability of refinery operations and to comply with regulatory requirements.	FEIR certified April 2009.	Air Quality Hazards Transportation
City of Carson				
52	BP Carson Refinery Safety, Compliance and Optimization Project	Physical changes and additions to multiple process units and operations, as well as operational and functional improvements within the confines of the existing refinery.	Addendum to FEIR January 2008. FEIR certified September 2006.	Air Quality Cumulative Effects Hazards Transportation

Table 2.4.1-1
Related Projects

Number in Exhibit 2.4-1	Project Title	Project Description	Status (Project Timeframe)	Relevant Potential Cumulative Environmental Factors
City of Carson (continued)				
53	Crude Logistics Optimization Project	Construction and operation of two 260-ft-diameter (79-m) covered external floating roof tanks to store crude oil at the BP Carson Crude Terminal (CCT).	EIR certified March 2008.	Cumulative Effects Noise Hazards Transportation
54	ConocoPhillips Los Angeles Refinery PM_{10} and NO_X Reduction Projects	Proposed project will reduce PM_{10} and NO_X emissions at its existing Wilmington (55A) and Carson plants (55B) through modifications to refinery units at both plants.	FEIR certified June 2007.	Aesthetics Air Quality Hydrology & Water Quality Transportation
City of El Segundo				
55	Chevron Products Company El Segundo Refinery Product Reliability and Optimization Project	Modifications and additions at the existing El Segundo Refinery to increase the reliability, energy efficiency, and capacity of specific existing refinery processing equipment; allow the processing of a wider range of crude oils; and voluntarily reduce potential atmospheric emissions from existing pressure relief devices.	FEIR certified May 2009.	Air Quality Energy Hazards Hydrology & Water Quality Noise Solid/Hazardous Waste Transportation
56	Chevron Products Company – El Segundo Refinery Heavy Crude Project	Modifications to the Chevron Products Company (Chevron) El Segundo Refinery to enable the refinery to maintain or slightly increase its current production levels of saleable products and processing more heavy crude oil.	FEIR certified August 2006. Addendum certified May 2007.	Air Quality
City of Torrance				
57	ExxonMobil Rule 1105.1 Compliance Project	Proposes modifications to the fluidized catalytic cracking unit at its Torrance Refinery to comply with new PM_{10} and ammonia emission limits set by SCAQMD Rule 1105.1.	FEIR certified March 2007.	Air Quality
City of Paramount				
58	Paramount Refinery Clean Fuels Project	Project proposes improvements to produce reformulated gasoline and ultra low sulfur diesel for California markets.	Addendum to FEIR September 2007. FEIR certified April 2004.	Air Quality Hazards Transportation

development is expected to continue with or without the Build Alternatives; therefore, when considered with other related projects, the proposed project would not result in significant or adverse cumulative land use effects.

Recreation and Coastal Zone

Build Alternatives

The Build Alternatives would have no effect on recreational land use. The Build Alternatives would not result in cumulatively considerable significant or adverse recreation impacts.

All of the proposed Build Alternatives would be consistent with the California Coastal Act and PMP, which states that all port-related developments shall be located, designed, and constructed so as to minimize substantial adverse environmental impacts; minimize potential traffic conflicts between vessels; give highest priority to the use of existing land space within harbors for port purposes, and provide for other beneficial uses consistent with the public trust.

All of the Build Alternatives and other related projects within the coastal zone would require coastal permits or CCC review. All projects would be conditioned, as appropriate, by the CCC, Ports, and Cities; therefore, they would not result in cumulatively considerable significant or adverse effects on coastal zone resources.

2.4.3.2 Growth Inducement

Bridge Replacement Alternatives

Direct Growth-Inducement Potential: Areas within the vicinity of the Port are largely built-out and consist of dense development typical of established urban areas. The Bridge Replacement Alternatives would not result in changes to zoning or land use designations that would have the potential to directly influence growth. None of the related projects are contingent upon the completion of the proposed project. Future development within the abandoned bridge footprint or within the surrounding areas would consist largely of redevelopment and would be approved in accordance with the applicable state and local planning processes. The Bridge Replacement Alternatives would not result in a greater amount of land available for redevelopment within or outside of the POLB than exists today; therefore, the Bridge Replacement Alternatives would not result in cumulatively considerable significant or adverse effects related to direct growth or development within the related projects area.

Indirect Growth-Inducement Potential: When considered in the context of future development that is likely to occur within the POLB/POLA and surrounding communities, the traffic congestion relief benefits associated with the Bridge Replacement Alternatives would have the potential to indirectly influence growth as a result of more efficient or improved access to and from areas within the POLB and surrounding communities. In other words, the proposed bridge replacement project would not cause indirect growth in and of itself; however, additional growth associated with future land development in the project area could be influenced by the traffic congestion-relief benefits provided by the new bridge. The Bridge Replacement Alternatives would not result in new accessibility to and from areas that are currently inaccessible and would not cause associated indirect growth via creation of new access. In other words, the proposed bridge replacement project would not cause indirect growth in and of itself; however, additional cumulative growth associated with future land development in the project area, which would be influenced by the traffic congestion-relief benefits provided by the new bridge, may occur as approved in the PMP and local and regional planning documents. Therefore, the Bridge Replacement Alternatives would not result in cumulatively considerable significant or adverse impacts related to indirect growth of development in the Port area.

Container Terminal Throughput Capacity: The POLB/POLA container storage throughput capacity must also be considered in cumulative growth of the Port area. The throughput capacity of the POLB/POLA container terminals is a function of several variables, as discussed in Section 2.1.2.

While the new bridge would provide more efficient access for trucks to and from the Port terminals, the throughput capacity constraints dictate the overall capacity of the terminals. Improved truck access to the Ports is not the driving influence on terminal throughput. The reduction of traffic congestion resulting from the Bridge Replacement Alternatives and the relatively small savings in overall cargo transit time attributable to the new bridge would not be an incentive for shippers to divert their cargo from other ports to the POLB/POLA. Additionally, increasing the bridge elevation would provide safe passage of larger vessels, but it would not increase potential throughput of the Ports because the project would not increase terminal capacity; therefore, the

Bridge Replacement Alternatives would not result in cumulatively considerable significant or adverse effects related to indirect growth of terminal capacity associated with the improved access to the Port.

Rehabilitation Alternative

Under the Rehabilitation Alternative, the Gerald Desmond Bridge would continue to operate in its existing configuration. There would be no changes in land use or zoning, and there would be no changes to the existing surface transportation system or access within the vicinity of the existing bridge. As such, there would be no potential for the Rehabilitation Alternative to result either directly or indirectly in cumulatively considerable significant or adverse growth effects.

2.4.3.3 Community Impacts

Community Character and Cohesion

Build Alternatives

The project area is zoned for Port-related industrial activities and consists mainly of heavy industrial uses associated with the Port's various terminals. No residential areas are within the Port planning areas, and the proposed project would not affect population or housing or result in any land use changes that either directly or indirectly affects local or regional population growth projections.

The project is confined to the immediate vicinity of the port and consists of the replacement or rehabilitation of an existing transportation facility; therefore, it would not contribute to the creation of a barrier between communities, nor would it encroach into adjacent communities, either of itself, or in the context of other related projects.

The Build Alternatives would not permanently affect any community facilities or services or access to any community facilities or services; therefore, the Build Alternatives would not result in any cumulatively considerable significant or adverse impacts, when considered in relation to other related projects on community character or cohesion.

Relocations

Bridge Replacement Alternatives

No residential areas would be affected by the Build Alternatives. Some property acquisition and/or employee displacement is expected under these alternatives. When considered along with the effects of other related projects taking place in the port area, the proposed project would contribute to a general trend of land conversion from smaller, less intense, land uses, to larger and more consolidated port-related land uses. In that sense, a cumulative contribution to relocations (primarily affecting commercial properties) can be attributed to the bridge improvement project; however, it is reasonable to believe that the proposed project and related projects would result in an overall increase in business opportunities, including commercial space and jobs, to meet the relocation needs of any displaced business or employee within the vicinity of the Ports. It is expected that all projects would comply with relocation and acquisition guidelines of the regulating agency; therefore, the relocation effects of the Build Alternatives, when considered with other related projects, would not result in any cumulatively considerable significant or adverse relocation impacts as a result of property acquisition and/or employee displacement.

Rehabilitation Alternative

No permanent acquisition or employee displacement is anticipated under this alternative. The Rehabilitation Alternative would not contribute to cumulatively considerable relocation impacts.

Environmental Justice

Build Alternatives

Because the proposed Build Alternatives would not affect residences, nor would it have permanent adjacency effects on residences, the proposed project would not result in disproportionately high and adverse effects on minority and/or low-income population groups; therefore, when considered with other related projects, the proposed project would not result in cumulatively considerable significant or adverse impacts on minority and/or low-income population groups.

2.4.3.4 Public Services

Build Alternatives

The need for public services (e.g., schools, health care facilities, parks, libraries) is governed by growth in population and, to a certain extent, by growth in permanent employment, which can also translate into additional population. Population growth itself is largely a regional phenomenon that is measured by the imbalance of immigration versus emigration plus net births. The former factor is influenced by the strength of the regional economy, which has exhibited (and continues to do so) sound strength over the long term. The latter factor is independent of public policy. The San Pedro Bay Ports constitute a substantial component of the region's economy The San Pedro Bay Ports handle more than 40 percent of the nation's total containerized cargo import traffic and 24 percent of the nation's total exports. This trade volume equates to $256 billion in total national trade in 2005, with $62.5 billion of that trade in California. In addition, the study conservatively estimates that more than 886,000 jobs in California are directly and indirectly related to international trade activities conducted through the San Pedro Bay Ports (ACTA, 2008). To the extent that the Ports continue to grow in response to global market forces, they will continue to be a substantial component of the regional economy; therefore, they would also contribute to growth in the employment-driven component of population growth over time.

Expected increases in regional population and employment are accounted for in the regional projections provided by SCAG. In an indirect sense, the contribution of the Ports to population and employment growth has already been taken into account. As the POLB adds and improves the productivity of its terminal facilities, the employment growth projections attributable to the Port, which are included in the SCAG projections, come "on line." So long as the additions of terminal capacity are in line with adopted regional employment growth forecasts, the potential cumulative effects on the need for public services of various kinds are being planned for at the regional and local level through the general plans and capital improvement programs of the many local jurisdictions in the region. In this scenario, when considered with other related projects, significant and adverse cumulative impacts associated with Port growth would not occur.

The Bridge Replacement Alternatives respond to the traffic demand generated by local and regional population and employment growth, and they accommodate vehicular movements related to cargo handling in the Port. These vehicular movements are the outcome of population and employment activity, not the cause; therefore, the Build Alternatives do not contribute to adverse or significant cumulative impacts on public services.

The Build Alternatives would also generate large volumes of construction and the Bridge Replacement Alternatives would generate demolition debris. This would result in disposal requirements and a reduction in municipal solid waste landfill capacity; however, 50 percent of the debris would be diverted in accordance with AB 75, and recyclable materials would be hauled to local recycling facilities or inert landfills. This would reduce use of Los Angeles County landfills and minimize project-related cumulative impacts on landfill capacity. It is assumed that all other related projects would also dispose of construction and demolition debris in accordance with state and local requirements. Landfill capacity would not be adversely impacted by disposal needs of these alternatives when considered in conjunction with the disposal needs of related projects. No cumulatively considerable significant or adverse impacts on landfill capacity are anticipated.

2.4.3.5 Maritime Navigation

<u>Build Alternatives</u>

Some construction activities over the Back Channel could potentially result in occasional shipping delays. These delays would be minimized through close coordination between the terminal operators, the Port, and the contractor. The Build Alternatives would not substantially interfere with the accessibility of the Port's berths to calling vessels; therefore, no cumulatively considerable significant or adverse impacts on maritime navigation are anticipated

2.4.3.6 Visual/Aesthetics

<u>Bridge Replacement Alternatives</u>

The Bridge Replacement Alternatives and all related projects planned within the Port would comply with PMP requirements for maintenance of visual quality and enhancement of visual quality of Harbor land at or along major vehicular approaches (POLB, 1999). These projects, in conjunction with the Bridge Replacement Alternatives, would not contribute to cumulatively considerable significant or adverse impacts on visual quality. Additionally, the new landmark bridge design proposed for the Bridge Replacement Alternatives would enhance the visual landscape and visual quality within and outside of the Port.

<u>Rehabilitation Alternative</u>

The visual quality and character of the project area would be the same under the Rehabilitation Alternative as the No Action Alternative. This alternative would not affect the visual/aesthetic environment, and it would not contribute to cumulatively considerable significant or adverse visual quality effects.

2.4.3.7 Cultural Resources

<u>Build Alternatives</u>

The former Edison Power Plant No. 3 and SCE transmission towers were determined eligible for listing on the NRHP. The Build Alternatives would not require demolition or alteration of the facilities or towers. New towers would be constructed adjacent to the existing towers. No known archaeological or paleontological resources were identified within the APE. The formation of Terminal Island and the surrounding areas make it unlikely that any archaeological or paleontological resources are present within the project area. The Build Alternatives would not adversely affect historic resources and, when considered with other related projects, would not result in cumulatively considerable significant or adverse impacts on cultural resources.

2.4.3.8 Water Resources

Water Quality

Build Alternatives

The Port's commitment to greening operations and increasing population density, along with increasingly stringent regulatory requirements and community involvement, have made the protection of water resources a priority in the Port. Soil disturbance associated with Build Alternative construction activities could result in temporary sedimentation and siltation effects on surface waters and could be cumulatively considerable when considered in relation to sedimentation and siltation effects of other related projects that could be under construction at the same time. However, potential cumulative effects on surface water due to the Build Alternatives are not anticipated because a site-specific SWPPP would be implemented, and the selection of appropriate construction site BMPs would ensure that no water quality standards or WDRs would be violated. It is reasonable to assume that all other related projects would also implement similar water quality protection measures. With implementation of these measures, the Build Alternatives would not contribute significantly or adversely to cumulative surface water quality impacts. Additionally, excavation activities are anticipated to encounter groundwater, and dewatering would be necessary. Dewatering groundwater in the project area is a concern because this can cause the contaminated groundwater plume to migrate to uncontaminated areas. All dewatering activities would be in compliance with Los Angeles RWQCB regulatory requirements, including an individual dewatering permit or waste discharge permit, if applicable. Prior to commencement of dewatering activities, RWQCB would be contacted immediately to provide a recommendation on how to handle the disposal of dewatering flows. Any dewatering activities, including those that may contact contaminated groundwater, shall be treated to remove pollutants to meet Los Angeles RWQCB discharge requirements, or hauled offsite and properly disposed of. No dewatering would be required during operation of the project. Additionally, the project would incorporate treatment BMPs into all of the alternatives that would capture and treat storm water runoff. Once operational, the completed project would result in beneficial effects on surface water and would have no effect on groundwater. The beneficial effects to surface water would be attained through the implementation of proposed treatment BMPs, where there currently is no treatment. Due to beneficial effects of the Build Alternatives, there is no potential to contribute to cumulatively considerable significant or adverse impacts on surface or groundwater.

Storm Water Runoff

Bridge Replacement Alternatives

The Bridge Replacement Alternatives would result in an increase in impervious surfaces and associated storm water runoff; however, all runoff would be captured and treated in eight treatment BMPs (i.e., six media filters and two biofiltration swales) prior to discharge to the existing storm drain. Storm water discharge would not exceed existing velocities and would not require construction of additional storm water drainage capacity. Implementation of the Bridge Replacement Alternatives would result in a beneficial effect on surface water quality due to treatment of storm water runoff prior to discharge into the harbor. No cumulatively considerable significant or adverse impacts related to storm water runoff are anticipated

Rehabilitation Alternative

The Rehabilitation Alternative would result in seismic improvements to the Gerald Desmond Bridge and would not result in new impervious surfaces or increased storm water runoff; however, treatment BMPs have been incorporated into this alternative, and all runoff would be captured and treated in five treatment BMPs (i.e., three media filters and two biofiltration swales). Implementation of the Rehabilitation Alternative would result in a beneficial effect on surface water quality due to treatment of storm water runoff prior to discharge into the harbor. No cumulatively considerable significant or adverse impacts related to storm water runoff are anticipated.

Hydrology and Floodplains

Build Alternatives

Although the North-side Alignment Alternative would place structures within the 100-year flood hazard area, it would not be considered a "significant encroachment." The Build Alternatives would not impede or redirect flows. When considered with other related projects, and due to the location of the Build Alternatives adjacent to the harbor and ocean, no cumulatively considerable significant or adverse impacts related to hydrology and floodplains are anticipated.

2.4.3.9 Geologic Resources

Bridge Replacement Alternatives

The Bridge Replacement Alternatives would be designed to meet all federal and state seismic design criteria, with return to service within days of a major seismic event. Soil loss associated with grading and other construction activities is expected to be minimal. It is anticipated that other related projects would be implemented in a similar manner; therefore, collectively, no conditions would be created that would result in a cumulative adverse impact either from or on geologic conditions when considered with other related projects. Additionally, implementation of the Build Alternatives would decrease the current risk of loss, injury, or death as a result of ground shaking or other seismically induced effects. The proposed project would also reduce the current risk associated with exposing people or structures to adverse effects because of seismic activities and seismic-related ground failure. No cumulatively considerable significant or adverse impacts related to geologic resources are anticipated.

Rehabilitation Alternative

Under this alternative, cumulative impacts to geologic resources would be comparable to those described under the Bridge Replacement Alternatives; however, it is likely that after a major seismic event, the Gerald Desmond Bridge would likely require demolition and reconstruction. No cumulatively considerable significant or adverse impacts related to geologic resources are anticipated.

2.4.3.10 Hazardous Wastes/Materials

Build Alternatives

Construction activities associated with the Build Alternatives and other related projects, either severally or collectively, could result in hazardous materials being used or encountered in the field. Hazardous waste/materials are potentially located in areas adjacent to the proposed alignments. This project (as would the related projects) would be required to employ BMPs in the transportation, storage, and handling of any hazardous materials encountered or used in their respective construction processes. The project would also be required to follow appropriate procedures for handling and disposal of such materials if they are encountered in the field in accordance with the project's hazardous waste management plan. Primarily, hazardous material-related impacts attributable to the Build Alternatives, in conjunction with construction of related projects, could potentially occur from the handling of contaminated soil and groundwater and potential presences of asbestos and LBP. All related projects in the area would be evaluated on a project-by-project basis and would incorporate measures into the hazardous waste management plan to reduce potential impacts. These measures would be expected to be consistent with applicable standards, regulations, and requirements to reduce potential impacts from hazardous materials/wastes. It is anticipated that other related projects would be implemented in a similar manner; therefore, with implementation of the protection measures, no cumulatively considerable significant or adverse impacts related to hazardous waters and materials are anticipated.

2.4.3.11 Noise

Build Alternatives

Construction noise effects are anticipated; however, noise generated during construction would be intermittent with varying levels of intensity. There are several other projects within a 0.5-mi (0.8-km) radius of this proposed project that may be under construction concurrently. Depending on phasing of the various projects and distance from other concurrent related projects, temporary, cumulative noise effects may occur. Potential cumulative noise effects related to construction activities would cease at the end of the construction period. Although not considered sensitive receptors (see Section 2.2.6 [Noise]) Port/harbor workers are located within 1,000 ft (305 m) of the construction site. Pile driving and bridge demolition activities could temporarily affect outdoor work areas for Port/harbor workers adjacent to the construction site (within 450 ft [137 m] of pile driving activities and within 500 ft [152 m] of bridge demolition activities). Port/harbor workers may be intermittently exposed to noise levels exceeding the City of Long Beach construction noise threshold. Due to the temporary and intermittent nature of construction noise, OSHA occupational noise protection measures, natural attenuation and distance to other related projects, construction-related noise would not be considered an adverse cumulative noise effect. As applicable, construction noise reduction practices would be incorporated into the project. As previously stated, intermittent and temporary increases in noise levels associated with construction and demolition would be temporary, and no cumulatively considerable significant or adverse impacts related to construction noise are anticipated.

Additionally, most of the ambient noise within the project area is already attributable to surface traffic and adjacent industrial operations. Operational noise effects of the Build Alternatives would not substantially contribute to permanent cumulative increases in ambient noise levels at sensitive receptors or in the project vicinity. The expected project-related maximum increase in ambient noise levels at the nearest sensitive receptor associated with the Build Alternatives, compared to the overall future ambient noise levels without the project, would be no more than 1 dBA. A change in ambient noise level of 3 dBA or less is generally considered imperceptible to human hearing. When combined with the industrial nature of the land uses within the project area, forecasted Port-related operational growth, the distance to the nearest sensitive receptors (1,300 ft [396 m]) and other related projects, the Build Alternatives would not contribute to cumulatively considerable significant or adverse increases in ambient noise.

2.4.3.12 Energy

Bridge Replacement Alternatives

Upon completion, the proposed project would conserve energy by relieving congestion and contributing towards other transportation efficiencies. Increases in energy use would be limited to those during construction of the project, and they would then return to normal levels subsequent to completion of the project. There is a potential for other related projects to be under construction concurrently with the proposed project; however, this project would not have substantial energy impacts contributing towards cumulative energy consumption. Overall energy saved by relieving congestion, reducing VMT, and other transportation efficiencies from the project over its design life would be greater than the energy consumed to construct the project. No cumulatively considerable significant or adverse impacts related to energy are anticipated.

Rehabilitation Alternative

The Rehabilitation Alternative would not result in cumulative energy impacts. With the exception of energy consumed during construction of the seismic retrofit improvements, energy impacts would be the same as the No Action Alternative. No cumulatively considerable significant or adverse impacts related to energy are anticipated.

2.4.3.13 Biological Environment

Natural Communities

Build Alternatives

No natural communities occur within the project area; therefore, when considered with other related projects, there is no potential for cumulatively considerable impacts on natural communities.

Wetlands and Other Waters

Build Alternatives

No wetlands are within the project footprint, and all construction activates would occur outside of the Back Channel. The Build Alternatives do not affect wetlands or other waters; therefore, when considered with other related projects, there is no potential for cumulatively considerable impacts on wetlands or other waters.

Plant Species

Build Alternatives

Construction and operation of the Build Alternatives would not result in any effects on any marine or terrestrial plant communities. All construction activities would occur entirely within developed areas that are devoid of natural plant communities and outside of the Back Channel. No loss of sensitive terrestrial or marine plant species would occur during the construction and operation of the Build Alternatives, and when considered with other related projects, no cumulatively considerable impacts on plant species are anticipated.

Animal Species

Build Alternatives

The project footprint associated with the Build Alternatives would occur entirely within developed areas and outside of the Back Channel. Potentially affected species are generally well adapted to construction and other human activities, and they would likely avoid the project area during construction; however, some mortality of common terrestrial wildlife species may result due to project construction activities. These common wildlife species are generally abundant in the project vicinity. No construction in the marine environment would be required, and no direct effects on marine species or habitat are anticipated. When considered with other related projects, the Build Alternatives would not have cumulatively considerable significant or adverse impacts related on marine or common terrestrial species.

Threatened and Endangered Species

Bridge Replacement Alternatives

The peregrine falcon and several species of bats frequently nest/roost on or around the Gerald Desmond Bridge. During construction of either bridge alignment, existing nesting ledges and roost areas on the Gerald Desmond Bridge would be available for continued use. As discussed in Section 2.3 (Biological Resources), if adjacent construction disturbance results in nest/roost abandonment by falcons and/or bats during construction of the new bridge, there are other suitable areas for these species to reside until construction is complete. New nesting ledges and bat boxes would be available for occupancy prior to exclusion activities associated with demolition of the existing bridge. Additionally, if feasible, falcon and bat exclusion for demolition of the Schuyler Heim Bridge and Gerald Desmond Bridge Replacement would be timed to avoid exclusion during the same breeding season. This would ensure that at least one familiar nesting/roost area within the project vicinity is available throughout construction. These impacts were considered at the project level, resulting in measures to avoid and minimize the potential effects on falcons and bats. Also, as discussed in Section 2.3 (Biological Resources), artificial nesting and roosting sites for peregrine falcons and bat species would be incorporated into the Gerald Desmond Bridge Replacement Alternatives. When considered with other related projects and with implementation of the protection measures discussed in Section 2.3, no cumulatively considerable significant or adverse impacts on peregrine falcons or bat species are anticipated.

Lighting of the project during construction and operation may affect special-status species and resident/migratory birds. Artificial lighting could potentially disrupt behavior, resulting in disorientation and collisions with the bridge structures (International Dark-Sky Association, 2002; Longcore and Rich, 2004). Although the potential for collisions would not represent a substantial effect on special-status species or bird migration or use at the project level, it may result in cumulative impacts to birds when considered with construction and operational lighting required for other related projects. The Bridge Replacement Alternatives would incorporate permanent bridge lighting types known to minimize potential effects (i.e., low-pressure sodium lights, high-pressure sodium lights, or LED lights) and avoid lighting types known to be disruptive to migrating wildlife (mercury vapor lamps [Jones, 2000]). Additionally, lighting would be shielded to ensure that light is focused inward, and the amount of lighting would be reduced where possible during both construction and operation. With implementation of the protection measures discussed in Section 2.3, and considering the extent and brilliance of ambient nighttime lighting of the harbor areas adjacent to the bridge, lighting on the existing bridge, and the industrialized nature of the BSA, no cumulatively considerable significant or adverse impacts associated with artificial lighting on special-status species or resident/migratory birds are anticipated.

Rehabilitation Alternative

This alternative would require temporary relocation of nesting ledges and staged construction that would modify nest/roost access during construction. If the Rehabilitation Alternative and the Schuyler Heim project are under construction at the same time, there is potential for temporary cumulative impacts on the falcon because all familiar perches could be unavailable for use; however, as discussed in Section 2.3 (Biological Resources), temporary nest sites would be created and available on the Gerald Desmond Bridge during construction. If nest/roost abandonment does occur, there are other suitable areas for these species to reside until construction is completed. Subsequent to construction of this alternative, existing nesting and roost areas would again be available for reoccupation. When considered with other related projects and with implementation of the protection measures discussed in Section 2.3, no cumulatively considerable significant or adverse impacts on peregrine falcons or bat species are anticipated.

Upon completion of the retrofit activities, bridge lighting would be the same as the existing bridge lighting. Construction night lighting would be focused and directed on the work area. Given the extent and brilliance of ambient nighttime lighting of the harbor areas adjacent to the bridge, lighting on the existing bridge, and the industrialized nature of the BSA, no cumulatively considerable significant or adverse impacts associated with artificial lighting on special-status species or resident/migratory birds are anticipated

Invasive Species

Build Alternatives

Construction vehicles can easily transport seeds of invasive species from other construction sites into the project area; however, because of the industrial and highly developed nature of the project area, invasive species establishment is unlikely. Standard measures to prevent the spread of invasive species would be implemented. Project landscaping would be limited to slopes near the bridge ramps and would follow the provisions set forth in EO 13112, which mandates preventing the introduction of and controlling the spread of invasive plant species on highway ROWs. No invasive species listed in the National Invasive Species Management Plan or the State of California Noxious Weed List would be used in the landscaping for the proposed project. It is anticipated that similar measures would be incorporated at other related project sites. With incorporation of these measures, no cumulatively considerable significant or adverse impacts related to the spread or establishment of invasive species are anticipated.

2.4.4 Environmental Resources for which Potentially Adverse Cumulative Impacts would Result

When considering the effects of past, present, and reasonably foreseeable future projects in combination with the anticipated effects associated with the Gerald Desmond Bridge Replacement Project, cumulatively considerable impacts on resource areas that are considered potentially adverse are discussed below.

2.4.4.1 Utilities/Emergency Service

Utilities

Bridge Replacement Alternatives

These alternatives and, more than likely, most related projects would require relocation of various utilities during construction (i.e., electric, telephone lines, natural gas, water and sewer pipelines, storm drains, and oil lines and wells). The relocation process could temporarily interrupt utilities while a changeover from the existing to relocated facilities occurs. It is also possible that construction activities associated with other related projects could interrupt utilities serving the immediate vicinity. Utility relocation for the proposed project would be conducted in a manner designed to minimize any potential for interruption. It is reasonable to believe that other related projects would also minimize the potential for service interruption. Interruption of associated utility service in the project area is unlikely to occur. If a service interruption associated with a utility relocation of a related project were to occur simultaneously with an interruption related to the Bridge Replacement Alternatives, this may result in a potentially adverse cumulative impact. The likelihood of such a simultaneous occurrence would be minimal and temporary in duration, perhaps extending for a period of hours. Because utility relocation is common within the Port and related projects area, service disruptions and associated potential cumulatively considerable impacts would be temporary, and minimal, cumulatively considerable adverse or significant impacts are not anticipated. Once operational, the proposed project would not have an effect on utility use or operation, either of itself or in the context of other related projects. .

Rehabilitation Alternative

Potential cumulative impacts associated with utility relocations for the Rehabilitation Alternative would be similar to those described for the Bridge Replacement Alternatives; however, the Rehabilitation Alternative would require much less utility relocation and would not involve the relocation of the SCE lines. Once operational, the proposed project would not have an effect on utility use or operation, either of itself or in the context of other related projects. Because utility relocation is common within the Port and related projects area, service disruptions and associated potential cumulatively considerable impacts would be temporary, and minimal, cumulatively considerable adverse or significant impacts are not anticipated..

Emergency Services

Bridge Replacement Alternatives

Some traffic delays can be expected during construction. Delays may potentially result in increased response times for emergency service providers. The Bridge Replacement Alternatives would utilize a staged construction method, and vehicle travel across the existing bridge would be maintained throughout the construction phases. Only minor effects on emergency services are anticipated during the construction phase and would mainly consist of reduced travel speeds through the project area. A TMP would be designed to identify ways to reduce emergency service impacts during the construction phase. Cumulative impacts to emergency services could potentially occur if construction of related projects is concurrent with the proposed project. Careful coordination between the proposed and related projects and emergency service providers should minimize these consequences. The TMP for this project would address issues of emergency circulation in conjunction with TMPs for other related projects, and cumulatively considerable adverse or significant impacts are not anticipated.

Rehabilitation Alternative

Potential cumulative impacts associated with emergency services for the Rehabilitation Alternative would be similar to those described for the Bridge Replacement Alternatives; however, most of the construction activities with potential to impact emergency response times would occur during off peak hours, from 7:00 p.m. to 7:00 a.m. A TMP designed to reduce emergency service impacts during the construction phase would be completed. Cumulative impacts to emergency services could potentially occur if construction of related projects is concurrent with the proposed project. Careful coordination between the proposed project and related projects and emergency service providers should minimize these consequences. The TMP for this project would also address emergency circulation in conjunction with TMPs for other related projects. Potential and cumulatively considerable adverse or significant impacts are not anticipated.

2.4.4.2 Air Quality

Construction Impacts

Bridge Replacement Alternatives

The Bridge Replacement Alternatives would result in construction-related cumulative impacts within the SCAB. The SCAB experiences chronic exceedance of state and federal ambient air quality standards; therefore, exceedances of established thresholds must be considered an adverse consequence. As discussed in Section 2.1.5, the Replacement Alternatives would exceed the SCAQMD construction threshold for NO_X during the 9th month of construction years 1 and 2, and the 3rd month of construction Year 3. Although the impact would be temporary, NO_X is a precursor for O_3 and, when considered with other related projects, could contribute cumulatively to the SCAB's O_3 nonattainment status. This exceedance would be considered a cumulative temporary adverse impact. All feasible mitigation measures would be implemented, as discussed in Section 2.1.5. Most of the air quality impacts from related projects would result from mobile sources, such as motor vehicles, construction equipment, and terminal operating vehicles. Ongoing EPA, CARB, SCAQMD, and Port programs are aimed at reducing overall emissions by encouraging or mandating measures to implement the use of alternative fuels, introduction of cleaner running engines, and increased use of ride sharing. In November 2006, the Ports approved the San Pedro Bay Ports CAAP. This plan links the emission reduction efforts and visions of the Ports with the similar efforts and goals of the regulatory agencies (e.g., SCAQMD and CARB) in charge of ensuring compliance with air quality standards. This 5-year CAAP highlights goals, emissions reduction, and budgetary needs for FY 2006/2007 through 2010/2011. The Ports will regularly evaluate the progress towards meeting the CAAP's goals, review the status of existing control measures, evaluate new measures, and develop a revised Action Plan each year (POLB, 2006b); however, construction emissions represent additions to the mobile source emissions burden of the SCAB; therefore, they are unavoidable during the most intense construction activities.

Additionally, construction activities could result in offsite ambient NO_X concentrations that would exceed SCAQMD thresholds of significance during construction year 2 and 3 at a distance of up to 1,640 ft (500 m) from the construction area. Exceedance of the threshold, when considered with the potential for exceedance of offsite ambient construction emission thresholds for other related projects, construction NO_X emissions could contribute to cumulatively adverse temporary air quality effects on sensitive receptors within 1,640 ft (500 m) of the construction area. Sensitive receptors potentially affected within 1,640 ft (500 m) include primarily Cesar Chavez Park and Elementary School, the Golden Shore Marine Reserve, and a few residences. Temporary adverse ambient offsite exceedances would be intermittent over the 12-month period, occur only during the most intense construction activities, and be highly dependent upon construction vehicle mix, proximity of construction activities to the sensitive receptors, and prevailing climactic conditions. .

To the extent feasible, the construction schedule of this project would be coordinated so that concurrent major construction activities are avoided or minimized to reduce adverse air quality impacts. Coordination of the SR 47/Schuyler Heim Bridge replacement project and Gerald Desmond

Bridge replacement project by their respective development teams, as well as PDTs of other related projects in the vicinity, is ongoing. Construction of the proposed project would result in temporary adverse effects to air quality, even after impacts have been minimized to the maximum extent practicable; therefore, impacts of the proposed project, when considered in conjunction with other related concurrent projects under construction, would be expected to be adverse. During construction of either Bridge Replacement Alternative, construction emissions would temporarily contribute to cumulative adverse effects to air quality.

Rehabilitation Alternative

The Rehabilitation Alternative would not exceed SCAQMD local or regional construction emission thresholds and would not contribute to cumulative adverse air quality effects during construction.

Operational Impacts

Bridge Replacement Alternatives

Under the Bridge Replacement Alternatives, regional daily operational emissions for all criteria pollutants would be substantially less than the operational emissions associated with the 2005 base year in both the opening (2015) and horizon years (2030); however, the SCAQMD operational thresholds for NO_X would be exceeded during the opening year. Although the impact would be temporary, NO_X is a precursor for O_3 and, when considered with other related projects, could temporarily contribute cumulatively to the SCAB's O_3 nonattainment status. The overall emissions reduction is due to compliance with adopted regulations for mobile source control measures and include the use of alternative or reformulated fuels, retrofit control on engines, and installing or encouraging the use of new engines and cleaner heavy-duty vehicles. However, when considered with other related projects, exceedance of SCAQMD daily operational threshold criteria would contribute to cumulative considerable temporary adverse effects to air quality during operations. By the horizon year (2030), daily operational Bridge Replacement Alternative emissions would be in compliance with all SCAQMD operational thresholds.

Additionally, localized CO effects associated with operation were assessed by estimating the maximum ambient CO concentrations near the intersections with the greatest potential for hot-spot generation. The Build Alternatives did not result in any exceedance of NAAQS or CAAQS and would not contribute to cumulatively adverse localized CO effects during operations.

2.4.4.3 Traffic and Circulation

Traffic Effects Associated with Three Other Related Projects

This subsection focuses on three roadway improvements from the listing of cumulative projects:

- Improvements to SR 47, excluding the direct "flyover" connector ramp serving traffic from EB Ocean Boulevard to NB SR 47;
- Widening of SR 710 north of the Ports; and
- The direct "flyover" connector ramp serving traffic from EB Ocean Boulevard to NB SR 47 (SR 47 Flyover).

All other cumulative transportation projects and the analysis of their potential traffic effects under both the Rehabilitation and Bridge Replacement Alternatives are included in the analysis of traffic effects presented in Section 2.1.5. Thus, the Rehabilitation Alternative would not result in any adverse cumulative effects on traffic and circulation.

The remainder of this section addresses cumulative effects of the Bridge Replacement Alternatives. The traffic forecasts used in the analysis presented in Section 2.1.5 include traffic from cumulative development projects and circulation on cumulative transportation projects, except for the three transportation projects listed above. These three transportation projects were added to the list of cumulative projects after the traffic forecasting was complete. The potential effects of the three projects listed below were examined using additional runs of the traffic forecasting model testing the sensitivity of the traffic network to these three projects. The flyover was analyzed separately because it was added to the SR 47 project late in the development of that project.

SR 47 and SR 710 Improvements

Improvements to the SR 47 Expressway and SR 710 freeway north of the Ports were not included in the roadway network used to forecast traffic for the future years because those improvements were not planned or programmed at the time that the travel demand forecasting model network was developed; however, a sensitivity analysis was conducted that included these two projects as additional improvements to the year 2030 Bridge Replacement Alternatives condition.

The traffic assignment model for the 2030 Bridge Replacement Alternatives condition was run with improvements to SR 710 and SR 47 (excluding the SR 47 Flyover) added to the network. Because of the additional capacity on SR 710 and SR 47, there are some changes in forecast traffic volumes.

Table 2.4.4-1 shows the changes in traffic with the proposed Bridge Replacement Alternatives, including and excluding the additional improvements to SR 710 and SR 47. The results show that the addition of those two projects could increase PCE traffic on the bridge between 2 and 8 percent during a given peak hour. Because the bridge is expected to operate at LOS C or better in the year 2030 with the Bridge Replacement Alternatives, the additional traffic can be easily accommodated in the proposed designs of the Bridge Replacement Alternatives.

SR 47 Flyover at Terminal Island Freeway Interchange

The proposed SR 47 Flyover would provide a direct connection for traffic from EB Ocean Boulevard to NB SR 47. The SR 47 Flyover is included in the preferred alternative in the May 2009 *Schuyler Heim Bridge Replacement and SR-47 Expressway Project Final Environmental Impact Statement/ Environmental Impact Report* (Caltrans, 2007a). The SR 47 Flyover could also influence some of the same roadway segments that would be affected by the proposed Bridge Replacement Alternatives for the Gerald Desmond Bridge. The SR 47 Flyover is expected to be operational sometime between 2015 and 2030.

Operational analysis of the influence of the SR 47 Flyover on the roadway study segments was conducted using CORSIM software and HCM methods. The peak-hour traffic volumes used in the analysis are the same as those used for analysis of the Bridge Replacement Alternatives. The SR 47 Flyover was evaluated with and without the proposed Bridge Replacement Alternatives in years 2015 and 2030.

Table 2.4.4-2 summarizes the results of the analysis of the influence of the SR 47 Flyover on

Table 2.4.4-1
Year 2030 Traffic Volumes for the Bridge Replacement Alternatives with SR 710 and SR 47 Improvements Except SR 47 Flyover

	AM Peak		MD Peak		PM Peak	
	EB	WB	EB	WB	EB	WB
Year 2030 with Bridge Replacement Plus SR 710 and SR 47 Improvements						
Autos	1,636	1,312	1,117	1,065	1,756	2,189
Trucks (Non-PCE)	1,059	1,164	1,249	1,192	1,148	866
Total Vehicles (Non-PCE)	2,695	2,476	2,366	2,257	2,904	3,055
Total Vehicles (PCE)	3,754	3,640	3,615	3,449	4,052	3,921
Year 2030 with Bridge Replacement						
Autos	1,445	1,311	1,131	1,010	1,900	2,066
Trucks (Non-PCE)	1,022	1,118	1,176	1,182	1,028	803
Total Vehicles (Non-PCE)	2,467	2,429	2,307	2,192	2,928	2,869
Total Vehicles (PCE)	3,489	3,547	3,483	3,374	3,956	3,672
Difference						
Autos	191	1	-14	55	-144	123
Trucks (Non-PCE)	37	46	73	10	120	63
Total Vehicles (Non-PCE)	228	47	59	65	-24	186
Total Vehicles (PCE)	265	93	132	75	96	249
Total Vehicles (PCE) – Percent Increase	8%	3%	4%	2%	2%	7%

Note: PCE – passenger car equivalents
Source: Iteris, 2009.

Table 2.4.4-2 Comparison of Study Segment LOS for the No Action/Rehabilitation Alternatives and Bridge Replacement Alternatives with and without the Ocean Boulevard to SR 47 Flyover

				Year 2005	Without EB Ocean Boulevard to NB SR 47 Flyover				With EB Ocean Boulevard to NB SR 47 Flyover			
					Year 2015		Year 2030		Year 2015		Year 2030	
	Segment	From	To	Existing/ Baseline	No Action/ Rehab Alt	Bridge Replace Alts	No Action/ Rehab Alt	Bridge Replace Alts	No Action/ Rehab Alt	Bridge Replace Alts	No Action/ Rehab Alt	Bridge Replace Alts
AM Peak Hour												
1	EB Ocean Blvd	Navy Way	Pier S Avenue	*	C	C	F	C	B	B	B	B
	WB Ocean Blvd	Pier S Avenue	Navy Way	*	C	C	C	C	C	C	C	C
2	EB Ocean Blvd	Pier S Avenue	Terminal Island Freeway	*	B	C	C	C	B	C	C	C
	WB Ocean Blvd	Terminal Island Freeway	Pier S Avenue	*	B	C	C	C	B	B	C	C
3	EB Ocean Blvd	Terminal Island Freeway	Horseshoe Ramps	*	B	C	C	C	C	C	C	C
	WB Ocean Blvd	Horseshoe Ramps	Terminal Island Freeway	*	B	E	B	D	B	B	B	B
4	EB Gerald Desmond Bridge	Upgrade	Crest	B	C	C	C	D	C	C	D	D
	EB Gerald Desmond Bridge	Crest	Downgrade	C	D	C	D	C	D	C	D	C
5	WB Gerald Desmond Bridge	Upgrade	Crest	C	F	C	F	C	F	C	F	C
	WB Gerald Desmond Bridge	Crest	Downgrade	C	D	C	D	C	D	C	D	C
6	NB Connector	EB Ocean Blvd	NB I-710	B	B	A	B	A	B	A	B	B
	SB Connector	SB I-710	WB Ocean Blvd	B	C	B	D	C	D	B	D	C
7	I-710 NB	NB Connector	NB I-710 Mainline	B	B	A	B	A	B	A	B	B
	I-710 SB	SB I-710 Mainline	SB Connector	A	B	B	B	C	B	B	B	C
8	EB Ocean Blvd	NB Connector	Downtown	A	A	B	A	B	A	B	A	B
	WB Ocean Blvd	Downtown	SB Connector	A	A	B	A	B	A	B	A	B
MD Peak Hour												
1	EB Ocean Blvd	Navy Way	Pier S Avenue	*	C	C	F	F	B	B	F	B
	WB Ocean Blvd	Pier S Avenue	Navy Way	*	C	C	C	C	B	C	B	C
2	EB Ocean Blvd	Pier S Avenue	Terminal Island Freeway	*	B	C	B	C	B	C	C	C
	WB Ocean Blvd	Terminal Island Freeway	Pier S Avenue	*	B	B	B	C	B	B	C	C
3	EB Ocean Blvd	Terminal Island Freeway	Horseshoe Ramps	*	B	C	B	B	B	C	B	C
	WB Ocean Blvd	Horseshoe Ramps	Terminal Island Freeway	*	B	F	F	F	B	B	F	B
4	EB Gerald Desmond Bridge	Upgrade	Crest	C	D	D	C	C	D	D	D	D
	EB Gerald Desmond Bridge	Crest	Downgrade	C	D	C	C	B	D	C	D	C
5	WB Gerald Desmond Bridge	Upgrade	Crest	C	F	C	F	C	F	C	F	C
	WB Gerald Desmond Bridge	Crest	Downgrade	C	C	C	D	C	C	C	F	C
6	NB Connector	EB Ocean Blvd	NB I-710	B	B	B	B	A	B	B	B	B
	SB Connector	SB I-710	WB Ocean Blvd	A	D	B	D	C	C	B	F	C
7	I-710 NB	NB Connector	NB I-710 Mainline	B	C	B	B	A	C	B	B	B
	I-710 SB	SB I-710 Mainline	SB Connector	A	B	B	B	C	B	B	C	C
8	EB Ocean Blvd	NB Connector	Downtown	A	A	A	A	A	A	A	A	A
	WB Ocean Blvd	Downtown	SB Connector	A	A	B	A	B	A	B	A	B
PM Peak Hour												
1	EB Ocean Blvd	Navy Way	Pier S Avenue	*	C	C	F	F	B	B	C	C
	WB Ocean Blvd	Pier S Avenue	Navy Way	*	C	C	D	D	C	C	D	D
2	EB Ocean Blvd	Pier S Avenue	Terminal Island Freeway	*	C	C	C	D	C	C	D	D
	WB Ocean Blvd	Terminal Island Freeway	Pier S Avenue	*	C	C	C	D	C	C	C	D
3	EB Ocean Blvd	Terminal Island Freeway	Horseshoe Ramps	*	C	C	B	C	C	C	C	D
	WB Ocean Blvd	Horseshoe Ramps	Terminal Island Freeway	*	C	B	C	C	C	B	C	C
4	EB Gerald Desmond Bridge	Upgrade	Crest	C	D	D	C	D	C	D	E	D
	EB Gerald Desmond Bridge	Crest	Downgrade	C	D	C	D	C	D	C	E	D
5	WB Gerald Desmond Bridge	Upgrade	Crest	C	F	C	F	C	E	C	F	D
	WB Gerald Desmond Bridge	Crest	Downgrade	C	D	C	D	C	D	C	D	C
6	NB Connector	EB Ocean Blvd	NB I-710	B	B	B	A	A	B	B	B	B
	SB Connector	SB I-710	WB Ocean Blvd	B	C	B	C	B	C	B	C	B
7	I-710 NB	NB Connector	NB I-710 Mainline	B	B	B	A	A	B	B	B	B
	I-710 SB	SB I-710 Mainline	SB Connector	A	A	B	B	B	A	B	B	B
8	EB Ocean Blvd	NB Connector	Downtown	A	A	B	A	B	A	B	B	B
	WB Ocean Blvd	Downtown	SB Connector	A	A	C	A	C	A	C	A	C

Notes:
* - Analysis is for multi-lane highway sections. Sections that were not or will not be grade-separated highway sections are not presented in this analysis comparison.
a - Sections where the existing 2005 condition was not a multi-lane highway, but the future condition will be. Therefore, no direct comparison is appropriate.
LOS - Level of Service ; NB - Northbound; SB - Southbound; EB - Eastbound; WB - Westbound; Alt - Alternative, Rehab - Rehabilitation
Source: Iteris, 2009.

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the Bridge Replacement Alternatives. Assuming that the SR 47 Flyover is in place and a bridge replacement is not, the analysis reveals that in the year 2030, LOS F occurs on the bridge in the WB direction (Segment 5) in all three peak hours. In the EB direction (Segment 4), LOS E occurs on the bridge in the PM peak hour. With both a bridge replacement and the SR 47 Flyover in place, the above conditions improve to LOS D or better in all three peak periods.

For the roadway segments not on the bridge (Segments 1 through 3 and 6 through 8), Table 2.4.4-2 reveals that in the year 2030, assuming the SR 47 Flyover is in place and a bridge replacement is not, LOS F occurs on EB Ocean Boulevard from Navy Way to Pier S Avenue during the MD peak hour. Under the same conditions, LOS F occurs on the connector from SR 710 to Ocean Boulevard during the MD peak hour. If both a Bridge Replacement Alternative and the SR 47 Flyover are implemented, the LOS on those two segments (EB Ocean Boulevard from Navy Way to Pier S Avenue and the connector from SR 710 to Ocean Boulevard) improves to LOS C or better.

With both a proposed Bridge Replacement Alternative and the SR 47 Flyover, no LOS F operations are forecast on the study segments in either year 2015 or 2030. These results indicate that neither a proposed Bridge Replacement Alternative nor the SR 47 Flyover is individually capable of resolving LOS F operations on all roadway segments, but that a proposed Bridge Replacement Alternative and the SR 47 Flyover acting together can.

The SR 47 Flyover, in conjunction with either proposed Bridge Replacement Alternative, would result in cumulative combined LOS benefits exceeding what either improvement could individually provide. Based on the analysis presented above, the SR 710 widening and SR 47 Expressway projects would provide an additional increment of traffic to the Bridge Replacement Alternatives. There is sufficient capacity on those alternatives to accommodate the additional traffic. The LOS E condition on the EB bridge segment during the PM peak hour with both the SR 47 Flyover and a Bridge Replacement Alternative implemented would remain LOS E, with an additional 2 to 8 percent increment of traffic associated with the SR 710 and SR 47 improvements. The density on that segment is 36.0 vehicles per lane per mile with the SR 47 Flyover and a Bridge Replacement Alternative implemented. An increase of 8 percent would result in a density of 38.9, which is still within the LOS E range.

In summary, it is concluded that all adverse cumulative traffic effects resulting from reasonably foreseeable roadway improvements in conjunction with the proposed Bridge Replacement Alternatives are identified in Section 2.1.5. There are traffic benefits to the proposed Gerald Desmond Bridge Replacement Alternatives from one of the three cumulative projects presented in this section. The flyover connector ramp from EB Ocean Boulevard to NB SR 47 would provide a benefit to the proposed Bridge Replacement Alternatives. The SR 47 Flyover, in conjunction with a proposed Bridge Replacement Alternative, is expected to address the adverse effect of the Bridge Replacement Alternatives on WB Ocean Boulevard from the Horseshoe Ramps to the Terminal Island Freeway interchange by improving operations to LOS C or better. Additional traffic from widening SR 710 north of the Ports could be accommodated by the proposed Bridge Replacement Alternatives.

Pedestrian and Bicycle Facilities

Terminal Island is an industrial area within the Harbor District where there is currently no residential, retail, or public recreational facilities and future nonmotorized demand (e.g., pedestrians or bicycles) on Ocean Boulevard over the Gerald Desmond Bridge is anticipated to be low, In addition, Terminal Island does not include any designated bicycle route. The Los Angeles County MTA has not included bikeways or walkways on the Gerald Desmond Bridge (or its replacement) or Terminal Island in its regional bikeway master plan.

The current Gerald Desmond Bridge has a pedestrian walkway, but it is not considered a “major nonmotorized route” and discussions with the MTA bikeway program staff concluded that a designated bike route or pedestrian walkway is not required for this project; therefore, no cumulative adverse effects would result from the Rehabilitation or Bridge Replacement Alternatives during construction or operation.

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Chapter 3

California Environmental Quality Act (CEQA) Evaluation

SECTION 3
CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) EVALUATION

3.1 DETERMINING SIGNIFICANCE UNDER CEQA

The Gerald Desmond Bridge Replacement Project is a POLB project. The POLB is the lead CEQA agency. Upon completion of the proposed project, if one of the Bridge Replacement Alternatives is constructed, the improvements between the existing SR 710 and SR 47, including the bridge, will be transferred to Caltrans by easement following route adoption and execution of a freeway agreement. It is estimated that the transfer would be completed within 2 years after construction. Additionally, the Port has obtained federal funding from FHWA for the project, and the project is subject to state and federal environmental review requirements. Project documentation has been prepared in compliance with CEQA and NEPA. FHWA's responsibility for environmental review, consultation, and any other action required in accordance with NEPA and other applicable federal laws for this project is being, or has been, carried out by Caltrans under its assumption of responsibility pursuant to 23 U.S.C. 327.

One of the primary differences between NEPA and CEQA is the way significance is determined. Under NEPA, significance is used to determine whether an EIS or some lower level of documentation would be required. NEPA requires that an EIS be prepared when the proposed federal action (project) *as a whole* has the potential to "significantly affect the quality of the human environment." The determination of significance is based on context and intensity. In the case of this project, a decision was made by Caltrans that the proposed project, as a whole, would not have the potential to significantly affect the quality of the human environment; therefore, an EIS was not required. Instead of an EIS, an EA has been prepared to satisfy NEPA requirements.

Some impacts determined to be significant under CEQA may not be of sufficient magnitude to be determined significant under NEPA. Under NEPA, it is the magnitude of the impact that is evaluated, and no judgment of its individual significance is deemed important. NEPA does not require that a determination of significant impacts be stated in environmental documents.

CEQA, on the other hand, does require the lead agency to identify each "significant effect on the environment" resulting from the project and ways to mitigate each significant effect. If the project may have a significant effect on any environmental resource, and the effect cannot be mitigated to a less-than-significant level, then an EIR must be prepared. Each and every significant effect on the environment must be disclosed in the EIR and mitigated if feasible. In addition, the CEQA Guidelines list many mandatory findings of significance, which also require the preparation of an EIR. There are no types of actions under NEPA that parallel the findings of mandatory significance of CEQA. This chapter discusses the effects of this project in terms of CEQA significance.

3.2 DISCUSSION OF SIGNIFICANCE OF IMPACTS

Impacts of the proposed project are discussed in detail in Chapter 2, below in Section 3.3 (Climate Change), and determination of the impact significance, pursuant to CEQA, is declared within Sections 3.2.1 through 3.2.15 (see bullets). However, some topical areas require additional CEQA-specific discussion. Supplemental CEQA discussion is provided within the sections below to support the CEQA significance determinations where required. All topics discussed in Chapter 2 for which no avoidance, minimization, and/or mitigation measures were proposed were determined to be less than significant project effects pursuant to CEQA. All other project effects are either discussed as significant project effects or unavoidable and significant effects, depending on if the project effect is less than significant after mitigation measures are implemented.

Additionally, where applicable, to reduce redundancy within the effect determinations, project alternatives have been grouped where appropriate. When the Build Alternatives are referenced, this refers to all proposed build alternatives as discussed in Chapter 1 (North-side and South-side Alignment Alternatives and the Rehabilitation Alternative). When the Bridge Replacement Alternatives are referenced, this refers to both the North and South-side Alignment Alternatives. The No Project/Rehabilitation Alternative is referenced when the effects associated with the Rehabilitation Alternative would result in the same project effects as the No Project Alternative.

3.2.1 Aesthetics

3.2.1.1 Less than Significant Effects of the Proposed Project

- The Build Alternatives would have a less than significant effect on scenic vistas, scenic resources, and the visual character and quality of the site and its surroundings.
- The Build Alternatives would not substantially contrast with the surrounding industrialized setting of the Port and would not substantially degrade the visual quality or character of the site or surroundings. The Build Alternatives would have a less than significant effect on visual quality and character.
- The Build Alternatives would have a less than significant effect on the creation of new sources of light or glare that would adversely affect day or nighttime views in the area.
- The Bridge Replacement Alternatives would result in a beneficial change in aesthetics and visual resources, and the Rehabilitation Alternative would result in no change in aesthetics or visual resources. The proposed project contribution to cumulative impacts on aesthetics/visual resources is less than significant.

See Sections 2.1.7 (Visual and Aesthetics) and 2.4 (Cumulative Impacts) for more information.

3.2.1.2 Significant Environmental Effects of the Proposed Project

There are no significant environmental effects related to aesthetics associated with construction or operation of the Build Alternatives.

3.2.1.3 Unavoidable Significant Environmental Effects

There are no unavoidable significant environmental effects related to aesthetics associated with construction or operation of the Build Alternatives.

3.2.1.4 Mitigation Measures

No mitigation is required.

3.2.2 Air Quality

Air quality construction and operational impact analysis is provided in Section 2.2.5 (Air Quality). Specific analysis as related to CEQA is provided below.

CEQA Air Quality Significance Criteria: Construction and Operation Thresholds

According to the CEQA Guidelines, the environmental conditions in the vicinity of a project that exist at the time of the revised NOP of the environmental document would be considered the baseline conditions against which the impacts are evaluated; therefore, the CEQA Baseline is established as the year 2005, when the project's NOP was published. The CEQA impact analysis is based on a comparison between the pollutant emissions level changes from the project and alternatives from 2005 through the horizon year 2030.

Project-related air contaminant emissions would have a significant impact under CEQA if they resulted in emissions that either creates a violation of an NAAQS or CAAQS (see Table 2.2.5-1) or exceeds SCAQMD construction or operation thresholds, as shown in Table 3-1.

3.2.2.1 Less than Significant Effects of the Proposed Project

- The Build Alternatives are consistent with the 2008 RTP and have been included in the 2008 RTIP, which was developed in compliance with state and federal requirements. The proposed project implements all feasible measures from the SCAQMD 2007 AQMP; therefore, impacts on the implementation of the applicable air quality plans would be less than significant.
- Construction and operational emissions associated with the Rehabilitation Alternative would not create a violation of NAAQS or CAAQS or cause an exceedance of daily construction or operational emission thresholds set forth by the SCAQMD; thus, the Rehabilitation Alternative would not violate ambient air quality standards (CAAQS and NAAQS) or exceed SCAQMD daily construction or operational emission thresholds, and impacts would be less than significant.
- The Build Alternatives would not expose sensitive receptors to substantial pollutant concentration, and impacts would be less than significant as discussed below:

The analysis of health risks associated with the proposed project is provided in Section 2.2.5. The HRA determined the incremental increase in health effects values associated with the proposed project by estimating the net change in impacts between the proposed project and CEQA baseline conditions. For the CEQA baseline scenario, activity levels in the baseline year of 2005 were held constant over the entire 70-year analysis period.

Table 3-1
SCAQMD Air Quality Significance Thresholds

Mass Daily Thresholds [a]		
Pollutant	**Maximum Emission (lbs/day)**	
	Construction	**Operation**
NO_X	100	55
VOC	75	55
PM_{10}	150	150
$PM_{2.5}$	55	55
SO_X	150	150
CO	550	550
Pb	3	3

TACs and Odor Thresholds	
TACs (including carcinogens and noncarcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Hazard Index ≥ 1.0 (project increment)
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402
Ambient Air Quality for Criteria Pollutants [b]	
NO_2 1-hour average annual average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.18 ppm (338 $\mu g/m^3$) – state 0.030 ppm (56 $\mu g/m^3$) – state
PM_{10} 24-hour average annual geometric average annual arithmetic mean	10.4 $\mu g/m^3$ (construction)[c] & 2.5 $\mu g/m^3$ (operation) 1.0 $\mu g/m^3$ 20 $\mu g/m^3$
$PM_{2.5}$ 24-hour average	10.4 $\mu g/m^3$ (construction)[c] & 2.5 $\mu g/m^3$ (operation)
Sulfate 24-hour average	25 $\mu g/m^3$
CO 1-hour average 8-hour average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 20 ppm (state) 9.0 ppm (state/federal)

Keys: lbs/day – pounds per day; ppm – parts per million; µg/m3 – microgram per cubic meter; ≥ greater than or equal to

[a] Based on SCAQMD CEQA Handbook (SCAQMD, 1993)

[b] Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.

[c] Ambient air quality threshold based on SCAQMD Rule 403.

Source: SCAQMD, 2007.

Table 2.2.5-21 shows that the CEQA increment for all of the analyzed health risk values are negative, which indicates that the risk from TACs is decreasing over time; therefore, this impact would be less than significant under CEQA.

None of the Build Alternatives would result in a hazard index or cancer burden that would exceed SCAQMD significance thresholds (see Section 2.2.5 and Table 2.2.5-21).

Additionally, none of the Build Alternatives would result in an exceedance of California CO standards at qualifying intersections and would not significantly impact sensitive receptors (see Section 2.2.5 and Tables 2.2.5-14 and 2.2.5-15).

- The Build Alternatives would have a less than significant impact resulting from the creation of objectionable odors within the project area.

See Section 2.2.5 for more information.

3.2.2.2 Significant Environmental Effects of the Proposed Project

None of the significant impacts on air quality could be mitigated to below the level of significance and are considered unavoidable.

3.2.2.3 Unavoidable Significant Environmental Effects

- Regional construction emissions associated with the Bridge Replacement Alternatives would result in a temporary short-term exceedance of the SCAQMD regional daily thresholds for NO_X during construction Years 1, 2, and 3. All feasible mitigation measures, as discussed in Section 2.2.5, have been proposed to reduce construction NO_X emissions, and impacts have been mitigated to the maximum extent practicable and would cease upon completing the construction and demolition activities. Regional construction NO_X emission impacts would remain significant even after implementation of the mitigation measures discussed in Section 2.2.5. Table 3-2 shows that the proposed mitigation measures would reduce regional NO_X emissions by providing a further 5 percent reduction of exhaust emissions from construction equipment when compared to the unmitigated emissions (see Tables 2.2.5-6 and 2.2.5-7). Nonetheless, during construction, the project would still exceed the SCAQMD regional daily significance threshold for NO_X during Construction Years 1, 2, and 3 and are considered significant and unavoidable impacts. See Section 2.2.5 for more information.
- Project construction would not cause an exceedance of SCAQMD local daily emissions of VOC, PM_{10}, or $PM_{2.5}$; however, Bridge Replacement Alternative construction emissions would result in a temporary short-term exceedance of the SCAQMD local daily threshold for NO_X during construction years 2 and 3. All feasible mitigation measures, as discussed in Section 2.2.5, have been proposed to reduce construction NO_X emissions, and impacts have been mitigated to the maximum extent practicable and would cease upon completing the construction and demolition activities. Local construction NO_X emission impacts would remain significant even after implementation of the mitigation measures discussed in Section 2.2.5. Table 3-2 shows that the proposed mitigation measures would reduce local NO_X emissions by providing a further 5 percent reduction of exhaust emissions from construction equipment when compared to the unmitigated emissions (see Tables 2.2.5-6 and 2.2.5-7). Nonetheless, project construction emissions would still exceed the SCAQMD local daily significance threshold for NO_X during construction Years 2 and 3 and are considered significant and unavoidable impacts. See Section 2.2.5 for more information.
- Operational emissions for the Bridge Replacement Alternatives would exceed SCAQMD daily operational emission threshold for NO_X in the opening year 2015. As discussed in Section 2.2.5, there are no feasible mitigation measures to reduce operational emissions within the project area. Operational emissions are summarized in Table 2.2.5-9. As shown, operational emissions associated with the Bridge Replacement Alternatives would be substantially reduced from the 2005 CEQA baseline levels in both 2015 and 2030. The emissions reduction is due to future year modeling results that reflect a newer vehicle fleet composition more in compliance with adopted regulations in the AQMP that are aimed at controlling emissions from mobile sources. Table 2.2.5-9 also shows that the net increases of project operational emissions relative to the No Action Baseline emissions would be relatively small, with the exception of NO_X. The net change in NO_X emissions between the proposed project and no action baseline during 2015 is estimated to be approximately 154 pounds per day, which would exceed the SCAQMD threshold. During the horizon year 2030, the net change in daily emissions would be below the SCAQMD

Table 3-2
Estimated Mitigated Peak Daily Construction Emissions [a]
(pounds/day)

Construction Year – Stage	CO	NO_X	VOC	PM_{10}	$PM_{2.5}$
Peak Daily Construction Emissions					
YEAR 1					
Onsite	31	84	7.1	63	16
Offsite [b]	29	20	3.6	1	1
Total	60	**104**	11	64	17
Regional Daily Significance Threshold	*550*	*100*	*75*	*150*	*55*
Exceed Threshold?	No	**Yes**	No	No	No
YEAR 2					
Onsite	289	694	64	89	42
Offsite [b]	36	19	4	1	1
Total	325	**713**	68	90	43
Regional Daily Significance Threshold	*550*	*100*	*75*	*150*	*55*
Exceed Threshold?	No	**Yes**	No	No	No
YEAR 3					
Onsite	178	404	38	76	29
Offsite[b]	32	16	4	1	1
Total	209	**420**	42	77	30
Regional Daily Significance Threshold	*550*	*100*	*75*	*150*	*55*
Exceed Threshold?	No	**Yes**	No	No	No
Peak Daily Onsite Construction Emissions					
Localized Daily Significance Threshold at Nearest Sensitive Receptors [c]	*10,198*	*143*	—	*191*	*120*
Year 1	29	84	—	63	16
Year 2	273	**694**	—	89	42
Year 3	178	**404**	—	76	29

Note: Exceedances from thresholds are shown in bold type.

[a] Compiled using the CEQA Air Quality Handbook and the emissions inventory from OFFROAD model. The equipment mix and use assumption for each phase is provided by the construction engineer; a list of equipment and assumptions is included in the project Air Quality Technical Study Report and Appendix A.

[b] Offsite emissions include motor vehicle emissions associated with construction equipment transport to site, worker commutes, and debris hauling activities.

[c] The nearest sensitive receptors include Cesar Chavez Elementary School and the multi-family residences that are located approximately 0.3-mi (483 m) east of the construction site boundary. It was estimated that the project's maximum daily disturbed area during any construction phase would be 4 to 5 acres (1.5 to 2 ha) (see Appendix A). The localized significance thresholds (LST) in the table are from the lookup tables for a 5-acre (2-ha) site at a 0.3-mi (500-m) distance in the SRA No. 4, South Coastal LA County; Tables C-1, C-2, C-4, and C-5 of the 2005-2007 lookup tables were used for LSTs of NO_X, CO, PM_{10}, and $PM_{2.5}$, respectively.

Source: Parsons, 2007a.

thresholds for all criteria pollutants, including NO_X. As described in Section 2.2.5, the Port CTP and the State drayage truck plans would result in a substantial reduction of DPM and NO_X emissions within the Port and the transportation facilities that serve Port area. However, these reductions cannot be quantified at this time; therefore, Bridge Replacement Alternative daily operational impacts for NO_X during the opening year (2015) would be considered significant and unavoidable. See Section 2.2.5 for more information.

- As discussed in Chapter 2.4 (Cumulative Impacts) NO_X is a precursor for O_3, and the SCAB is in nonattainment status for O_3. When considered with other related projects, the Bridge Replacement Alternatives exceedance of the SCAQMD NO_X construction and operational thresholds would be a cumulatively considerable significant and unavoidable impact. NO_X impacts have been mitigated to the maximum extent practicable; however, they would be considered cumulatively significant during construction Years 2 and 3 and in the opening year (2015). To partially offset project-related localized cumulative air quality effects, the Port will require the project to contribute $530,000 to the Port's Cumulative Air Quality Impact Reduction Program. The project contribution will be distributed consistent with the Schools and Related Sites Guidelines and Healthcare and Seniors Facility Program Guidelines for the Port of Long Beach Grant Programs. As previously discussed, all unavoidable air quality effects are considered cumulatively significant and unavoidable, even after mitigation. Implementation of CEQA (AQ)-1 below would help offset cumulative air quality effects on those most directly affected by the construction and operation of the proposed project. See Section 2.4 for more information
- As discussed in Section 3.3, the Build Alternatives would result in significant unavoidable project-related increases of GHGs associated with construction and operational emissions. The increase is primarily due to increased traffic during operations within the project area (i.e., more cars/trucks within the project area results in more GHG emissions when compared to the CEQA baseline). Vehicle emissions are regulated at the federal and state levels, and outside of additional regulation or other improvements in fuel or engine technology, there are no feasible mitigation measures to reduce GHG emissions from vehicles. However, as discussed in Section 3.3 (Climate Change), new legislation was recently passed at the federal level that mandates increased fuel economy standards that will reduce future GHGs from all passenger vehicles and light-duty trucks. In addition to the Port's CTP, the Port is developing the Climate Change/Greenhouse Gas Strategic Plan (CC/GHG Plan) to reduce Port-wide GHG. The new federal regulation and CTP would reduce project operational GHG emissions. However, these reductions cannot be quantified at this time; therefore, GHG impacts would be considered significant and unavoidable. See Section 3.3 for more information.
- As discussed in Section 3.3, the Build Alternatives would result in a project-related increase in GHGs. This increase would contribute to a cumulative regional increase in GHG. The Port is addressing GHG through their GHG programs and the CC/GHG Plan at regional, Port, and terminal levels; however, as discussed in Section 3.3, there are no project-specific feasible mitigation measures to address GHG for transportation projects. GHG transportation emission reductions will come from three overarching strategies: more efficient vehicles, lower-carbon fuels, and reduction of vehicle use or VMT. The GHG emission reductions in the transportation sector will be achieved through regulations, market mechanisms, incentives, and land use policy; however, these reductions cannot be quantified at this time. To partially offset the project-related significant and unavoidable cumulative increase in GHG emissions within the project area, the Port will require the project to contribute $647,000 to the Port's Greenhouse Gas Emissions Reduction Program. The project contribution will be distributed consistent with the Port's Greenhouse Gas Reduction Program Guidelines. Implementation of CEQA (GHG)-1 below would help offset the project-related increase in GHG; however, cumulative GHG impacts would be significant and unavoidable. See Section 3.3 for more information.

3.2.2.4 Mitigation Measures

In addition to the mitigation measures discussed in Section 2.2.5, the Port will also implement and fund mitigation measures CEQA (AQ)-1 and CEQA (GHG-1) below:

CEQA (AQ)-1: Cumulative Air Quality Impact Reduction Program. To help reduce air quality impacts associated with the Gerald Desmond Bridge Replacement Project, the Port will require the project to provide funding in support of the Schools and Related Sites Guidelines for the Port of Long Beach Grant Programs and Healthcare and Seniors Facility Program Guidelines for the Port of Long Beach Grant Programs.

The Gerald Desmond Bridge Replacement Project would contribute to local and regional air quality impacts, as discussed in previous sections of this document, in the following ways: First, it would produce emissions of criteria pollutants during the 5-year project construction period, including demolition of the existing bridge. Such emissions have been estimated to exceed the SCAQMD threshold of significance for only one pollutant – NO_X. That exceedance has been estimated to occur on a peak daily basis during years 2 and 3 of the construction period.

Second, operation of the Gerald Desmond Bridge Replacement Project would result in daily operational emissions that would be expected to be below the SCAQMD significance threshold for all but one criteria pollutant – NO_X. Based on the analysis presented in Section 2.2 of this document, operation of the Gerald Desmond Bridge Replacement Project would yield an estimated daily exceedance of the SCAQMD significance threshold for NO_X in the opening year (2015), but it would not show an exceedance of that threshold by the year 2030. Assuming that a straight line decline in emissions would occur over the intervening time, the SCAQMD significance threshold would be reached approximately 13 years after opening of the new bridge, or by 2028. When compared with CEQA Baseline (year 2005) conditions, years 2015 and 2030 show estimated substantial declines in NO_X emissions, under both the No Project and Project scenarios. It is only when compared with NEPA Baseline (i.e., against No Project) conditions that the Gerald Desmond Bridge Replacement Project shows an estimated increase. It should further be noted that the new Gerald Desmond Bridge will be carrying a combination of Port-related and regional traffic, just as it does at the present time. As is noted in this document, the bridge is expected to result in a redistribution of some trips passing through the traffic study area, and because of this, some contribution to indirect growth, albeit unmeasurable, has been acknowledged. Given the fact that not all trips using the new bridge would be Port-related, it is a conservative assumption to associate all of the increased NO_X emissions with the proposed project.

Third, the Gerald Desmond Bridge Replacement Project would have a very small contribution to MSAT production. Again, when comparing against the CEQA Baseline, both the 2015 and 2030 No Project and Project conditions show substantial estimated reductions. When compared with the NEPA Baseline, the Gerald Desmond Bridge Replacement Project would result in additional daily contributions of total MSATs on the order of 1.4 pounds per day and 0.9 pounds per day, in 2015 and 2030, respectively.

Fourth, the Gerald Desmond Bridge Replacement Project has been estimated to show potential increases in cancer risk, chronic hazard indices, and acute hazard indices for residential, occupational, and sensitive receptor exposure; however, these estimated increases are small, and none rise to the established thresholds of significance. All estimates show decreases when compared with the CEQA Baseline; only NEPA Baseline comparisons show increases.

The calculation of the contributions to be made to the Schools and Related Sites Guidelines for the Port of Long Beach Grant Programs and Healthcare and Seniors Facility Program Guidelines for the Port of Long Beach Grant Programs will take into consideration the alternative selected for implementation. Recognizing the small contributions to operational emissions that would be associated with the Gerald Desmond Bridge Replacement Project, the calculation will be primarily based upon a consideration of the contribution to daily cumulative emissions occurring during the construction period. The calculation methodology used to determine the financial contribution will be consistent with the approach used for the Middle Harbor Redevelopment EIS/EIR. Specifically, the peak daily cumulative construction emissions that would exceed SCAQMD significance thresholds in the Gerald Desmond Bridge Replacement Project will be compared to the peak daily cumulative construction emissions that exceeded SCAQMD significance thresholds in the Middle Harbor project to establish a ratio of the respective impacts between the two projects. Moreover, the calculation would also recognize that only one of the three impacts acknowledged in the Middle Harbor document (i.e., construction, health risk, and noise) is acknowledged for the Gerald Desmond project (i.e., construction). That ratio will then be applied to the total mitigation cost established for the Middle Harbor Schools and Related Sites, and Healthcare and Senior Facility Programs to determine the Gerald Desmond Bridge mitigation cost to those same programs.

The distribution of the funds being contributed to the Schools and Related Sites and Healthcare and Seniors Facility Programs, to potential applicants and projects, will be determined through a public evaluation process and approved by the Board of Harbor Commissioners.

The timing of the payments pursuant to this mitigation measure shall be made by the latter of the following two dates: (1) the date that the Port issues a Notice to Proceed or otherwise authorizes commencement of construction on the project; or (2) the date that the Gerald Desmond Bridge Replacement Project Final EIR/EA is conclusively determined to be valid, either by operation of PRC Section 21167.2 or by final judgment or final adjudication.

CEQA (GHG)-1: Greenhouse Gas Emission Reduction Program Guidelines (GHG Program). To partially address the cumulative GHG impacts of the Gerald Desmond Bridge Replacement Project, the Port will require the project to provide funding for the GHG Program. The Gerald Desmond Bridge Replacement Project is estimated to result in 47,169 metric tons per year of CO_{2e} in 2015 and 55,999 tons per year of CO_{2e} in 2030. When compared with the CEQA Baseline (year 2005) condition, these estimates show increases of 14,291 metric tons per year (2015) and 23,121 metric tons per year, respectively. When compared with the NEPA Baseline (i.e., No Project) condition, the estimated increases are smaller; namely 5,618 metric tons per year (2015) and 6,383 metric tons per year (2030), respectively. These increases are considered cumulatively considerable, although specific thresholds to establish significance have not been adopted for transportation projects. It should be noted that, similar to the discussion under Mitigation Measure AQ-1, the new bridge will carry both Port-related and regional trips, as are being carried on the existing bridge. Because the above figures include Port-related and regional trips, they represent conservative estimates of potential impacts.

The calculation of the contribution to be made to the GHG Emission Reduction Program will be done at completion of the public comment period on the environmental document, taking into consideration the alternative selected for implementation. The calculation will be based upon a consideration of the contribution to daily cumulative emissions occurring in comparison with the CEQA Baseline condition and is consistent with the approach used for the Middle Harbor Redevelopment EIS/EIR. Specifically, a cost of emission reductions value of $15 per ton of CO_{2e} produced will be applied to GHG emissions associated with the Gerald Desmond Bridge Replacement Project. Using the difference between year 2030 Project versus CEQA Baseline quantity calculations will yield the GHG mitigation fee contribution associated with the Gerald Desmond Bridge Replacement Project.

This contribution will be used to pay for measures pursuant to the GHG Emission Reduction Program Guidelines, which include, but are not limited to, generation of green power from renewable energy sources, ship electrification, goods movement efficiency measures, cool roofs to reduce building cooling loads and the urban heat island effect, building upgrades for operational efficiency, tree planting for biological sequestration of CO_2, energy-saving lighting, and purchase of renewable energy certificates (RECs).

The timing of the payments pursuant to this mitigation measure shall be made by the latter of the following two dates: (1) the date that the Port issues a Notice to Proceed or otherwise authorizes commencement of construction on the project; or (2) the date that the Gerald Desmond Bridge Replacement Final EIR/EA is conclusively determined to be valid, either by operation of PRC Section 21167.2 or by final judgment or final adjudication. At the project level, there are common measures that have the potential to reduce GHG emissions. These measures include using reclaimed water, landscaping, energy-efficient lighting, and idling restrictions.

3.2.3 Biological Resources

3.2.3.1 Less than Significant Effects of the Proposed Project

- There are no riparian habitats or sensitive natural communities within the project footprint; therefore, the Build Alternatives would have no impact on riparian habitats or sensitive natural communities.
- There are no federally protected or other wetlands within the project area; therefore, the Build Alternatives would have no impact on wetland resources.
- The Build Alternatives would have no impact on local plans or policies protecting biological resources or on approved Habitat Conservation Plans, Natural Community Conservation Plans, or other approved conservation plans as there are none within the project impact area.

- As discussed in Section 2.4, no cumulatively considerable significant impacts on biological resources are anticipated.

See Sections 2.3 (Biological Resources) and 2.4 (Cumulative Impacts) for more information.

3.2.3.2 Significant Environmental Effects of the Proposed Project

- Construction and operational lighting could affect migratory bird species. Impacts on migratory bird species would be less than significant with incorporated mitigation measures in Section 2.3.5The peregrine falcon and several species of bats frequently nest/roost on or around the Gerald Desmond Bridge. Build Alternative construction impacts on falcons and bats would be less than significant with incorporated mitigation measures in Section 2.3.5.
- The potential for the spread or introduction of invasive species would be less than significant with incorporated mitigation measures in Section 2.3.6.

See Sections 2.3.5 and 2.3.6 for more information.

3.2.3.3 Unavoidable Significant Environmental Effects

There are no unavoidable significant environmental effects related to biological resources associated with the Build Alternatives. All impacts are less than significant with implementation of the mitigation measures discussed in Section 2.3.5.

3.2.3.4 Mitigation Measures

Mitigation measures for the Build Alternatives under CEQA would be the same as those discussed in Section 2.3.5.

3.2.4 Cultural Resources

3.2.4.1 Less than Significant Effects of the Proposed Project

- The Build Alternatives do not have the potential to directly or indirectly impact a known unique paleontological resource or site or unique geologic feature. Impacts are considered less than significant.
- The proposed project area does not lie within an area where human remains are known to occur. Potential impacts from the disturbance of unanticipated human remains during construction of the Build Alternatives are considered less than significant.
- No archaeological resources within the project area were identified in record searches or during surveys completed for the project. Impacts from the disturbance of unanticipated archaeological resources during construction of the Build Alternatives are considered less than significant.
- The LBGS and the SCE transmission towers were the only historic resources identified within the APE for the project. The Build Alternatives would not result in a substantial adverse change in the significance of a historical resource. Impacts on historic resources are considered less than significant.
- As discussed in Section 2.4, no cumulatively considerable significant impacts on cultural resources are anticipated.

See Section 2.1.8 (Cultural Resources) for more information.

3.2.4.2 Significant Environmental Effects of the Proposed Project

There are no significant environmental effects related to cultural resources associated with construction or operation of the Build Alternatives.

3.2.4.3 Unavoidable Significant Environmental Effects

There are no unavoidable significant environmental effects related to cultural resources associated with construction or operation of the Build Alternatives.

3.2.4.4 Mitigation Measures

No mitigation is required.

3.2.5 Geology and Soils

3.2.5.1 Less than Significant Effects of the Proposed Project

- Construction or operation of the Build Alternatives would not expose people or structures to substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, or landslides. This impact is considered less than significant.
- The project site could experience strong seismic ground shaking that could result in seismic-related ground failure, including liquefaction. However, the project area has been well studied, and engineering and design measures would account for onsite soil

conditions and the Build Alternatives would withstand an MCE without collapse. Project engineering and design measures would minimize the potential for substantial adverse effects on people or structures, and impacts would be less than significant.

- Soil erosion and loss because of project grading and other construction activities are expected to be minimal. This impact is considered less than significant (see Section 2.2.1 [Water Resources and Hydrology]).
- None of the structures included in the Build Alternatives would increase the current risk of loss, injury, or death because of landslides, ground shaking, and other seismically induced effects. This impact is considered less than significant.
- The proposed project is located in an existing transportation corridor and is not located on an unstable geologic unit; however, due to the makeup of the project site (imported fill), soil would be considered unstable during seismic events but would not become unstable as a result of the project. Engineering and design measures would be incorporated into the Build Alternatives to ensure structure stability during seismic events; therefore, the project would result in a less than significant impact as a result of unstable or expansive soils.
- As discussed in Section 2.4, no cumulatively considerable significant impacts on geology and soils are anticipated.

See Sections 2.2.2 (Geologic Resources) and 2.4 (Cumulative Impacts) for more information.

3.2.5.2 Significant Environmental Effects of the Proposed Project

There are no significant environmental effects related to geology and soils associated with construction or operation of the Build Alternatives.

3.2.5.3 Unavoidable Significant Environmental Effects

There are no unavoidable significant environmental effects related to geology and soils associated with construction or operation of the Build Alternatives

3.2.5.4 Mitigation Measures

No mitigation is required.

3.2.6 Hazards and Hazardous Materials

3.2.6.1 Less than Significant Effects of the Proposed Project

- Construction and operation of the Build Alternatives would have less than significant impacts relating to hazards to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment or through routine transport, use, or disposal of hazardous materials.
- As discussed in Section 2.4, no cumulatively considerable significant impacts on geology and soils are anticipated.

See Sections 2.2.4 (Public Health and Safety), 2.2.3 (Hazardous Materials/Waste), and 2.4 (Cumulative Impacts) for more information.

3.2.6.2 Significant Environmental Effects of the Proposed Project

- Soil areas disturbed during construction may contain ADL. Impacts would be less than significant with incorporated mitigation measures.
- ACMs and LBP are present on the Gerald Desmond Bridge and could also be present in building structures that would be demolished. The materials could be released to the environment due to construction disturbance. Impacts related to the potential release of asbestos and LBP would be less than significant with incorporated mitigation measures.
- The Gerald Desmond Bridge is used as an emergency access route; consequently, emergency response plans and emergency evacuation plans are likely to be impacted by project construction. This impact is considered less than significant with incorporated mitigation. Close coordination with Port and Long Beach officials and emergency service providers would occur prior to and regularly during construction.
- Disturbance of areas containing unknown contaminated soil and/or groundwater associated with Port oil development, military use, USTs, or sites or areas on or adjacent to sites listed pursuant to Government Code Section 65962.5 could result in potential hazards to the public, construction workers, or the environment. Impacts would be less than significant with incorporated mitigation measures.

See Section 2.2.3 (Hazardous Materials/Waste) for more information.

3.2.6.3 Unavoidable Significant Environmental Effects

There are no unavoidable significant environmental effects associated with construction or operation of the Build Alternatives related to hazards and hazardous materials assuming implementation of the mitigation measures discussed in Sections 2.1.5, 2.2.3, and 2.2.4.

3.2.6.4 Mitigation Measures

Mitigation of impacts related to hazards and hazardous materials and wastes under CEQA would be the same as those discussed in Sections 2.1.5, 2.2.3 and 2.2.4.

3.2.7 Hydrology and Water Quality

3.2.7.1 Less than Significant Effects of the Proposed Project

- The proposed project would not substantially degrade water quality, or violate any water quality standards or waste discharge requirements, or otherwise degrade water quality. Impacts to water quality are considered less than significant.

The Build Alternatives would incorporate all standard BMPs that the Port and Caltrans adhere to, including SWPPP and NPDES requirements. Additionally, these alternatives would include treatment of all associated storm water runoff prior to discharge into the bay, potentially resulting in improved water quality during operations, and impacts would be less than significant.

- Project impacts due to the placement of structures within a 100-year flood hazard area would be less than significant.

Only the North-side Alignment Alternative would result in structures within the 100-year flood hazard area. This would not be considered a significant encroachment and would not impact flood flow.

- Impacts from construction and operation of the Build Alternatives on existing drainage patterns would be less than significant.

The Build Alternatives would utilize existing drainage patterns to transport runoff to treatment BMPs. All runoff would be captured and treated prior to discharge and would not result in substantial erosion, siltation or flooding on- or offsite.

- The Build Alternatives would have no impact on groundwater supplies or recharge.
- Project impacts on water drainage systems and or the potential to create new sources of polluted runoff would be less than significant.

The Bridge Replacement Alternatives would result in increased storm water runoff containing typical highway pollutants; however, all of the Build Alternatives would capture and treat runoff prior to discharging to existing storm water facilities at current discharge rates. No new drainage capacity would be required. Storm water would be treated prior to discharge, and no additional sources of polluted runoff are anticipated.

- Construction and operation of the Build Alternatives would not change the risk of loss, injury, or death resulting from flood, and impacts would be less than significant.
- The Build Alternatives would not increase risk to people or structures as a result of inundation by seiche, tsunami, or mudflow. Impacts would be less than significant.
- As discussed in Section 2.4, no cumulatively considerable significant impacts on hydrology and water quality are anticipated.

See Sections 2.2.1 (Water Resources and Hydrology), 2.2.2 (Geologic Resources [tsunami and seiche]), and 2.4 (Cumulative Impacts) for more information.

3.2.7.2 Significant Environmental Effects of the Proposed Project

There are no significant effects related to hydrology and water quality associated with construction and operation of the Build Alternatives.

3.2.7.3 Unavoidable Significant Environmental Effects

There are no unavoidable significant environmental effects related to water quality and hydrology associated with construction and operation of the Build Alternatives.

3.2.7.4 Mitigation Measures

No mitigation is required.

3.2.8 Land Use and Planning

3.2.8.1 Less than Significant Effects of the Proposed Project

- The proposed project is located within the Harbor District and would have no impact related to the physical division of an established community or the implementation of any applicable habitat conservation or natural community conservation plan.

- The proposed project would be constructed within or adjacent to an existing transportation corridor and would have a less than significant effect on applicable land use plans, policies, and regulations of agencies with jurisdiction over the project.

Construction and operation of the Build Alternatives would not divide any established communities or conflict with any land use plans or policies; however, the North-side Alignment Alternative would require conversion of 0.7 acres (0.3-ha) of privately held Port-related industrial to public transportation. Also, the South-side Alignment Alternative would reduce areas on Pier T for container terminal use and Port lease land by 2.4 acres (1-ha). This reduction in land and associated terminal reconfiguration on Piers T, D, and E would not be considered a significant land use conflict and is consistent with the PMP.

- As discussed in Section 2.4, no cumulatively considerable significant impacts on land use and planning are anticipated.

See Sections 2.1.1 (Land Use, Recreation, and Coastal Zone) and 2.4 (Cumulative Impacts) for more information.

3.2.8.2 Significant Environmental Effects of the Proposed Project

There are no significant environmental effects related to land use associated with construction or operation of the Build Alternatives.

3.2.8.3 Unavoidable Significant Environmental Effects

There are no unavoidable significant environmental effects related to land use associated with construction or operation of the Build Alternatives.

3.2.8.4 Mitigation Measures

No mitigation is required.

3.2.9 Mineral Resources

3.2.9.1 Less than Significant Effects of the Proposed Project

- The proposed project is located in the Wilmington Oil Field. The Build Alternatives would impact existing and abandoned oil wells within the project area; however, construction and operation of these alternatives would not result in the loss of mineral or oil deposits or the recovery area (Wilmington Oil Field). Relocation/reconfiguration of existing extraction sites and re-abandonment of former well sites would be completed in accordance with the guidelines set forth by the DOGGR, as required. Impacts to mineral resources associated with the Build Alternatives would be considered less than significant.
- The proposed project would not result in the loss of any mineral resources or recovery area. There is no potential for cumulatively considerable significant impacts on mineral resources.

See Section 2.1.4 (Utilities and Service Systems) for more information.

3.2.9.2 Significant Environmental Effects of the Proposed Project

There are no significant environmental effects related to mineral resources associated with construction and operation of the Build Alternatives.

3.2.9.3 Unavoidable Significant Environmental Effects

There are no unavoidable significant environmental effects related to mineral resources associated with construction or operation of the proposed Build Alternatives.

3.2.9.4 Mitigation Measures

Mitigation is not required.

3.2.10 Noise

Noise impact analysis for CEQA is independent from NEPA analysis as defined in 23 CFR 772 and as discussed in Chapter 2. CEQA looks at the existing noise setting and how large or perceptible a noise increase would be within the context of the noise setting. NEPA looks at noise impacts in relation to the NAC.

3.2.10.1 Less than Significant Effects of the Proposed Project

- Build Alternative construction activities would not increase ambient noise levels at the location of sensitive receptors by more than 3 dBA, and construction noise impacts would be considered less than significant.

Measured ambient noise levels were 62 dBA at both of the nearest sensitive noise receptors located approximately 1,300 ft (396 m) (Cesar Chavez Park) and 1,500 ft (457 m) (Cesar Chavez Elementary School) from the construction areas for the Bridge Replacement Alternatives. Maximum construction noise levels associated with the Build Alternatives would occur during pile driving and bridge demolition activities associated with the Bridge Replacement Alternatives. Anticipated pile driving noise levels at 1,300 and 1,500 ft (396 and 457 m) would be 61 and 60 dBA, respectively. Anticipated maximum bridge demolition noise levels at 1,300 and 1,500 ft (396 and 457 m) would be 60 and 59 dBA, respectively. Maximum anticipated construction noise levels at the nearest sensitive receptors would both be less than the measured ambient noise levels.

Additionally, the Rehabilitation Alternative would require replacement of the bridge deck at night between the hours of 7:00 p.m. and 7:00 a.m., which would require a variance/permit from the noise control officer. Anticipated maximum noise levels would be 57 and 56 dBA at 1,300 and 1,500 ft (396 and 457 m) from bridge deck replacement activities. Bridge deck replacement activities would stop at the end of the bridge, approximately 0.4-mi (0.6-km) west of the Los Angeles River. The nearest potential noise sensitive receptor (i.e., Cesar Chavez Elementary School) is located 0.7-mi (1.1 km) from the nearest bridge deck replacement activities. All other retrofit activities would occur during normal construction hours and would have noise levels below the maximum noise levels associated with the Build Alternatives, as previously discussed.

- Build Alternative construction activities would not exceed City of Long Beach Municipal Code maximum noise levels, and construction noise impacts would be less than significant.

The nearest sensitive receptors, Cesar Chavez Park and Cesar Chavez Elementary School, are located in Land Use District 1. As discussed in Section 2.2.6, the maximum noise level allowed at these locations under the Long Beach Municipal Code is 65 dBA. The maximum anticipated project construction noise level would be 61 dBA at Cesar Chavez Park and 60 dBA at Cesar Chavez Elementary school.

- Build Alternative operational noise levels would not increase ambient noise levels by 3 dBA at the location of sensitive receptors and operational noise levels would be less than significant.

Operational noise levels associated with the Build Alternatives are directly related to forecasted traffic volumes. Forecasted traffic volumes will increase with or without the project from 2005 baseline levels; therefore, ambient operational noise will also increase with or without the project.

Traffic noise from SR 710 would be the dominant project-related noise source with the potential to increase ambient noise levels at the nearest sensitive receptor locations. As discussed in Section 2.2.6, the worst-case noise condition was modeled along SR 710. The worst-case scenario resulted in a predicted 2030 operational ambient noise level of 64 dBA at the nearest sensitive noise receptor across the river. As previously discussed, the measured ambient condition near the sensitive receptor locations was 62 dBA. Project-related increase in ambient noise at sensitive receptors would be 2 dBA in 2030. This represents a maximum worst-case increase because predicted noise levels are based on the worst-case noise conditions. A difference of 3 dBA or less is generally considered imperceptible to human hearing.

As discussed in Section 2.2.6, increases in operational ambient noise levels adjacent to Ocean Boulevard would also occur with or without the project. The portions of Ocean Boulevard within the project area are located within the Harbor District. The expected project-related maximum increase in ambient noise levels associated with the Build Alternatives, compared to the overall future ambient noise levels without the project, would be no more than 1 dBA. As previously discussed, a difference of 3 dBA or less is generally considered imperceptible to human hearing.

- Build Alternative operational noise levels would not exceed City of Long Beach Municipal Code maximum noise levels, and operational noise impacts would be less than significant.

The nearest sensitive receptors, Cesar Chavez Park and Elementary School and Edison Elementary School, are located in Land Use District 1. As discussed in Section 2.2.6, the maximum noise level allowed at these locations under the Long Beach Municipal Code is 65 dBA. The maximum anticipated project operational noise level, based on the 2030 worst-case noise conditions on SR 710, would be 64 dBA at the nearest sensitive receptor across the river.

- As discussed in Section 2.4, no cumulatively considerable significant impacts on sensitive receptors associated with construction or operation of the Build Alternatives are anticipated.

See Sections 2.2.6 (Noise) and 2.4 (Cumulative Impacts) for more information.

3.2.10.2 Significant Environmental Effects of the Proposed Project

There are no significant effects related to noise associated with construction or operation of the build alternatives.

3.2.10.3 Unavoidable Significant Environmental Effects

There are no unavoidable significant environmental effects related to noise associated with construction or operation of the Build Alternatives.

3.2.10.4 Mitigation Measures

No mitigation is required.

3.2.11 Population and Housing

3.2.11.1 Less than Significant Effects of the Proposed Project

- The proposed project is a transportation project. The temporary construction work force for this project would come from the existing labor pool in the southern California area, and construction of the project would not require any relocation or new housing for construction workers. The proposed project does not include construction of residential housing, commercial, office, industrial, institutional, or any other use other than transportation. No permanent employment or associated population growth would occur due to the construction or operation of the project. No housing would be displaced, and construction of replacement housing would not be required. The proposed project would have less than significant impacts on population and housing.
- The proposed project would rehabilitate or replace the Gerald Desmond Bridge. The Build Alternatives would not result in additional traffic-generating land use or direct traffic growth, and impacts would be less than significant.

The Build Alternatives would provide access to and from the same areas that the existing Gerald Desmond Bridge serves today. The Bridge Replacement Alternatives would not result in new accessibility to and from areas that are currently inaccessible and would not cause associated indirect growth via creation of new access. The Bridge Replacement Alternatives would not be a direct cause of new vehicle trips generated; rather the congestion-relief benefits of the Bridge Replacement Alternatives would have the potential to attract traffic from other more-congested roadways in the project area. This potential future increase in traffic volume on the new bridge would be a redistribution of vehicle trips and would not actually cause a net increase in local or regional vehicle trips; therefore, the Bridge Replacement Alternatives would redistribute existing vehicle trips and would not result in new vehicle trips. Impacts on traffic growth would be considered less than significant.

- The Bridge Replacement Alternatives would require the relocation of several businesses within the project footprint. The business operations are associated with Port operations, and it is anticipated that the impacted business could be relocated to other areas within or adjacent to the Port. The proposed project would not require large numbers of people to relocate; therefore, it would not require replacement housing elsewhere, and impacts are considered less than significant.
- As discussed in Section 2.4, no cumulatively considerable significant impacts on population or housing are anticipated.

See Sections 2.1.2 (Growth), 2.1.3 (Community Impacts), and 2.4 (Cumulative Impacts) for more information.

3.2.11.2 Significant Environmental Effects of the Proposed Project

There are no significant environmental effects related to population and housing associated with construction or operation of the Build Alternatives.

3.2.11.3 Unavoidable Significant Environmental Effects

There are no unavoidable significant environmental effects related to population and housing associated with construction or operation of the Build Alternatives.

3.2.11.4 Mitigation Measures

No mitigation is required.

3.2.12 Public Services & Safety

3.2.12.1 Less than Significant Effects of the Proposed Project

- Construction of the Bridge Replacement Alternatives would require temporary relocation of Fire Boat Station #20 operations to temporary facilities due to its location within the construction and demolition area. Temporary facilities would be located in an improved area approximately 100 ft (30.6 m) outside of the construction and demolition areas. The temporary facilities would be available for use prior to relocation. Subsequent to completion of the construction and demolition activities, Fire Boat Station #20 operations would be relocated back to its existing location. No loss of service or increase in response times is anticipated, and impacts are considered less than significant.

- As discussed in Section 2.4, no cumulatively considerable significant impacts on public services and safety are anticipated.

See Sections 2.1.3.2 (Relocations) and 2.4 (Cumulative Impacts) for more information.

3.2.12.2 Significant Environmental Effects of the Proposed Project

- The Bridge Replacement Alternatives would result in new bridge structures and associated modified access that have yet to be evaluated by the Port for vulnerability to terrorist attacks. Impacts on public services and safety would be less than significant with incorporated mitigation measures.
- Construction activities could result in temporary road and navigation hazards that may result in safety hazards to businesses, tenants, transportation companies, construction workers, and the public. Impacts on public services and safety would be less than significant with incorporated mitigation measures.

See Section 2.2.4 (Public Health and Safety) for more information.

3.2.12.3 Unavoidable Significant Environmental Effects

There are no unavoidable significant environmental effects associated with construction or operation of the Build Alternatives on public services, assuming implementation of the mitigation measures discussed in Section 2.2.4.

3.2.12.4 Mitigation Measures

Mitigation measures under CEQA would be the same as those discussed in Section 2.2.4.

3.2.13 Recreation

3.2.13.1 Less than Significant Effects of the Proposed Project

- Construction and operation of the Build Alternatives would not affect recreation opportunities, facilities, or services, or access to recreational facilities or services. The Build Alternatives would have no impact on recreation.
- As discussed in Section 2.4, no cumulatively considerable significant impacts on recreation are anticipated.

See Sections 2.1.1 (Land Use, Recreation, and Coastal Zone), 2.1.3 (Community Impacts), and 2.4 (Cumulative Impacts) for more information.

3.2.13.2 Significant Environmental Effects of the Proposed Project

There are no significant environmental effects related to recreation associated with construction or operation of the Build Alternatives.

3.2.13.3 Unavoidable Significant Environmental Effects

There are no unavoidable significant environmental effects related to recreation associated with construction and operation of the Build Alternatives.

3.2.13.4 Mitigation Measures

No mitigation is required.

3.2.14 Transportation/Traffic

3.2.14.1 Less than Significant Effects of the Proposed Project

- The Rehabilitation Alternative would have less than significant impacts on traffic congestion during construction. This is because the existing Gerald Desmond Bridge would remain in place, the bridge deck rehabilitation would occur only during nighttime hours when traffic volumes are light, no traffic detour routes would be required, and all lanes of the bridge would be restored to full operation during daytime peak traffic hours. Construction impacts of the Bridge Rehabilitation Alternative would be less than significant.
- The Rehabilitation Alternative would have less than significant operational impacts because this alternative does not change traffic operations. This alternative results in the same operational conditions as the No Project Alternative. It should be noted that this alternative improves seismic performance only and does not address the other project objectives as discussed in Chapter 1, which include additional roadway capacity to handle current and forecasted traffic volumes and increased vertical clearance for safe navigation through the Back Channel into the Inner Harbor.

- As discussed in Section 2.4, no cumulatively considerable significant impacts on traffic and circulation due to construction or operation of the Bridge Rehabilitation Alternative are anticipated.
- The Bridge Replacement Alternatives would have a beneficial impact on harbor operations, commerce, and harbor congestion as a result of improved safety for ships passing under the new bridge and additional traffic capacity on the bridge (see below). The increased vertical clearance would have a beneficial impact to harbor safety and congestion, as it would allow ships to pass under the new bridge quicker due to improved safety conditions. Impacts on harbor congestion or the ability for maritime commerce to operate efficiently would be less than significant.

  The Rehabilitation Alternative would maintain existing limited vertical clearance of the Gerald Desmond Bridge. The limited vertical clearance provided by the existing bridge has the potential to cause increased harbor congestion due to time-consuming navigation safety procedures that must be followed when larger ships need to pass beneath the existing bridge. Due to the fact that this safety hazard is an existing condition in place with the current Gerald Desmond Bridge, the impact to harbor operations and congestion within the harbor attributable to the Rehabilitation Alternative is considered less than significant.
- The proposed Bridge Replacement Alternatives would increase the traffic-carrying capacity of the bridge, which would improve traffic flow, handle future projected increases in traffic volume (that would otherwise occur regardless of the project), and lead to an overall reduction in area traffic congestion. Although the Bridge Replacement Alternatives do not add any trips to the transportation system, the new bridge would cause a redistribution of area traffic due to congestion reduction on a new Replacement Bridge Alternative compared to the existing bridge. Overall, compared to the No Project/ Rehabilitation Alternatives, the proposed Bridge Replacement Alternatives would result in a benefit to traffic on the bridge.

See Section 2.1.5 (Traffic and Circulation) for more information.

3.2.14.2 Significant Environmental Effects of the Proposed Project

- A temporary significant traffic impact attributable to the Bridge Replacement Alternatives would occur at the Pico Avenue and Pier B Street/9th Street intersection during construction Stage 2. Mitigation Measure TC-1 includes the following improvements to the intersection prior to the start of construction Stage 2: add dual NB right-turn lanes; restripe the EB through/right lane to a right-turn lane; provide one EB through lane; and continue to provide two SR 710 SB off-ramp lanes to Pico Avenue. This impact would be less than significant after mitigation.
- A temporary significant traffic impact attributable to the Bridge Replacement Alternatives would occur at the Pico Avenue and Pier D Street intersection during construction Stages 2, 3, and 4. Mitigation Measure TC-3 includes the following improvements to the intersection prior to the start of construction Stage 2: install a traffic signal at the intersection of Pico Avenue and Pier D Street. The traffic signal will be permanent and will not be removed after completion of construction of a Bridge Replacement Alternative. After mitigation, impacts at this intersection would be less than significant during construction Stage 2, but they would be significant during construction Stages 3 and 4, as discussed in Section 3.2.14.3 below.
- A temporary significant traffic impact attributable to the Bridge Replacement Alternatives would occur at the Pico Avenue and Pier E Street intersection during construction Stages 3 and 4. Mitigation Measure TC-4 includes the following improvements to the intersection prior to the start of construction Stages 3 and 4: install a traffic signal at the intersection of Pico Avenue and Pier E Street (the signal will be permanent and will not be removed after completion of construction); restripe the NB through lane to a NB right-turn lane, providing a single NB through lane; add dual free-flow WB right-turn lanes; and continue to provide two EB Ocean Boulevard off-ramp lanes to Pico Avenue. This impact would be less than significant after mitigation.
- A project-related significant impact is anticipated at the intersection of Ocean Boulevard/Magnolia Avenue. As discussed in Section 2.1.5, potential striping and signalization improvements have been identified that would mitigate this significant impact. Mitigation Measure TC-6 requires the Port to coordinate with the Long Beach City Traffic Engineer and provide funding for restriping and/or signalization improvements at the intersection of Ocean Boulevard and

Magnolia Avenue as mitigation for the impact of a Bridge Replacement Alternative at the intersection. This impact would be less than significant after mitigation.

See Section 2.1.5 (Traffic and Circulation) for more information.

3.2.14.3 Unavoidable Significant Environmental Effects

Bridge Replacement Alternatives

- A temporary unavoidable significant traffic impact would occur during construction of the proposed Bridge Replacement Alternatives at the intersection of Pico Avenue and Pier B Street/9th Street. The significant impact would occur for 22 months due to conditions during construction Stages 3 and 4 of the proposed Bridge Replacement Alternatives. Proposed Mitigation Measure TC-2 and implementation of the TMP would mitigate this impact to the maximum extent practicable and includes the following improvements to the intersection prior to the start of construction Stages 3 and 4: remove the NB-SB split-signal phasing; restripe the NB through lane to a NB left-turn lane; widen the SB approach and provide two left-turn lanes and one through lane; and continue to provide two on-ramp lanes to NB SR 710. Upon opening the new bridge, the significant traffic impact would no longer exist due to the new alignment and ramps.
- A temporary unavoidable significant traffic impact has been identified that would occur during construction of the proposed Bridge Replacement Alternatives at the intersection of Pico Avenue and Pier D Street. The significant impact would occur for 22 months due to conditions during construction Stages 3 and 4 of the proposed Bridge Replacement Alternatives. There is no feasible mitigation for this impact; however, the TMP would minimize impacts to the maximum extent practicable. Upon opening the new bridge, the significant traffic impact would no longer exist due to the new alignment and ramps.
- A temporary significant traffic impact has been identified that would result from construction of the proposed Bridge Replacement Alternatives at the Ocean Boulevard and Terminal Island Freeway interchange. As discussed in Section 2.1.5, there is no feasible mitigation for this impact, and the two intersections of the Ocean Boulevard ramps (north and south) and the Terminal Island Freeway would have temporary and unavoidable significant impacts for 3 years, which is the approximate combined duration of construction Stages 2, 3, and 4 of either of the proposed Bridge Replacement Alternatives.
- A project-related significant impact is anticipated at the intersection of Navy Way/ Seaside Avenue under the Bridge Replacement Alternatives. This intersection and implementation of mitigation at this location is outside of the Port's jurisdiction; therefore, it must be considered a significant and unavoidable project impact pursuant to CEQA. However, it should be noted, as discussed in Section 2.1.5, proposed Measure TC-5 would mitigate this impact by adding a third NB left-turn lane at this intersection. If TC-5 is implemented through NEPA or Measure TRANS-6 is implemented as identified in the approved POLA China Shipping EIR, or if POLA implements any of the projects at this location as discussed in Section 2.1.5 prior to opening the new bridge, then the significant traffic impact would be eliminated.
- A temporary significant project-related traffic impact attributable to the Bridge Replacement Alternatives would occur on WB Ocean Boulevard between the Horseshoe Ramps and the Terminal Island Freeway interchange. This condition would occur in the opening year (2015) but would no longer occur in the horizon year (2030). As discussed in Section 2.1.5, there are no feasible measures to mitigate this impact, and it is considered a significant and unavoidable project impact; however, it should be noted that construction of the SR 47 Flyover, as approved in 2009 within the Schuyler Heim Bridge Replacement SR 47 Expressway Project FEIS/EIR, would eliminate this significant traffic impact. The estimated completion date for the SR 47 Flyover is 2019.
- All unavoidable traffic impacts are also considered cumulative unavoidable significant impacts on traffic and circulation. With incorporation of mitigation measures as discussed in Section 2.1.5 (Traffic and Circulation), all unavoidable traffic impacts, and thus cumulative traffic impacts, have been mitigated to the maximum extent practicable. As previously discussed, pursuant to CEQA, there is no feasible mitigation for impacts at Navy Way/Seaside Avenue and on Ocean Boulevard between the horseshoe ramps and Terminal Island freeway interchange. Improvements proposed at Navy Way/Seaside Avenue (TC-6) are outside the jurisdiction of the Port. If either Measure TC-6 or POLA's

proposed improvements are completed at this location, then the cumulative impact would be eliminated. Similarly, subsequent to construction of the SR 47 Flyover, as discussed in Section 2.4 (Cumulative Impacts), the cumulative unavoidable significant impact would be eliminated and the new bridge, in combination with the SR 47 Flyover, would result in cumulatively beneficial effects on traffic and circulation that would otherwise not occur if only one of the projects were constructed. However, the anticipated construction completion date for the SR 47 Flyover is 2019 (Caltrans 2009), and the cumulative unavoidable significant traffic impact between the horseshoe ramps and the Terminal Island Freeway interchange would remain until completion of the flyover or would no longer exist in 2030, as discussed in Section 2.1.5.

See Sections 2.1.5 (Traffic and Circulation) and 2.4 (Cumulative Impacts) for more information.

3.2.14.4 Mitigation Measures

Mitigation measures under CEQA would be the same as those discussed in Section 2.1.5.

3.2.15 Utilities and Service Systems

3.2.15.1 Less than Significant Effects of the Proposed Project

- The proposed project is a transportation project and would have no impact on wastewater treatment requirements or require expansion of plants or facilities.
- The proposed project would have less than significant effects on storm water drainage facilities and would not require construction of new facilities (see Section 2.2.1 [Water Resources]).
- The proposed project is a transportation project. The project would result in some water demand during construction; however, it would not result in any future demand. Effects on water supply due to construction and operation are considered less than significant impacts.
- The Build Alternatives would generate large amounts of construction and demolition debris. The project would comply with all federal, state, and local requirements regarding solid waste disposal and recycling. Impacts on local and regional landfill capacity would be less than significant.
- The project requires extensive utility relocation that could temporarily interrupt service during changeover from the existing to relocated facilities. Utility relocation would be conducted in a manner designed to minimize any potential for interruption. Interruption of associated utility service in the project area is unlikely to occur; however, if interruption does occur, the impact would be minor and temporary; therefore, this impact is considered less than significant.
- As discussed in Section 2.4, no cumulatively considerable significant impacts on utilities and service systems are anticipated.

See Sections 2.1.4 (Utilities and Service Systems) and 2.4 (Cumulative Impacts) for more information.

3.2.15.2 Significant Environmental Effects of the Proposed Project

There are no significant environmental effects related to utilities and service systems associated with construction or operation of the Build Alternatives.

3.2.15.3 Unavoidable Significant Environmental Effects

There are no unavoidable significant environmental effects related to utilities and service systems associated with construction and operation of the Build Alternatives.

3.2.15.4 Mitigation Measures

No mitigation is required.

3.3 CLIMATE CHANGE

While climate change has been a concern since at least 1988, as evidenced by the establishment of the United Nations and World Meteorological Organization’s Intergovernmental Panel on Climate Change (IPCC), efforts devoted to GHG emissions reduction and climate change research and policy have increased dramatically in recent years.

Global climate change is expressed as changes in the average weather of the earth, as measured by changes in wind patterns, storms, precipitation, and temperature. Much scientific research has indicated that the human-related emissions of GHGs above natural levels are likely a significant contributor to global climate change.

3.3.1 Impacts of Greenhouse Effect

Changes in the global climate are associated with substantial potential physical, economic, and social effects, such as inundation of settled areas near the coast from rises in sea level associated with melting of land-based glacial ice sheets, exposure to more frequent and powerful climate events, and changes in suitability of certain areas for agriculture, among others. The IPCC constructed several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts. It concluded that stabilization of GHGs at 400 to 450 ppm carbon dioxide (CO_2)-equivalent concentration is required to keep global mean warming below 2 °C, which is assumed to be necessary to avoid dangerous climate change (IPCC, 2001).

GHGs are gases that trap heat in the atmosphere; GHGs are emitted by natural processes and human activities. Emissions from human activities, such as electricity production and internal combustion vehicle use, have elevated the concentration of these gases in the atmosphere.

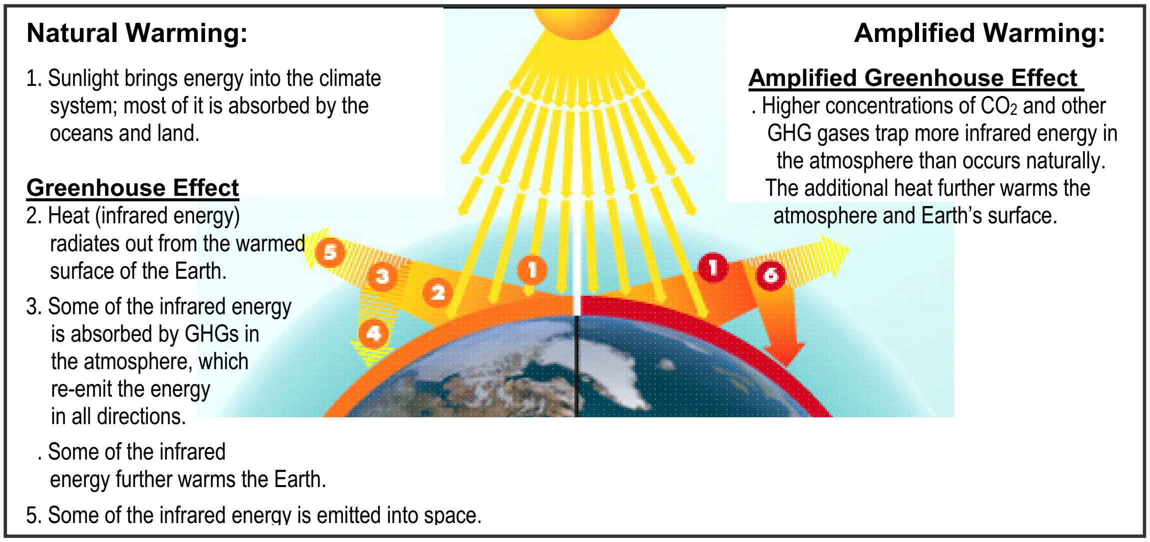
Worldwide, 11 of the 12 years between 1995 and 2006 ranked among the 12 warmest years in the record of global surface temperature since 1850 (IPCC, 2007). According to a recent CEC document, the American West is heating up faster than other regions of the U.S. (CEC, 2009). It is estimated that approximately 40 percent of GHGs in the State of California are produced by passenger vehicles and light-duty trucks (CEC, 2006).

The accumulation of GHGs in the atmosphere regulates the earth's temperature. Without these natural GHGs, the earth's surface would be approximately 61°F cooler (AEP, 2007); however, emissions from fossil fuel combustion for activities such as electricity production and vehicular transportation have elevated the concentration of GHGs in the atmosphere above natural levels. According to the IPCC study (IPCC, 2007), the atmospheric concentration of CO_2 in 2005 was 379 ppm compared to the pre-industrial levels of 280 ppm. In addition, the Fourth U.S. Climate Action Report concluded, in assessing current trends, that carbon dioxide emissions increased by 20 percent from 1990 to 2004, while methane and nitrous oxide emissions decreased by 10 percent and 2 percent, respectively. Exhibit 3-1 shows a graphical presentation of the global heat balance.

There appears to be a close relationship between the increased concentration of GHGs in the atmosphere and global temperatures. For example, the California Climate Change Center reports that by the end of this century, average global surface temperatures could rise by 4.7 to 10.5 ºF due to increased GHG emissions. Scientific evidence indicates a trend of increasing global temperatures near the earth's surface over the past century due to increased human-induced levels of GHGs.

GHGs differ from criteria pollutants in that GHG emissions do not cause direct adverse human health effects. Rather, the direct environmental effect of GHG emissions is the increase in global temperatures, which in turn has numerous indirect effects on the environment and humans. For example, some observed changes include shrinking glaciers, thawing permafrost, later freezing and earlier break-up of ice on rivers and lakes, a lengthened growing season, shifts in plant and animal ranges, and earlier flowering of trees (IPCC, 2001). Other, longer term environmental impacts of global warming may include sea-level rise, changing weather patterns with increases in the severity of storms and droughts, changes to local and regional ecosystems including the potential loss of species, and a significant reduction in winter snow pack. For example, estimates include a 30 to 90 percent reduction in snow pack in the Sierra Nevada mountain range. Current data suggest that in the next 25 years, in every season of the year, California could experience unprecedented heat, longer and more extreme heat waves, greater intensity and frequency of heat waves, and longer dry periods. More specifically, the California Climate Change Center (2006) predicted that California could witness the following events:

- Temperature rises between three to 10.5 ºF
- 6 to 20 inches or more rise in sea level
- 2 to 4 times as many heat-wave days in major urban centers
- 2 to 6 times as many heat-related deaths in major urban centers
- 1 to 1.5 times more critically dry years
- Losses to mountaintop snowpacks and water supply (e.g., according to the California Climate Change Center, Sierra snowpack could be reduced by as much as 20 to 40 percent by 2100 [CEC, 2009])
- 25 to 85 percent increase in days conducive to ozone formation
- 3 to 20 percent increase in electricity demand
- 10 to 55 percent increase in the risk of wildfires



Source: NAS, 2009

Exhibit 3-1 Natural and Amplified Warming

Direct Effects of Sea-Level Rise on the California Coast

According to studies by California Climate Change Center and the Pacific Institute (PI, 2009) under medium to medium-high GHG emissions scenarios, MSL along the California coast is projected to rise from 3 to 4.5 ft (1.0 to 1.4 m) by the year 2100. The direct effect of sea-level rise on transportation includes the following:

Navigation. Sea-level rise makes water deeper, which enables deeper draft vessels to navigate a particular channel. This effect, however, is fairly small compared with the draft of most vessels. Saltwater advancing upstream can alter the point at which flocculation leads to sedimentation and the creation of shoals. Conversely, the clearance under bridges decreases. In a few cases where clearances are extremely tight, this effect could limit the ability of boats to pass underneath a bridge, particularly in the case of very small boats slowly passing underneath very small bridges, where the clearance may be less than a foot. Larger vessels are less likely to be impeded, because most bridges over key shipping lanes are either drawbridges or have very high spans. The proposed bridge replacement project would be taller with more clearance for the vessel passage compared to the existing condition. As such, it would provide better safety for vessel traffic in case of sea-level rise.

Roadways. Sea-level rise may also affect roadways. In many low-lying communities, roads are lower than the surrounding lands, so that land can drain into the streets. As a result, the streets are the first to flood. In some barrier island communities, the lowest bayside streets are already flooded during spring high tides. As the sea rises, this flooding will become more frequent. Most roads are not flooded by the tides and have some type of drainage system to convey water away during rainstorms. As the sea level rises, these drainage systems become less effective, causing more flooding—and increased rainfall intensity will further increase the severity and frequency of flooding there. The proposed project would improve safety by providing improved corridor conditions.

The World Resources Institute's GHG Protocol Initiative identifies six GHGs generated by human activity that are believed to be contributors to global warming (WRI/WBCSD, 2007):

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur hexafluoride (SF_6)

The different GHGs have varying global warming potential (GWP). The GWP is the potential of a gas to trap heat in the atmosphere. The reference gas for GWP is CO_2, which has a GWP of one. Methane has a GWP of 21, which means that it has 21 times greater global warming effect than CO_2 on a mass basis. N_2O has a GWP of 310. To assess the effect of GHG emissions, the combined emissions of various GHGs from a source are presented as a CO_2 equivalent (CO_2e). The total CO_2e is calculated by multiplying the amount of each GHG emitted from the project by its GWP and adding them up.

Black carbon has recently been implicated as a contributor to global warming due to its heat absorption while airborne in the atmosphere (House of Representatives 2007). It also may contribute to melting of snowpack, glaciers, and polar ice when it settles on these surfaces because its black color absorbs more solar radiation than ice. Recent research indicates that some fraction of black carbon observed in California mountains is likely due to trans-Pacific transport from Asia (Hadley, *et. al.* 2008). Black carbon is emitted from a range of naturally occurring events and human activities, including wildfires, diesel engines, and domestic biofuel burning. Emission studies suggest that approximately one-third of black carbon emissions come from biomass burning sources such as waste combustion and wood-fired stoves, and the remainder come from fossil fuel burning sources such as diesel engines (House of Representatives 2007). At present, there are no standards, regulations, or protocols related to assessing or mitigating black carbon emissions.

Black carbon is a component of DPM; therefore, it is released into the atmosphere as a component of diesel engine emissions. Black carbon emissions are addressed in this EIR/EA through the detailed analysis of DPM emissions. DPM emissions are the focus of the project criteria pollutant and HRA. The health risk factors for DPM take into consideration all of its chemical constituents, including black carbon; therefore, black carbon emissions are addressed as part of DPM through the project HRA.

Recently, the U.S. Supreme Court ruled that potential harm associated with climate change is serious and well recognized, that EPA must regulate GHGs as pollutants, and it must promulgate regulations for GHG emissions from new motor vehicles (*Massachusetts et al. Environmental Protection Agency* [case No. 05-1120], 2007). Currently, control of GHGs is generally regulated at the state level and approached by setting emission reduction targets for existing sources of GHGs, setting policies to promote renewable energy and increase energy efficiency, and developing statewide action plans.

To date, 12 states, including California, have set state GHG emission targets. EO S-3-05 and the passage of AB 32, the California Global Warming Solutions Act of 2006, promulgated the California target to achieve 1990 GHG levels by the year 2020. The target-setting approach allows progress to be made in addressing climate change and is a forerunner to the setting of emission limits. A companion bill, Senate Bill (SB) 1368, similarly addresses global warming, but from the perspective of electricity generators selling power into the state. The legislation requires that imported power meet the same GHG standards that power plants in California meet. SB 1368 also sets standards for CO_2 for any long-term power production of electricity at 1,000 pounds per megawatt hour.

3.3.2 Regulatory Background

The approach to addressing the emission of GHGs is through environmental regulations enforced through air quality laws. The Supreme Court has determined that GHGs are pollutants that can be regulated under the CAA. In addition, California has passed laws directing the CARB to develop actions to reduce GHG emissions.

Federal Level

At the time of this writing, EPA had not promulgated any regulations under the CAA pertaining to GHG emissions; however, GHG emissions and related energy issues are in the process of consideration for legislation at the federal level. On May 19, 2009, President Obama announced a new national policy aimed at increasing fuel economy and reducing GHG emissions for all new cars and trucks sold in the United States. The new national policy, which will harmonize GHG emissions standards and fuel economy standards, is the result of an agreement among California, the United States, and the automobile industry. As part of the agreement, EPA and the federal DOT are jointly developing new federal standards for model years 2012-2016 that will ultimately require an average fuel economy standard of 35.5 mpg in 2016. This is roughly equivalent to Pavley's 2016 GHG emission standard and surpasses the standard set in the fuel economy law passed by Congress in 2007, which required an average fuel economy of 35 mpg in 2020. Furthermore, in June 2009, the House of Representatives passed the American Clean Energy and Security Act (HR 2454), which would establish an economy-wide GHG cap-and-trade system to help address climate change and build a clean energy economy (PEW Center, 2009).

State Level

California has passed laws directing the CARB to develop actions to reduce GHG emissions. Caltrans and its parent agency, the Business, Transportation, and Housing Agency, have also taken an active role in addressing GHG emission reduction and climate change.

Western Regional Climate Action Initiative. In 2007, the states of California, Arizona, New Mexico, Oregon, Washington, Utah, and Montana, and the Canadian provinces of British Colombia, Manitoba, and Quebec signed the Western Regional Climate Action Initiative (WCI). The goal of the Initiative is to collaborate to identify, evaluate, and implement ways to reduce GHG emissions, as well as to design a regional market-based multi-sector mechanism by the end of 2008. In addition, a multi-state registry will track, manage, and credit entities that reduce GHG emissions.

AB 1493 – Vehicular Emissions of Greenhouse Gases. In 2002, with the passage of AB 1493 (Pavley), California launched an innovative and proactive approach to dealing with GHG emissions and climate change at the state level. AB 1493 required CARB to develop and implement regulations to reduce GHGs emitted by automobile passenger vehicles and light-duty trucks; these regulations will apply to automobiles and light trucks beginning with 2009 and later model year vehicles. CARB estimates that the regulation will reduce climate change emissions from the light-duty passenger vehicle fleet by 18 percent in 2020 and by 27 percent in 2030 (CARB, 2004). In 2008, EPA denied California's request for a waiver under the CAA needed to implement AB 1493. On January 21, 2009, CARB requested that EPA reconsider its previous waiver denial, and on June, 30, 2009, EPA granted the waiver request, which begins with motor vehicles in the 2009 model year (74 Fed. Reg. 32744). California is expected to enforce its standards for 2009 to 2011 and then harmonize efforts with the federal government to implement equivalent standards for 2012 to 2016. The granting of the waiver will also allow California to implement even stronger standards in the future. The state is expected to start developing new standards for the post-2016 model years later this year.

AB 32 – California Global Warming Solution Act of 2006. On June 1, 2005, Governor Arnold Schwarzenegger signed EO S-3-05. The goal of this Executive Order is to reduce California's GHG emissions to: (1) 2000 levels by 2010, (2) 1990 levels by the 2020 and (3) 80 percent below the 1990 levels by the year 2050.

In 2006, this goal was further reinforced with the passage of AB 32, the California Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals while further mandating that CARB create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of GHGs." By January 1, 2009, CARB must adopt a scoping plan for reducing California's GHG emissions. In December 2008, CARB adopted a final scoping plan for reducing the State's GHG emissions.

Executive Order S-01-07. EO S-01-07 was enacted by Governor Schwarzenegger on January 18, 2007. The order mandates the following: (1) establish a statewide goal to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020; and (2) establish a Low Carbon Fuel Standard (LCFS) for transportation fuels for California.

California Climate Action Registry. Established by the California Legislature in 2000, the California Climate Action Registry (CCAR) (Registry) is a nonprofit public-private partnership that maintains a voluntary registry for GHG emissions. The purpose of the Registry is to help companies, organizations, and local agencies establish GHG emissions baselines for purposes of complying with future GHG emission reduction requirements. It provides leadership on climate change by developing and promoting credible, accurate, and consistent GHG reporting standards and tools for organizations to measure, monitor, verify, and reduce their GHG emissions consistently across industry sectors and geographical borders.

SB 97. SB 97, enacted in 2007, directs the state Office of Planning and Research (OPR) to develop draft CEQA Guidelines "for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions" by July 1, 2009, and directs the Resources Agency (now the National Resources Agency) to certify and adopt the CEQA Guidelines by January 1, 2010. The National Resources Agency closed comments on the CEQA Guidelines amendments for GHG emissions on November 10, 2009.

AB 32 requires CARB to incorporate the standards and protocols developed by CCAR into the state's future GHG emissions reporting program to the maximum extent feasible. The current GHG emission calculation methods used by CCAR are contained in *California Climate Action Registry – General Reporting Protocol* (CCAR Protocol – V2.2) (CCAR, 2007). This protocol categorizes GHG emission sources as: (1) direct (i.e., vehicles, onsite combustion, fugitive, and process emissions), and (2) indirect (i.e., from offsite electricity, steam, and co-generation). The City of Long Beach (and the Port, as the City Harbor Department), is a member of the CCAR. EO S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team.

POLB Climate Change/Greenhouse Gas Strategic Plan. The Port's commitment to protecting the environment, as stated in the Green Port Policy, necessitates the development of programs and projects to reduce GHG emissions. Although the state has yet to formalize GHG regulations for the goods movement sector, the Port has already begun work in this area. In September 2008, the Port's Board of Harbor Commissioners adopted a formal resolution establishing a framework for reducing GHG emissions. The framework outlined efforts that are already underway at the Port toward addressing the issue of climate change. These efforts include:

1. The Port collaborated with other city departments to produce the city's first voluntary GHG emissions inventory (calendar year 2007) which was submitted to the CCAR.

2. The Port joined other city departments in preparing a plan to increase energy efficiency in city-owned facilities, in turn reducing indirect GHG emissions from energy generation. This initiative is known as the Southern California Edison 2009-2011 Local Government Partnership.

3. The Port participates in tree planting and urban forest renewal efforts through its support of the City of Long Beach's Urban Forest Master Plan.

4. Port staff consulted with the Long Beach Gas and Oil Department (LBGO) and Tidelands Oil Production Company (Tidelands) to evaluate potential opportunities for capturing CO_2 produced by oil operations in the Harbor District and re-injecting (sequestration) it through wells at the Port back into the subsurface formations.

5. Beginning with the 2006 POLB air emissions inventory, GHG emissions from oceangoing vessels, heavy-duty trucks, cargo-handling equipment, harbor craft, and locomotives are quantified to enable the establishment of GHG reduction goals.

6. The Port's Renewable Energy Working Group is developing strategies to expand renewable energy at the Port. Criteria for emerging technologies will be established so that the technologies can be evaluated in a manner similar to the existing CAAP Technology Advancement Program.

7. The Port's Renewable Energy Working Group recently finalized a Solar Energy Technology and Siting Study ("Solar Siting Study") that reviewed available solar technologies and the estimated solar energy generation potential for the entire Harbor District. The study determined that there are many sites within the Harbor District where solar energy-generating technologies could be developed on building rooftops and at ground-level.

8. Based on the Solar Siting Study, the Port is developing a program to provide incentive funding to Port tenants for the installation of solar panels on tenant-controlled facilities.

The Port is also developing a Climate Change/ Greenhouse Gas Strategic Plan (CC/GHG Plan). This plan will examine GHG impacts for all activities within the Harbor District and will identify strategies for reducing the overall carbon footprint of those activities. Similar to the CAAP, the Port's GHG/CC Plan will identify strategies for activities under direct Port control and also those that are controlled by third parties, such as tenants. This Plan will also be used to mitigate potential project-specific and cumulative GHG impacts from future projects through modernization and/or upgrading of marine terminals and other facilities in the Long Beach Harbor District.

One element of the CC/GHG Plan is the Greenhouse Gas Emission Reduction Program Guidelines (GHG Guidelines). These Guidelines describe a procedure that the Port will use to select GHG emission reduction programs that meet the CC/GHG Plan reduction goals. The Guidelines were adopted by the Board of Commissioners on March 22, 2009.

The work on establishing thresholds is continuing, and regional action plans are being developed throughout California. These include Climate Change Action Plans adopted by: San Joaquin Valley APCD, August 2008; San Francisco Bay Area.

Caltrans Climate Action Program. The Climate Action Program (CAP) at Caltrans is an interdisciplinary effort intended to promote, facilitate, and coordinate implementation of climate change strategies and related activities within the Department and with partner agencies. The program focuses on GHG emission reduction and adaptation measures. The overall objective is to encourage innovative ways to balance progressive program delivery within the context of responsible environmental stewardship in a way that:

1) allows transportation strategies, plans, and projects as a whole to contribute to the state's GHG emission reduction plan;
2) provides guidelines, procedures, performance measures, and a quantifiable set of reporting protocol to monitor GHG footprints;
3) considers potential impacts of climate variability on the transportation system and

development of risk assessment for long-lasting transportation investments; and

4) advances applied research to support climate change knowledge base in transportation.

The CAP serves as a resource for technical assistance, training, information exchange, and partnership-building opportunities.

Caltrans has taken tangible steps and will continue to explore feasible, cost-effective measures for further reduction of GHG emissions from transportation. The Department will work closely with the CAT, Cal-EPA, CARB, CEC. and other stakeholders to ensure an effective cross-agency policy framework to maintain California as a leader in protecting the environment and in the fight against climate change.

3.3.3 Sources of GHGs

The GHG emissions are mostly related to fossil fuel combustion for energy use, as shown in Exhibits 3-2 and 3-4. Exhibit 3-2 shows historical GHG emissions from a global perspective, and Exhibit 3-4 presents California sources of anthropogenic GHGs. These sources are driven largely by economic growth and fuel used for power generation, transportation, heating, and cooling.

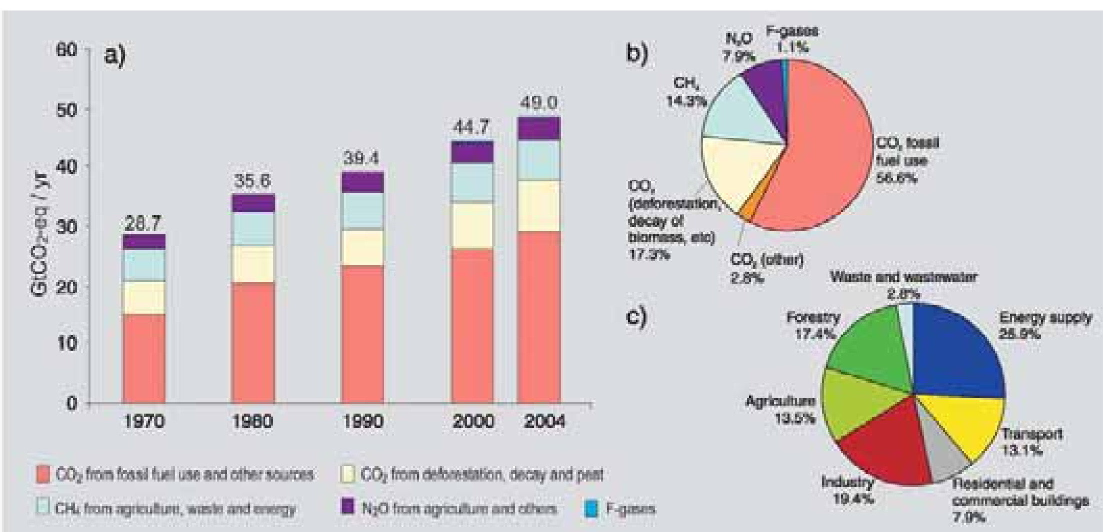
According to the CEC, energy-related CO_2 emissions resulting from fossil fuel combustion represents approximately 81 percent of California's total GHG emissions (Exhibit 3-3). Although the emissions of other GHG gases, such as CH_4 (methane) and N_2O (nitrous oxide) are small, it should be noted that their GWP is very high in relation to that of CO_2.

Primary sources of emissions of these GHGs are from:

- CH_4 – agricultural activities and landfills
- N_2O – agricultural soil and mobile source fuel combustion
- High GWP gases – industrial processes, refrigerants, insulating material; these have a long lifetime in the atmosphere (varying from several decades to several centuries)

According to CEC, among the end-use sectors contributing to California's GHG emissions, the transportation sector represents the largest source and constitutes 41 percent of the state's GHG emissions. Exhibit 3-4 shows the emissions of GHGs by the end-use sector in 2004, and Exhibit 3-5 presents California GHG emissions trends and forecasts to 2020, with and without the AB 32 limit.

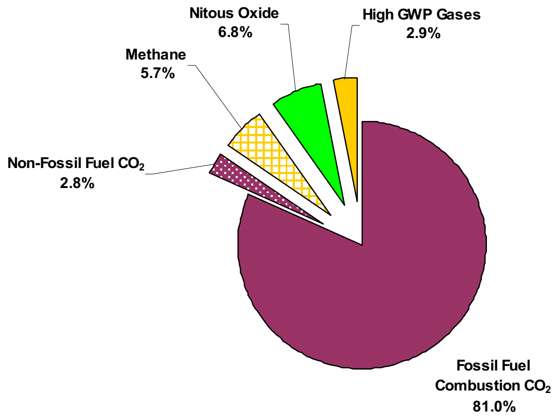
As Exhibit 3-4 shows, transportation sector activities are responsible for a substantial portion of the GHG emissions in California. Because of its size, it is critical that the transportation sector achieve significant emission reductions toward the State's 2020 goal. If the transportation sector does not provide significant GHG reductions, it would be difficult for another sector to make up the required reduction in emission reductions.



(a) Global annual emissions of anthropogenic GHGs from 1970 to 2004. (b) Share of different anthropogenic GHGs in total emissions in 2004 in terms of carbon dioxide equivalents (CO_2-eq). (c) Share of different sectors in total anthropogenic GHG emissions in 2004 in terms of CO_2-eq. (Forestry includes deforestation.)

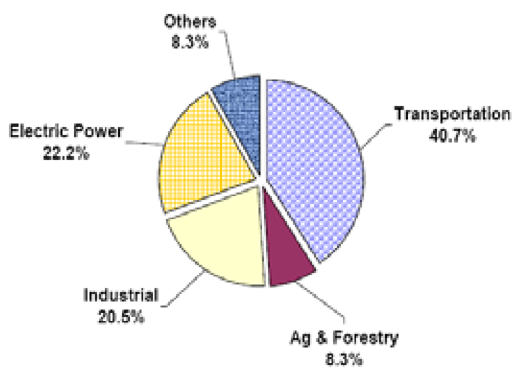
Source: IPCC, 2007

Exhibit 3-2 Global Sources of Anthropogenic GHGs



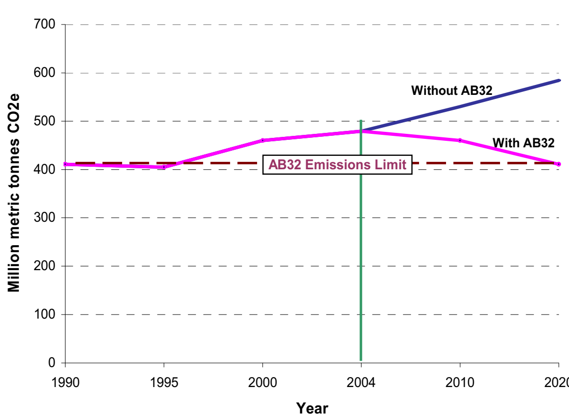
Source: CEC, 2006.

Exhibit 3-3
California GHG Composition by Type of Gas in 2004



Source: CEC, 2006

Exhibit 3-4
Sources of California's GHG Emissions by End-Use Sector (2004)



Source: CEC, 2006.

Exhibit 3-5
California GHG Inventory Forecast

3.3.4 Project GHG Emissions

GHG Significance Threshold

As previously described, California laws, such as SB 97 (PRC §21083.05) and AB 32, provide that climate change is an environmental effect subject to CEQA. Lead agencies therefore are required to determine whether a project's climate change-related effects may be significant and to impose feasible mitigation to minimize any significant effects. Determining significance, however, can be a challenging task. Accordingly, the Governor's OPR in its June 2008 Technical Advisory, "CEQA and Climate Change," asked CARB to make recommendations for GHG-related thresholds of significance, identifiable benchmarks or standards that assist lead agencies in the significance determination. According to its *Climate Change Scoping Plan* (CARB, 2008c), CARB was anticipating to make its final recommendations on thresholds in 2009 (by June 1) to harmonize with OPR's timeline for issuing draft CEQA guidelines addressing GHG emissions and to provide much needed guidance to lead agencies in the near term; such guidance is, as of writing, not yet available.

As stated in CARB's Proposed Scoping Plan, CARB has concluded that a zero threshold, which was previously considered, should not be mandated in light of the fact that (1) some level of emissions in the near term and at mid-century is still consistent with climate stabilization and (2) current and anticipated regulations and programs apart from CEQA (e.g., AB 32, the Pavley vehicle regulations) will increasingly reduce the GHG contributions of past, present, and future projects; however, any non-zero threshold must be sufficiently stringent to make substantial contributions to reducing the State's GHG emissions to meet its interim (2020) and long-term (2050) emissions reduction targets.

CARB has developed preliminary interim threshold concepts for two important sectors: industrial projects, and residential and commercial projects (CARB, 2008c). At the time of this writing, CARB is still working on a proposal for an interim approach for significance thresholds for transportation projects and other sectors; therefore, for the analysis presented here, the project GHG emissions are compared with two baselines, consistent with those used in the analysis of criteria pollutant operational emissions. The project GHG emissions in opening year 2015 and horizon year 2030 are compared with two baselines as follows:

- The changes in CO_2e emissions along the project corridor, compared with the CEQA baseline (i.e., emissions during the NOP year 2005).

- The changes in CO_2e emissions along the project corridor compared with the No Project scenario.

These comparisons provide disclosure of changes in project emissions of GHGs. The analysis will be updated when thresholds of significance for transportation projects become available, which is anticipated by early 2010, according to the CARB Scoping Plan update.

<u>*GHG Emissions Analysis*</u>

The proposed project is a transportation facility; therefore, the GHG emissions would only include the direct GHG emissions that would be generated by the construction and operational activities of the project. Sources of GHG emissions are the same as those analyzed for criteria pollutant emissions and include (1) project-related construction sources, including off-road construction equipment exhaust emissions, and emissions from on-road haul trucks and workers commute vehicles; and (2) GHG emissions from vehicles traveling along the project corridor.

Project-related GHG emissions (No Project and Build Alternatives) were calculated using the emission factors for off-road and on-road mobile sources, annual VMTs along the project roadways, and guidelines of the CCAR Protocol and the *Technical Advisory*, prepared by the Governor Office of Planning and Research (OPR, 2008).

Climate change, as it relates to man-made GHG emissions, is by nature a global and cumulative phenomenon. According to the Association of Environmental Professionals (AEP), in its paper titled *Alternative Approaches to Analyzing Greenhouse Gas Emissions and Global Climate Change in CEQA Documents* (AEP, 2007), "an individual project does not generate enough GHG emissions to significantly influence global climate change. Global climate change is a cumulative impact; a project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of GHGs." The following GHG emissions estimate at the project level is presented following the POLB directive and for the purpose of disclosing all project-related emissions.

Table 3-3 summarizes the annual GHG emissions that would occur within the project region (i.e., California) associated with the construction and operation of the Bridge Replacement Alternatives during opening year 2015 and horizon year 2030. For the opening year, the total GHGs are presented as combined emissions from project operation and emissions from the simultaneous demolition of the old bridge. As Table 3-3 indicates, in each project construction phase, as well as future operation, CO_2 is the primary GHG of concern because vehicle operation (on-road or off-road) does not result in appreciable amounts of other GHGs.

Table 3-3
Annual Operational GHG Emissions Associated with Project Proposed Alternative

Project Scenario/Roadway Segments	Emissions (Metric Tons per Year)			
	CO_2	CH_4	N_2O	CO_2e
CEQA Base Year 2005				
Ocean Boulevard				
Navy Way to Pier S Avenue	6,250	0.39	0.16	6,308
Pier S Avenue to Terminal Island Freeway	2,278	0.20	0.04	2,295
Terminal Island Freeway to Horseshoe Ramps	7,876	0.48	0.20	7,949
Gerald Desmond Bridge	10,511	0.63	0.27	10,608
NB SR 710 Connector Ramp	2,965	0.16	0.08	2,994
SB SR 710 Connector Ramp	1,136	0.06	0.03	1,148
Ocean Boulevard Connector Ramps to Downtown	1,567	0.14	0.02	1,577
Total Year 2005	**32,583**	**2.05**	**0.81**	**32,878**
Year 2015 – No Project				
Ocean Boulevard				
Navy Way to Pier S Avenue	6,471	0.14	0.18	6,529
Pier S Avenue to Terminal Island Freeway	6,229	0.14	0.16	6,282
Terminal Island Freeway to Horseshoe Ramps	3,775	0.11	0.09	3,805
Gerald Desmond Bridge	16,714	0.41	0.43	16,858
NB SR 710 Connector Ramp	4,192	0.08	0.12	4,232
SB SR 710 Connector Ramp	2,136	0.04	0.07	2,158

Table 3-3
Annual Operational GHG Emissions Associated with Project Proposed Alternative

Project Scenario/Roadway Segments	Emissions (Metric Tons per Year)			
	CO_2	CH_4	N_2O	CO_2e
Ocean Boulevard Connector Ramps to Downtown	1,677	0.06	0.03	1,687
Total Year 2015 – No Project	**41,195**	**0.98**	**1.08**	**41,551**
Net Change from 2005 CEQA Baseline	**8,612**	**-1.07**	**0.27**	**8,673**
Year 2015 – With Project (Opening Year)				
Ocean Boulevard				
Navy Way to Pier S Avenue	6,536	0.14	0.18	6,594
Pier S Avenue to Terminal Island Freeway	7,338	0.17	0.19	7,401
Terminal Island Freeway to Horseshoe Ramps	3,420	0.10	0.08	3,447
New Bridge	18,151	0.38	0.51	18,318
NB SR 710 Connector Ramp	4,905	0.09	0.14	4,951
SB SR 710 Connector Ramp	3,672	0.06	0.11	3,708
Ocean Boulevard Connector Ramps to Downtown	2,427	0.08	0.04	2,442
Total Roadway Traffic Emissions	***46,448***	***1.02***	***1.27***	***46,862***
Demolition of Old Bridge – Construction Emissions	306	0.06	0.00	307
Total Year 2015 – Project Opening Year	**46,754**	**1.08**	**1.27**	**47,169**
Net Change from 2005 CEQA Baseline	**14,171**	**-0.98**	**0.46**	**14,291**
Net Change from No Project Scenario	**5,559**	**0.1**	**0.19**	**5,618**
Horizon Year 2030 – No Project				
Ocean Boulevard				
Navy Way to Pier S Avenue	8,467	0.07	0.24	8,544
Pier S Avenue to Terminal Island Freeway	7,317	0.06	0.20	7,381
Terminal Island Freeway to Horseshoe Ramps	4,514	0.05	0.11	4,549
Gerald Desmond Bridge	19,905	0.22	0.50	20,065
NB SR 710 Connector Ramp	4,669	0.03	0.14	4,714
SB SR 710 Connector Ramp	2,553	0.01	0.08	2,579
Ocean Boulevard Connector Ramps to Downtown	1,775	0.02	0.03	1,785
Total Year 2030 – No Project	**49,201**	**0.47**	**1.31**	**49,616**
Net Change from 2005 CEQA Baseline	**16,618**	**-1.58**	**0.5**	**16,738**
Horizon Year 2030 – With Project				
Ocean Boulevard				
Navy Way to Pier S Avenue	8,601	0.07	0.25	8,678
Pier S Avenue to Terminal Island Freeway	8,784	0.07	0.24	8,861
Terminal Island Freeway to Horseshoe Ramps	3,883	0.04	0.10	3,914
New Bridge	21,342	0.17	0.62	21,537
NB SR 710 Connector Ramp	5,781	0.04	0.18	5,837
SB SR 710 Connector Ramp	4,481	0.03	0.14	4,526
Ocean Boulevard Connector Ramps to Downtown	2,633	0.03	0.04	2,648
Total Year 2030 – With Project	**55,504**	**0.45**	**1.57**	**55,999**
Net Change from 2005 CEQA Baseline	**22,921**	**-1.60**	**0.75**	**23,121**
Net Change from No Project Scenario	**6,303**	**-0.02**	**0.26**	**6,383**

One metric ton equals 2,204.6 lbs

CO_2e = carbon dioxide equivalent of combined emissions of all GHGs. The CO_2-equivalent emission of each GHG is the emission rate multiplied by its corresponding global warming potential (GWP). The GWPs for CH_4 and N_2O are 21 and 310, respectively.

Comparison with No Project (NEPA Baseline)

Table 3-3 shows that the project annual CO_2e emissions would increase relative to the No Project scenario (defined as NEPA baseline in this EIR/EA). The estimated GHG emissions increases as compared with the No Project scenario are 5,618 metric tons CO_2e per year ($MTCO_2e$/yr) and 6,383 $MTCO_2e$/yr in 2015 and 2030, respectively.

It should be noted that while the CO_2 emissions factor does assume certain reductions in vehicle emissions due to future vehicle models operating more efficiently, the factor does not take into account additional reductions in vehicle emissions that would take place in response to AB 1493, when mobile source emission reductions are ultimately implemented through legislation.

As previously mentioned, CARB and SCAQMD have developed preliminary interim threshold concepts for two important sectors – industrial projects, and residential and commercial projects – but not as yet for the transportation sector (CARB, 2008c). The proposed CARB interim significance threshold of GHG emissions for industrial projects is set at 7,000 $MTCO_2e$/yr, and for residential/ commercial projects the interim significance threshold is approximately 6,500 $MTCO_2e$/yr. SCAQMD recently recommended a revised threshold of 10,000 $MTCO_2e$/yr for industrial-sector projects. This new threshold includes construction emissions amortized over 30 years and added to operational GHG emissions (SCAQMD, 2008).

Although a significance threshold of GHG emissions for transportation-sector projects has not yet been proposed, it should be noted that the project contribution to GHG emissions, compared with the no-project scenario, is below the CARB and SCAQMD recommended interim significance thresholds for both industrial and residential/ commercial projects. Similarly, compared with the SCAQMD recommended threshold of 10,000 $MTCO_2e$/yr for industrial-sector projects; with total GHG emissions through the construction period of project, amortized over 30 years, the additional CO_2e for the project would be 653 metric tons per year. Adding this value to the operational emissions of GHGs would result in project increment (the increase of GHG emissions compared to no-project scenario) of 5,964 $MTCO_2e$/yr and 7,036 $MTCO_2e$/yr in 2015 and 2030, respectively, both of which are less than the SCAQMD recommended threshold for industrial projects. Furthermore, project GHG emissions compared to the CEQA baseline are above the aforementioned thresholds; however, determination of significance of project GHG emissions will be provided when CARB adopts or makes available such thresholds for transportation-sector projects.

As described above, both the Port and Caltrans have committed to reducing GHG emissions through the development of programs and plans to reduce GHG emissions. The Port has already begun programs to reduce GHG emissions from goods movement. The Port's 2008 formal resolution has established a framework for reducing GHG emissions. The framework outlined efforts (as listed above) that are already underway at the Port toward addressing the issue of climate change.

Comparison with CEQA Baseline

The data in Table 3-3 show that in each analyzed future year, annual operational CO_2e emissions would increase relative to the CEQA baseline.

The estimated GHG emissions increase from 2005 emissions is 14,291 $MTCO_2e$/yr and 23,121 $MTCO_2e$/yr during 2015 and 2030, respectively. These increases would be considered significant based on the above discussion of thresholds for GHG emissions.

Cumulative and Regional Emissions

At the regional level, the proposed Build Alternatives do not generate additional new trips, but rather result in a redistribution of vehicle trips. As shown in Table 3-4, the cumulative effect of the Bridge Replacement Alternatives would be a decrease in regional VMT and Vehicle Hours Traveled (VHT) when compared to the No Project/Rehabilitation Alternative. The reduction in VMT and VHT would likely result in a decrease of the cumulative GHG emissions within the region; however, the anticipated decrease cannot be quantified and the project-related increase in GHG would still be considered a cumulatively considerable significant and unavoidable project impact.

Mitigation Measures

As described in Section 2.2.5.5 of this EIR/EA, the project would employ all applicable control measures included in the CAAP and will comply with applicable state plans and regulations.

As included in the CARB Scoping Plan, GHG emission reductions will come from three overarching strategies: more efficient vehicles, lower-carbon fuels, and reduction of vehicle use or VMT. The GHG emission reductions in the transportation sector will be achieved through regulations, market mechanisms, incentives, and land use policy.

Table 3-4
Forecasted Daily VMT and VHT in the Project Vicinity

	No Project/ Rehabilitation Alternative	Bridge Replacement Alternatives	Increase/ (Decrease)	No Project/ Rehabilitation Alternative	Bridge Replacement Alternatives	Increase/ (Decrease)
	2015 VMT			**2030 VMT**		
Total Autos	4,475,415	4,466,876	(8,539)	4,950,124	4,937,966	(12,157)
Total Trucks	850,846	847,881	(2,964)	1,144,522	1,138,963	(5,560)
Total All Vehicles	5,326,260	5,314,757	(11,503)	6,094,646	6,076,929	(17,717)
	2030 VHT			**2030 VHT**		
Total Autos	113,604	112,817	(787)	148,869	147,273	(1,596)
Total Trucks	17,685	17,404	(281)	31,687	30,909	(778)
Total All Vehicles	131,289	130,221	(1,068)	180,556	178,182	(2,374)

Source: Iteris, 2009.

At the project level, there are common measures that have the potential to reduce GHG emissions. These measures include using reclaimed water, landscaping, energy-efficient lighting, and idling restrictions. The following presents a brief discussion of GHG reduction potential of these measures.

- Reclaimed Water – It is estimated that 30 percent of the electricity used in California is used for the treatment and delivery of water. Using reclaimed water helps conserve energy and reduces GHG emissions from electricity production. Reclaimed water would be used, if available, during construction of the proposed project.
- Landscaping – Landscaping would reduce surface warming and would decrease CO_2 through photosynthesis. Implementation of this measure would also have the potential to reduce GHG emissions.
- Energy-Efficient Lighting – Energy-efficient streetlights and LED traffic signals would be incorporated, to the extent feasible, in the final design of the proposed project.
- Idling restrictions for trucks – Limiting truck idling time to 2 minutes during construction would also reduce GHG emissions during construction.

Use of these common GHG reduction measures would be considered, as applicable during the construction planning stage, for implementation during project construction. Implementation of these measures has the potential to reduce GHG emissions in addition to the reductions expected from operation of the proposed project.

Caltrans and the Business, Transportation, and Housing Agency have taken an active role in addressing GHG emissions reduction from transportation sources. Recognizing that more than 81 percent of California's GHG emissions are from the burning of fossil fuels and 40 percent of all human-made GHG emissions are from transportation, Caltrans has created and is implementing the CAP (December 2006).

One of the main strategies in the proposed CAP is to make California's transportation system more efficient. The highest levels of CO_2 from mobile sources, such as automobiles, occur at stop-and-go speeds (zero to 25 mph – traffic congestion) and speeds higher than 55 mph. Relieving congestion, by enhancing operations and improving travel times in high-congestion travel corridors, would lead to an overall reduction in GHG emissions. A stated project objective is to reduce congestion and improve traffic operations, which is consistent with the objectives of the CAP. The Bridge Replacement Alternatives are expected to relieve congestion and improve travel times, which may result in an overall reduction of GHG emissions.

Caltrans continues to be actively involved on the Governor's Climate Action Team as CARB works to implement AB 1493 and AB 32. As part of its CAP, Caltrans is supporting efforts to reduce VMT by planning and implementing smart land use strategies (i.e., job/ housing proximity, developing transit-oriented communities, and high-density housing along transit corridors). Caltrans is working closely with local jurisdictions on planning activities; however, Caltrans does not have local land use planning authority. Caltrans is also supporting efforts to improve the energy efficiency of the transportation sector by increasing vehicle fuel economy in new cars and light- and heavy-duty trucks; however, it is important to note that control of fuel economy standards is held by EPA and CARB. Caltrans is also reducing the amount of cement used as binding material in concrete. Consistent with the CAP, binding materials for pavements and bridges, could be partially substituted by supplementary cementitious materials such as fly ash, slag, or silica fume, whose production generate less CO_2 emissions than traditional Portland cement. Lastly, the use of alternative fuels is also being considered. Caltrans is participating in funding for alternative fuel research at UC Davis.

3.4 MITIGATION MEASURES FOR SIGNIFICANT IMPACTS UNDER CEQA

Mitigation measures under CEQA would be the same as those discussed in Chapter 2 within each section under Avoidance, Minimization and/or Mitigation Measures and CEQA (AQ-1) and CEQA (GHG-1) described above. With the exception of construction and operational NO_X emissions and the cumulative considerable effects on air quality, unavoidable traffic impacts, and unavoidable project-related and cumulatively considerable increase in GHG emissions, all other construction and operational impacts associated with the Build Alternatives would be fully mitigated.

Chapter 4

Comments and Coordination

CHAPTER 4
COMMENTS AND COORDINATION

4.1 SCOPING PROCESS

An NOP/PEAR and Notice of Initiation of Studies (NOIS) to prepare an EIR/EA was issued on October 25, 2002, by the Port to notify affected parties and to solicit comments from responsible agencies and the public on the proposed project. Additionally, the NOP/NOIS advertised a Scoping Meeting/Open House, which was held November 12, 2002, at the Port Administration Building. The Scoping Meeting/ Open House was also advertised in several newspapers, including *Long Beach Press Telegram, The Daily Breeze, The Philippine Times, Mundo L.A.* (local Spanish newspaper), and *La Opinion* (local Spanish newspaper). The purpose of the Scoping Meeting/Open House was to introduce the project and preliminary design concepts to agencies and members of the public and to receive comments. The scoping meeting for public agencies was held in the afternoon, and the open house for the general public was held that evening. Several exhibits were displayed, including design concepts and computer-renderings of the project, as well as an exhibit depicting the environmental process. Project staff and consultants were present to answer questions. No written comments were received at the Open House.

Four comment letters were received during the NOP review period and scoping meetings. Issues of concern included utilities, water resources, and hazardous waste/materials. A Draft EIR/EA was released for public review on June 14, 2004, for a 60-day review period. Subsequent to the public comment period for the Draft EIR/EA, the Port elected to add a Toll-Operation Alternative and expanded the limits of the proposed project study area. As a result, the Port issued a revised NOP for this revised Draft EIR/EA on December 5, 2005. No comments were received during the revised NOP public comment period.

4.1.1 Agency Consultation

As part of the coordination necessary for the environmental study process, the following federal, state, regional, and local agencies were consulted:

- USFWS
- USCG
- EPA
- State of California Office of Planning and Research
- CDFG
- SHPO
- SCAQMD
- SCAG
- AQMD
- RWQCB
- California Conservation Corps

Staff from some of these agencies provided information regarding the presence of environmental resources within the project area, regulations governing those resources, impact assessment methodologies, environmental impacts, and mitigation measures (see Appendix D for correspondence with the AQMD and CDFG). The SHPO determined that the proposed project would have no adverse effect on historic properties, therefore granting their concurrence on July 21, 2003 (Appendix C).

Prior to and during the preparation of this revised Draft EIR/EA, ongoing PDT meetings were held to discuss design options, factors to be considered during the environmental study process, and scheduling issues. Representatives and technical staff from the Port, Caltrans, FHWA, and the consultant team attended these meetings.

4.1.1.1 Related Project Coordination

Subsequent to circulation of the June 2004 Draft EIR/EA, the Port's PDT for the Gerald Desmond Bridge Replacement Project initiated ongoing coordination meetings with the ACTA Schuyler Heim Bridge Replacement and SR 47 Expressway Project planning team. The coordination meetings were to communicate project information, study methodologies, and findings between the two planning teams for these closely related projects. This facilitated consistency in planning assumptions, specifically in the area of traffic forecasting and assessment of cumulative and secondary impacts. These meetings are planned to continue throughout the project development process and into construction, assuming both projects receive environmental approvals and are funded.

4.1.2 Public Participation

A public hearing was held July 19, 2004, during the 60-day public review period of the Draft EIR/EA. This meeting discussed the major components and environmental impacts of this project. Public comments and questions were taken at the close of the hearing.

Twelve (12) entities provided comments on the Draft EIR/EA. The commenter's consisted of:

- Long Beach Department of Oil and Gas
- Division of Oil, Gas, and Geothermal Resources
- California Department of Conservation
- San Pedro and Peninsula Homeowners' Coalition
- DTSC
- CDFG
- MTA
- Natural Resources Defense Council
- SCAQMD
- THUMS Long Beach Company
- EPA
- USCG

4.2 PUBLIC COMMENTS AND RESPONDING TO COMMENTS

The comments and concerns received from the 12 public entities (listed in Section 4.1.2) regarding the 2004 Draft EIR/EA have been addressed in this revised Draft EIR/EA.

This revised Draft EIR/EA is being circulated for public review and comment. Comments received on the revised draft environmental document and at the public hearing will be responded to in the final environmental document.

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Chapter 8

Application Summary Report

APPLICATION SUMMARY REPORT

PREPARED IN ACCORDANCE WITH THE CERTIFIED PORT MASTER PLAN AND CALIFORNIA COASTAL ACT OF 1976

for the

GERALD DESMOND BRIDGE REPLACEMENT PROJECT

This narrative, including the EIR/EA project description, project background, project objectives, staff analysis, and, where appropriate, mitigation measures to be implemented, constitutes an Application Summary Report (ASR) and Proposed Staff Recommendations prepared in accordance with the certified PMP, as amended, and the California Coastal Act of 1976. Based upon data contained herein, the proposed project is in conformance with the stated policies of the PMP. This document was circulated for public review and becomes effective upon adoption by the Long Beach Board of Harbor Commissioners.

8.1 PORT MASTER PLAN ISSUES

The Port's Preferred Alternative (North-side Alignment Alternative) for the Gerald Desmond Bridge Replacement project is located within the Port's Northeast, Middle Harbor, and Terminal Island Planning Districts. These areas are largely devoted to port facilities, port-related industries, facilities that do not require access to berthing facilities or water frontage, hazardous cargo facilities, ancillary port facilities, oil production uses, navigable corridors, and utilities.

The proposed North-side Alignment Alternative is consistent with the six long-range planning goals and objectives for future port development and expansion stated in the PMP:

Goal 1: Consolidate similar and compatible land and water areas.

Goal 2: Encourage maximum use of facilities.

Goal 3: Provide for the safe cargo handling and movement of vessels within the Port.

Goal 4: Develop land for primary port facilities and port-related uses.

Goal 5: Improve internal traffic circulation (i.e., roadway and rails).

Goal 6: Protect, maintain, and enhance the overall quality of the coastal environment.

8.2 CALIFORNIA COASTAL ACT ISSUES

Relevant sections of the California Coastal Act are listed below, with a discussion of their relationship to the proposed project.

8.2.1 Section 30701

(b) – Existing ports shall be encouraged to modernize and construct necessary facilities within their boundaries in order to minimize or eliminate the necessity for future dredging and filling to create new ports in new areas of the state.

The North-side Alignment Alternative would replace the over-capacity and deteriorating Gerald Desmond Bridge with a bridge that would:

- Be structurally sound and seismically resistant;
- Provide a roadway with three through lanes in each direction with standard shoulders;
- Provide maximum 5 percent approach grades;
- Provide vertical clearance that would allow safe passage of some existing container ships and new-generation vessels currently being constructed.

This structure would meet the 2030 transportation needs of the Port and the region. Furthermore, its design would meet current structural and seismic standards, ensuring a 100-year design life. The project would improve access to primary port facilities and increase the efficiency of existing port facilities, thus reducing the need for new ports in new areas of the state.

8.2.2 Section 30780

(a) – Minimize substantial adverse environmental impacts.

The North-side Alignment Alternative would provide a structurally sound and seismically resistant replacement bridge that would improve public safety.

The otherwise significant impacts associated with air quality, seismic hazards, biological resources, hazardous materials, public health and safety, traffic, and socioeconomic issues would be minimized to a level of less than significant by incorporating necessary mitigation measures during each phase of the project.

(c) – Give highest priority to the use of existing land space within harbors for port purposes, including, but not limited to, navigational facilities, shipping industries, and necessary support and access facilities.

The North-side Alignment Alternative would replace the existing over-capacity and deteriorating bridge with a structurally sound and seismically resistant bridge to maximize the efficient use of Port facilities.

8.2.3 Section 30715

(a) – Appealable Developments.

Approval of any regional transportation project that is not principally for internal circulation within the Port boundaries is appealable to the CCC.

Appendix A
Air Quality Data

Appendix A – Air Quality

A-1 Construction Emissions
- Construction Schedule
- Construction Equipment and Emissions Calculations Worksheets
- SCAQMD Rule 403

A-2 Transportation Conformity Working Group Project Documentation

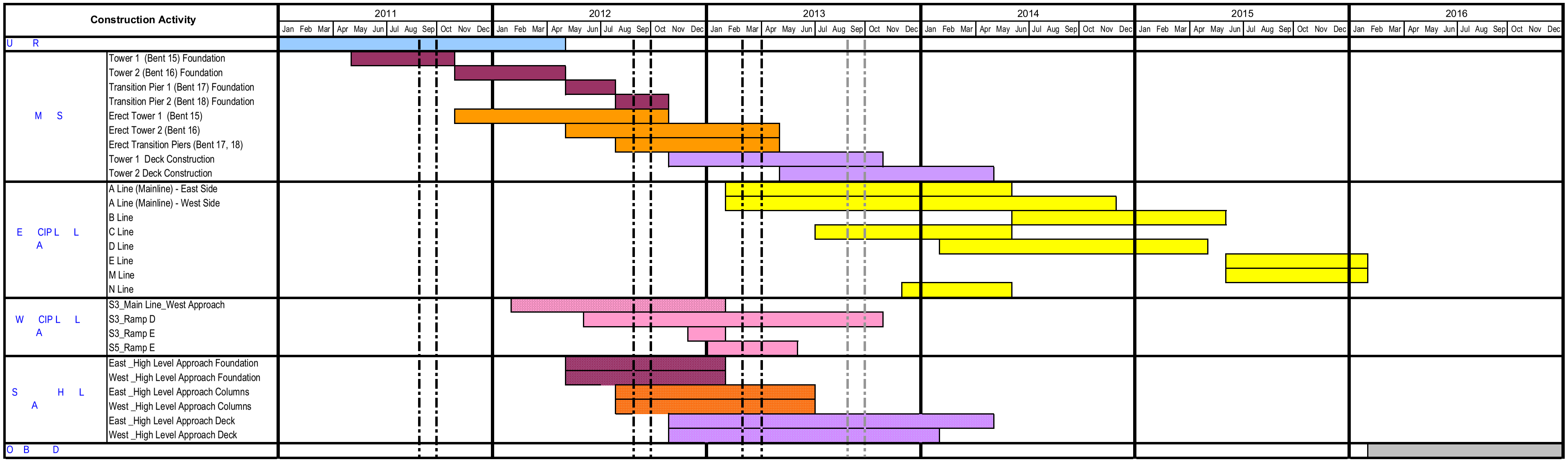
A-3 2008 RTIP and RTP Project Listings

A-1 Construction Emissions

- Construction Schedule
- Construction Equipment and Emissions Calculations Worksheets
- SCAQMD Rule 403

Gerald Desmond Bridge Replacement Project

Constructruction Schedule - Summary



Gerald Desmond Bridge Replacement Project
Construction Emissions

Timeline #1

YEAR 1 - Maximum Daily Emissions (Month 9) — **2011 (September)**

Utility Relocation and Main Spans	**Hours per Day**	**Number of Equipment**	**Peak Emissions (lbs/day)**				
			CO	**NO_X**	**VOC**	**PM_{10}**	**$PM_{2.5}$**
Dump Truck	8	2	0.53	1.20	0.0	0.05	0.05
Flatbed Truck	8	4	18.81	63.45	5.0	0.20	0.18
Pile Driver	8	1	3.16	9.29	0.8	0.32	0.29
Concrete Truck	8	8	2.74	3.07	0.6	0.80	0.71
Crane	8	2	6.47	11.07	1.0	2.54	2.26
Pickup Truck	8	20	0.93	0.10	0.1	0.01	0.01
Main Spans Total		Unmitigated	**32.6**	**88.2**	**7.5**	**3.9**	**3.5**
		Mitigated	31.0	83.7	7.2	3.7	3.3
Offsite Emissions							
Offsite Haul Trucks (Roundtrips)		40	26.0	17.7	0.7	0.4	0.38
Offsite Delivery Trucks (Roundtrips)							
Offsite Trash Trucks (Roundtrips)							
Truck trip Total			*26.0*	*17.68*	*0.71*	*0.38*	*0.38*
Worker Trips (Phase 1 and 2)		140	3.3	2.7	2.8	0.2	0.23
Worker Trips (Phase 3)							
Worker TripsTotal			3.3	2.7	2.8	0.2	0.23
Fugitive Dust (yd3 per day)							
Fugitive Dust (acres per day) - Max		4.9				93.6	19.65
Fugitive Dust (square footage per month) - Demol.							
Fugutive Dust Total		Unmitigated				93.6	19.7
		Mitigated				59.9	12.6
Off-site Total		Unmitigated	**29.2**	**20.3**	**3.6**	**0.6**	**0.6**
		Mitigated	29.2	20.3	3.6	0.6	0.6
On-site Total		Unmitigated	***32.6***	***88.2***	***7.5***	***97.5***	***23.1***
		Mitigated	*31.0*	*83.7*	*7.2*	*63.6*	*15.9*
Regional Total		Unmitigated	**61.8**	**108.5**	**11.1**	**98.1**	**23.8**
		Mitigated	60.2	104.1	10.7	64.2	16.5

Summary Table

Ma imum Dail missions - Year 1	**CO**	**NOx**	**VOC**	**PM_{10}**	**$PM_{2.5}$**
Unmitigated *(lbs/day)*					
On-site	33	88	8	98	23
Off-site	29	20	4	1	1
Total	**62**	**108**	**11**	**98**	**24**
SCAQMD Regional Significance Threshold	550	100	75	150	55
Over/Under	488	(8)	64	52	31
Exceed Threshold?	No	Yes	No	No	No
Mitigated *(lbs/day)*					
On-site	31	84	7	64	16
Off-site	29	20	4	1	1
Total	**60**	**104**	**11**	**64**	**17**
SCAQMD Regional Significance Threshold	550	100	75	150	55
Over/Under	490	(4)	64	86	38
Exceed Threshold?	No	Yes	No	No	No

Gerald Desmond Bridge Replacement Project
Construction Emissions

Timeline #2

YEAR 2 - Maximum Daily Emissions (Month 9) — **2012 (September)**

Approach Spans	**Hours per Day**	**Number of Equipment**	**Peak Emissions (lbs/day) CO**	**NO_X**	**VOC**	**PM_{10}**	**$PM_{2.5}$**
Drilling Rig	8	3	12.2	21.6	0.8	0.88	0.78
Screed Machine	8	1	3.3	4.7	0.7	0.39	0.35
Dump Truck	8	5	1.3	2.5	0.4	0.13	0.11
Generator	8	12	30.0	51.6	6.8	3.37	3.00
Flatbed truck	8	19	84.8	283.6	23.4	10.86	9.67
Concrete Pump	8	8	24.6	55.0	5.8	2.34	2.08
Pile Driver	8	6	18.5	41.3	4.4	1.76	1.56
Concrete Truck	8	8	2.7	3.6	0.6	0.18	0.16
Backhoe/Loader	8	6	19.5	32.0	4.9	3.57	3.18
Scraper	8	3	26.4	46.2	3.6	2.61	2.32
Bulldozer	8	3	15.9	54.9	3.8	2.73	2.43
Crane	8	14	43.3	77.2	6.7	5.16	4.59
Pickup Trucks	8	20	0.9	0.1	0.1	0.01	0.01
Total - Approach Spans		Unmitigated	**283.20**	**674.35**	**61.98**	**33.99**	**30.25**
		Mitigated	269.04	640.63	58.88	32.29	28.74
Main Spans							
Flatbed truck	8	3	13.38	44.8	3.7	1.7	1.53
Concrete Truck	8	14	4.76	6.3	1.0	0.3	0.29
Crane	8	1	3.09	5.5	0.5	0.4	0.33
Total - Main Spans		Unmitigated	**21.23**	**56.61**	**5.22**	**2.41**	**2.14**
		Mitigated	20.17	53.78	4.96	2.29	2.04
Offsite Emissions							
Offsite Haul Trucks (Roundtrips)	10	40	3.0	15.5	0.7	0.4	0.35
Offsite Delivery Trucks (Roundtrips)							
Offsite Trash Trucks (Roundtrips)							
Truck Trip Total			*3.0*	*15.5*	*0.7*	*0.4*	*0.3*
Worker Trips (Phase 1 and 2) - Site Prep		190	32.5	3.3	3.6	0.3	0.31
Worker Trips (Phase 3) -							
Worker Trips (Phase 3)							
Worker Trips Total			*32.5*	*3.3*	*3.6*	*0.3*	*0.3*
Asphalt (acres per month)							
Fugitive Dust (yd3 per day)							
Fugitive Dust (acres per day) - Max		4.5				86.08	18.08
Fugitive Dust (square footage per month) - Demol.							
Fugutive Dust Total		Unmitigated				**86.1**	**18.1**
		Mitigated				55.1	11.6
Off-site Total		Unmitigated	**35.5**	**18.8**	**4.2**	**0.7**	**0.7**
		Mitigated	35.5	18.8	4.2	0.7	0.7
On-site Total		Unmitigated	***304.4***	***731.0***	***67.2***	***122.5***	***50.5***
		Mitigated	*289.2*	*694.4*	*63.8*	*89.7*	*42.3*
Regional Total		Unmitigated	**340.0**	**749.8**	**71.4**	**123.1**	**51.1**
		Mitigated	324.8	713.2	68.1	90.3	43.0

Summary Table

Ma imum Dail missions - Year	**CO**	**NOx**	**VOC**	**PM_{10}**	**$PM_{2.5}$**
Unmitigated *(lbs/day)*					
On-site	304	731	67	122	50
Off-site	36	19	4	1	1
Total	**340**	**750**	**71**	**123**	**51**
SCAQMD Regional Significance Threshold	550	100	75	150	55
Over/Under	210	(650)	4	27	4
Exceed Threshold?	No	Yes	No	No	No
Mitigated *(lbs/day)*					
On-site	289	694	64	90	42
Off-site	36	19	4	1	1
Total	**325**	**713**	**68**	**90**	**43**
SCAQMD Regional Significance Threshold	550	100	75	150	55
Over/Under	225	(613)	7	60	12
Exceed Threshold?	No	Yes	No	No	No

Gerald Desmond Bridge Replacement Project
Construction Emissions

Timeline #3

YEAR 3 - Maximum Daily Emissions (Month 3) — **2013 (March)**

Approach Spans	Trip Length	No. of Eq.	CO	NOx	VOC	PM_{10}	$PM_{2.5}$
Drilling Rig		1	4.03	6.50	0.29	0.24	0.21
Dump Truck		5	1.28	2.40	0.04	0.12	0.10
Generator		8	19.49	32.83	4.16	2.07	1.84
Flatbed truck	5	11	48.05	158.78	13.27	5.50	4.90
Concrete Pump		5	15.06	31.75	3.44	1.32	1.17
Pile Driver		3	9.04	19.05	2.09	0.77	0.69
Screed Machine		2	6.54	8.91	1.60	0.62	0.56
Backhoe/Loader		3	9.63	14.98	2.24	1.65	1.47
Concrete Truck		12	4.04	5.33	0.87	0.25	0.23
Scraper		2	16.63	29.47	2.37	1.61	1.43
Bulldozer		2	10.11	35.44	2.78	1.70	1.52
Crane		10	29.60	51.61	4.04	3.32	2.95
Pickup Truck	5	20	0.78	0.08	0.01	0.01	0.01
Total East Approaches		Unmitigated	**174.29**	**397.15**	**37.20**	**19.19**	**17.08**
		Mitigated	165.58	377.29	35.34	18.23	16.23
Main Span							
Generator		1	1.83	3.08	0.43	0.19	0.17
Flatbed truck	4	1	4.37	14.43	1.08	0.52	0.46
Concrete Truck		2	0.67	0.89	1.21	0.04	0.04
Crane		2	5.92	10.32	0.14	0.68	0.60
Total West Approaches		Unmitigated	**12.79**	**28.72**	**2.86**	**1.43**	**1.27**
		Mitigated	12.15	27.29	2.71	1.36	1.21
Offsite Emissions							
Offsite Haul Trucks (Roundtrips)	20	40	2.84	13.64	0.60	0.33	0.32
Offsite Delivery Trucks (Roundtrips)							
Offsite Trash Trucks (Roundtrips)							
Truck Trip Total			2.84	13.64	0.60	0.33	0.32
Worker Trips (Phase 1 and 2)	20	150	28.84	2.37	3.32	0.25	0.25
Worker Trips (Phase 3)							
Worker Trips - Calculated Total			28.84	2.37	3.32	0.25	0.25
Asphalt (acres per month)							
Fugitive Dust (acres per day) - Normal							
Fugitive Dust (yd3 per day)							
Fugitive Dust (acres per day) - Max		4.6				87.86	18.45
Fugitive Dust (square footage per month) - Demol.							
Fugitive Dust Total		Unmitigated				87.9	18.5
		Mitigated				56.2	11.8
Off-site Total		Unmitigated	**31.68**	**16.02**	**3.92**	**0.58**	**0.57**
		Mitigated	31.68	16.02	3.92	0.58	0.57
On-site Total		Unmitigated	**187.08**	**425.87**	**40.06**	**108.48**	**36.80**
		Mitigated	177.73	404.58	38.06	75.82	29.24
Regional Total		Unmitigated	**218.76**	**441.89**	**43.98**	**109.06**	**37.37**
		Mitigated	209.41	420.59	41.98	76.40	29.81

Summary Table

Ma imum Dail missions - Year	CO	NOx	VOC	PM_{10}	$PM_{2.5}$
Unmitigated *(lbs/day)*					
On-site	187	426	40	108	37
Off-site	32	16	4	1	1
Total	**219**	**442**	**44**	**109**	**37**
SCAQMD Regional Significance Threshold	550	100	75	150	55
Over/Under	331	(342)	31	41	18
Exceed Threshold?	No	Yes	No	No	No
Mitigated *(lbs/day)*					
On-site	178	405	38	76	29
Off-site	32	16	4	1	1
Total	**209**	**421**	**42**	**76**	**30**
SCAQMD Regional Significance Threshold	550	100	75	150	55
Over/Under	341	(321)	33	74	25
Exceed Threshold?	No	Yes	No	No	No

Gerald Desmond Bridge Replacement Project

Construction Emissions

Timeline #3-a

YEAR 3 - Maximum Daily Emissions (Month 9)

			2013 (September)				
Approach Spans	**Trip Length**	**No. of Eq.**	**CO**	**NOx**	**VOC**	**PM_{10}**	**$PM_{2.5}$**
Generator		4	9.74	16.42	2.27	1.04	0.92
Flatbed truck	5	4	17.47	57.74	4.82	2.06	1.83
Concrete Pump		1	3.01	6.35	0.70	0.26	0.23
Concrete Truck		1	0.34	0.44	0.07	0.02	0.02
Crane		4	11.84	20.64	2.16	1.36	1.21
Pickup Truck	5	20	0.78	0.08	0.01	0.01	0.01
Total Approach Spans		Unmitigated	**43.20**	**101.67**	**10.03**	**4.75**	**4.22**
		Mitigated	41.04	96.59	9.53	4.51	4.01
Main Spans							
Flatbed truck	5	4	17.47	57.74	4.82	2.06	1.83
Concrete Truck		2	0.67	0.89	0.14	0.04	0.04
Total Main Spans		Unmitigated	**18.15**	**58.63**	**4.97**	**2.10**	**1.87**
		Mitigated	17.24	55.70	4.72	2.00	1.78
Offsite Emissions							
Offsite Haul Trucks (Roundtrips)	20	40	22.67	13.64	0.60	0.33	0.32
Offsite Delivery Trucks (Roundtrips)							
Offsite Trash Trucks (Roundtrips)							
Truck Trip Total			22.67	13.64	0.60	0.33	0.32
Worker Trips (Phase 1 and 2) - Site Prep	20	148	2.84	2.29	2.62	0.25	0.25
Worker Trips (Phase 3)							
Worker Trips - Calculated Total			2.84	2.29	2.62	0.25	0.25
Asphalt (acres per month)							
Fugitive Dust (yd3 per day)							
Fugitive Dust (acres per day) - Max		4.6				87.86	18.45
Fugitive Dust (square footage per month) - Demo							
Fugitive Dust Total		Unmitigated				87.9	18.5
		Mitigated				56.2	11.8
Off-site Total		Unmitigated	**25.51**	**15.94**	**3.22**	**0.58**	**0.57**
		Mitigated	25.51	15.94	3.22	0.58	0.57
On-site Total		Unmitigated	**61.35**	**160.30**	**15.00**	**94.71**	**24.55**
		Mitigated	58.28	152.28	14.25	62.74	17.60
Regional Total		Unmitigated	**86.86**	**176.24**	**18.22**	**95.29**	**25.12**
		Mitigated	83.79	168.22	17.47	63.31	18.17

Summary Table

Maximum Daily Emissions - Year 3	**CO**	**NOx**	**VOC**	**PM_{10}**	**$PM_{2.5}$**
Unmitigated *(lbs/day)*					
On-site	61	160	15	95	25
Off-site	26	16	3	1	1
Total	**87**	**176**	**18**	**95**	**25**
SCAQMD Regional Significance Threshold	550	100	75	150	55
Over/Under	463	(76)	57	55	30
Exceed Threshold?	No	Yes	No	No	No
Mitigated *(lbs/day)*					
On-site	58	152	14	63	18
Off-site	26	16	3	1	1
Total	**84**	**168**	**17**	**63**	**18**
SCAQMD Regional Significance Threshold	550	100	75	150	55
Over/Under	466	(68)	58	87	37
Exceed Threshold?	No	Yes	No	No	No

Gerald Desmond Bridge Replacement Project
Construction Emissions

Timeline #4

Old Bridge Demolition - Maximum Daily Emissions | **2015 (October)**

Bridge Demolition	**Trip Length**	**Number of Eq.**	**CO**	**NOX**	**VOC**	**PM10**	**PM2.5**
Sawcutters		2	6.45	8.43	1.4	0.9	0.78
Dump Truck	2	2	0.51	0.95	0.1	0.1	0.04
Excavators		2	8.46	13.28	0.8	0.6	0.50
Barge		1	2.96	5.73	0.6	0.4	0.34
Cranes/Genie Lifts		2	5.69	9.57	0.8	0.5	0.46
Pickup Truck	4	4	0.11	0.01	0.0	0.0	0.00
Total Bridge Demolition		Unmitigated	**24.18**	**37.97**	**3.69**	**2.39**	**2.12**
		Mitigated	*22.97*	*36.08*	*3.50*	*2.27*	*2.02*
Offsite Emissions							
Offsite Haul Trucks (Roundtrips)	20	40	1.7	7.6	0.3	0.20	0.20
Offsite Delivery Trucks (Roundtrips)							
Offsite Trash Trucks (Roundtrips)							
Truck Trip Total			1.68	7.55	0.35	0.20	0.20
Worker Trips (Phase 1 and 2)	20	150	2.9	0.3	0.3	0.05	0.05
Worker Trips (Phase 3)							
Worker Trips - Calculated Total			2.87	0.29	0.33	0.05	0.05
Asphalt (acres per month)							
Fugitive Dust (acres per day) - Normal							
Fugitive Dust (yd3 per day)							
Fugitive Dust (acres per day) - Max							
Fugitive Dust (square footage per month) - Demo		27,000				5.2	1.08
Fugitive Dust Total		Unmitigated				**5.2**	**1.1**
		Mitigated				*3.3*	*0.7*
Off-site Total		Unmitigated	**4.56**	**7.84**	**0.67**	**0.25**	**0.25**
		Mitigated	*4.56*	*7.84*	*0.67*	*0.25*	*0.25*
On-site Total		Unmitigated	**24.18**	**37.97**	**3.69**	**7.54**	**3.21**
		Mitigated	22.97	36.08	3.50	5.57	2.71
Regional Total		Unmitigated	**28.74**	**45.81**	**4.36**	**7.79**	**3.45**
		Mitigated	*27.53*	*43.91*	*4.18*	*5.82*	*2.96*

Summary Table

Maximum Daily Emissions	**CO**	**NOx**	**VOC**	**PM_{10}**	**$PM_{2.5}$**
Unmitigated					
On-site	24	38	4	8	3
Off-site	5	8	1	0	0
Total	**29**	**46**	**4**	**8**	**3**
SCAQMD Regional Significance Thresho	550	100	75	150	55
Over/Under	521	54	71	142	52
Exceed Threshold?	No	No	No	No	No
Mitigated					
On-site	23	36	4	6	3
Off-site	5	8	1	0	0
Total	**28**	**44**	**4**	**6**	**3**
SCAQMD Regional Significance Thresho	550	100	75	150	55
Over/Under	522	56	71	144	52
Exceed Threshold?	No	No	No	No	No

Gerald Desmond Bridge Replacement Project
Construction Emissions

Rehabilitation Alternative

Bridge Rehabilitation — **2012 (September)**

Phase	Trip Length	Number of Eq.	CO	NOX	VOC	PM10	PM2.5
Concrete Truck		2	0.3	0.5	0.1	0.0	0.02
Concrete Pump	5	1	1.7	4.4	0.4	0.2	0.19
Dump Truck		5	0.8	3.0	0.1	0.1	0.09
Excavator		1	3.7	5.4	0.4	0.3	0.27
Cranes/Lifts		3	8.2	16.0	1.4	0.9	0.77
Bulldozer (Liebherr Crawler)		1	5.3	17.8	1.3	0.7	0.61
Saw Cutter		2	6.8	10.3	1.4	0.9	0.83
Total		Unmitigated	**26.80**	**57.31**	**5.06**	**3.11**	**2.77**
		Mitigated	*25.46*	*54.44*	*4.80*	*2.95*	*2.63*
Offsite Emissions							
Offsite Haul Trucks (Roundtrips)	50	12	2.3	1.3	0.5	0.1	0.12
Offsite Delivery Trucks (Roundtrips)							
Offsite Trash Trucks (Roundtrips)							
Truck Trip Total			2.27	1.30	0.49	0.12	0.12
Worker Trips (Phase 1 and 2)	30	150	12.8	11.6	1.4	0.3	0.26
Worker Trips (Phase 3)							
Worker Trips - Calculated Total			12.77	11.63	1.41	0.26	0.26
Asphalt (acres per month)							
Fugitive Dust (acres per day) - Normal							
Fugitive Dust (yd3 per day)							
Fugitive Dust (acres per day) - Max		4				87.1	18.29
Fugitive Dust (square footage per month) - Demol							0.00
Fugitive Dust Total		Unmitigated				**87.1**	**18.3**
		Mitigated				*55.7*	*11.7*
Off-site Total		Unmitigated	**15.04**	**12.93**	**1.90**	**0.39**	**0.38**
		Mitigated	*15.04*	*12.93*	*1.90*	*0.39*	*0.38*
On-site Total		Unmitigated	**26.80**	**57.31**	**5.06**	**90.20**	**21.06**
		Mitigated	25.46	54.44	4.80	58.69	14.33
Regional Total		Unmitigated	**41.83**	**70.24**	**6.96**	**90.59**	**21.44**
		Mitigated	*40.49*	*67.37*	*6.70*	*59.08*	*14.72*

Summary Table

Maximum Daily Emissions	**CO**	**NOx**	**VOC**	**PM_{10}**	**$PM_{2.5}$**
Unmitigated					
On-site	27	57	5	90	21
Off-site	15	13	2	0	0
Total	**42**	**70**	**7**	**91**	**21**
SCAQMD Regional Significance Threshold	550	100	75	150	55
Over/Under	508	30	68	59	34
Exceed Threshold?	No	No	No	No	No
Mitigated					
On-site	25	54	5	59	14
Off-site	15	13	2	0	0
Total	**40**	**67**	**7**	**59**	**15**
SCAQMD Regional Significance Threshold	550	100	75	150	55
Over/Under	510	33	68	91	40
Exceed Threshold?	No	No	No	No	No

SCAQMD Rule 403

(Adopted May 7, 1976) (Amended November 6, 1992)
(Amended July 9, 1993) (Amended February 14, 1997)
(Amended December 11, 1998)(Amended April 2, 2004)

RULE 403. FUGITIVE DUST

(a) Purpose

The purpose of this Rule is to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (man-made) fugitive dust sources by requiring actions to prevent, reduce or mitigate fugitive dust emissions.

(b) Applicability

The provisions of this Rule shall apply to any activity or man-made condition capable of generating fugitive dust.

(c) Definitions

(1) ACTIVE OPERATIONS means any source capable of generating fugitive dust, including, but not limited to, earth-moving activities, construction/demolition activities, disturbed surface area, or heavy- and light-duty vehicular movement.

(2) AGGREGATE-RELATED PLANTS are defined as facilities that produce and / or mix sand and gravel and crushed stone.

(3) AGRICULTURAL HANDBOOK means the region-specific guidance document that has been approved by the Governing Board or hereafter approved by the Executive Officer and the U.S. EPA. For the South Coast Air Basin, the Board-approved region-specific guidance document is the Rule 403 Agricultural Handbook dated December 1998. For the Coachella Valley, the Board-approved region-specific guidance document is the Rule 403 Coachella Valley Agricultural Handbook dated April 2, 2004.

(4) ANEMOMETERS are devices used to measure wind speed and direction in accordance with the performance standards, and maintenance and calibration criteria as contained in the most recent Rule 403 Implementation Handbook.

(5) BEST AVAILABLE CONTROL MEASURES means fugitive dust control actions that are set forth in Table 1 of this Rule.

(6) BULK MATERIAL is sand, gravel, soil, aggregate material less than two inches in length or diameter, and other organic or inorganic particulate matter.

(7) CEMENT MANUFACTURING FACILITY is any facility that has a cement kiln at the facility.

(8) CHEMICAL STABILIZERS are any non-toxic chemical dust suppressant which must not be used if prohibited for use by the Regional Water Quality Control Boards, the California Air Resources Board, the U.S. Environmental Protection Agency (U.S. EPA), or any applicable law, rule or regulation. The chemical stabilizers shall meet any specifications, criteria, or tests required by any federal, state, or local water agency. Unless otherwise indicated, the use of a non-toxic chemical stabilizer shall be of sufficient concentration and application frequency to maintain a stabilized surface.

(9) CONSTRUCTION/DEMOLITION ACTIVITIES means any on-site mechanical activities conducted in preparation of, or related to, the building, alteration, rehabilitation, demolition or improvement of property, including, but not limited to the following activities: grading, excavation, loading, crushing, cutting, planing, shaping or ground breaking.

(10) CONTRACTOR means any person who has a contractual arrangement to conduct an active operation for another person.

(11) DISTURBED SURFACE AREA means a portion of the earth's surface which has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural soil condition, thereby increasing the potential for emission of fugitive dust. This definition excludes those areas which have:

(A) been restored to a natural state, such that the vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;

(B) been paved or otherwise covered by a permanent structure; or

(C) sustained a vegetative ground cover of at least 70 percent of the native cover for a particular area for at least 30 days.

(12) DUST SUPPRESSANTS are water, hygroscopic materials, or non-toxic chemical stabilizers used as a treatment material to reduce fugitive dust emissions.

(13) EARTH-MOVING ACTIVITIES means the use of any equipment for any activity where soil is being moved or uncovered, and shall include, but not be limited to the following: grading, earth cutting and filling operations, loading or unloading of dirt or bulk materials, adding to or removing from open storage piles of bulk materials, landfill operations, weed abatement through disking, and soil mulching.

(14) DUST CONTROL SUPERVISOR means a person with the authority to expeditiously employ sufficient dust mitigation measures to ensure compliance with all Rule 403 requirements at an active operation.

(15) FUGITIVE DUST means any solid particulate matter that becomes airborne, other than that emitted from an exhaust stack, directly or indirectly as a result of the activities of any person.

(16) HIGH WIND CONDITIONS means that instantaneous wind speeds exceed 25 miles per hour.

(17) INACTIVE DISTURBED SURFACE AREA means any disturbed surface area upon which active operations have not occurred or are not expected to occur for a period of 20 consecutive days.

(18) LARGE OPERATIONS means any active operations on property which contains 50 or more acres of disturbed surface area; or any earth-moving operation with a daily earth-moving or throughput volume of 3,850 cubic meters (5,000 cubic yards) or more three times during the most recent 365-day period.

(19) OPEN STORAGE PILE is any accumulation of bulk material, which is not fully enclosed, covered or chemically stabilized, and which attains a height of three feet or more and a total surface area of 150 or more square feet.

(20) PARTICULATE MATTER means any material, except uncombined water, which exists in a finely divided form as a liquid or solid at standard conditions.

(21) PAVED ROAD means a public or private improved street, highway, alley, public way, or easement that is covered by typical roadway materials, but excluding access roadways that connect a facility with a public paved roadway and are not open to through traffic. Public paved roads are those open to public access and that are owned by any federal, state, county, municipal or any other governmental or quasi-governmental agencies. Private paved roads are any paved roads not defined as public.

(22) PM_{10} means particulate matter with an aerodynamic diameter smaller than or equal to 10 microns as measured by the applicable State and Federal reference test methods.

(23) PROPERTY LINE means the boundaries of an area in which either a person causing the emission or a person allowing the emission has the legal use or possession of the property. Where such property is divided into one or more sub-tenancies, the property line(s) shall refer to the boundaries dividing the areas of all sub-tenancies.

(24) RULE 403 IMPLEMENTATION HANDBOOK means a guidance document that has been approved by the Governing Board on April 2, 2004 or hereafter approved by the Executive Officer and the U.S. EPA.

(25) SERVICE ROADS are paved or unpaved roads that are used by one or more public agencies for inspection or maintenance of infrastructure and which are not typically used for construction-related activity.

(26) SIMULTANEOUS SAMPLING means the operation of two PM_{10} samplers in such a manner that one sampler is started within five minutes of the other, and each sampler is operated for a consecutive period which must be not less than 290 minutes and not more than 310 minutes.

(27) SOUTH COAST AIR BASIN means the non-desert portions of Los Angeles, Riverside, and San Bernardino counties and all of Orange County as defined in California Code of Regulations, Title 17, Section 60104. The area is bounded on the west by the Pacific Ocean, on the north and east by the San Gabriel, San Bernardino, and San Jacinto Mountains, and on the south by the San Diego county line.

(28) STABILIZED SURFACE means any previously disturbed surface area or open storage pile which, through the application of dust suppressants, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust and is demonstrated to be stabilized. Stabilization can be demonstrated by one or more of the applicable test methods contained in the Rule 403 Implementation Handbook.

(29) TRACK-OUT means any bulk material that adheres to and agglomerates on the exterior surface of motor vehicles, haul trucks, and equipment (including tires) that have been released onto a paved road and can be removed by a vacuum sweeper or a broom sweeper under normal operating conditions.

(30) TYPICAL ROADWAY MATERIALS means concrete, asphaltic concrete, recycled asphalt, asphalt, or any other material of equivalent performance as determined by the Executive Officer, and the U.S. EPA.

(31) UNPAVED ROADS means any unsealed or unpaved roads, equipment paths, or travel ways that are not covered by typical roadway materials. Public unpaved roads are any unpaved roadway owned by federal, state, county, municipal or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public.

(32) VISIBLE ROADWAY DUST means any sand, soil, dirt, or other solid particulate matter which is visible upon paved road surfaces and which can be removed by a vacuum sweeper or a broom sweeper under normal operating conditions.

(33) WIND-DRIVEN FUGITIVE DUST means visible emissions from any disturbed surface area which is generated by wind action alone.

(34) WIND GUST is the maximum instantaneous wind speed as measured by an anemometer.

(d) Requirements

(1) No person shall cause or allow the emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area such that:

(A) the dust remains visible in the atmosphere beyond the property line of the emission source; or

(B) the dust emission exceeds 20 percent opacity (as determined by the appropriate test method included in the Rule 403 Implementation Handbook), if the dust emission is the result of movement of a motorized vehicle.

(2) No person shall conduct active operations without utilizing the applicable best available control measures included in Table 1 of this Rule to minimize fugitive dust emissions from each fugitive dust source type within the active operation.

(3) No person shall cause or allow PM_{10} levels to exceed 50 micrograms per cubic meter when determined, by simultaneous sampling, as the difference between upwind and downwind samples collected on high-volume particulate matter samplers or other U.S. EPA-approved equivalent

method for PM_{10} monitoring. If sampling is conducted, samplers shall be:

(A) Operated, maintained, and calibrated in accordance with 40 Code of Federal Regulations (CFR), Part 50, Appendix J, or appropriate U.S. EPA-published documents for U.S. EPA-approved equivalent method(s) for PM_{10}.

(B) Reasonably placed upwind and downwind of key activity areas and as close to the property line as feasible, such that other sources of fugitive dust between the sampler and the property line are minimized.

(4) No person shall allow track-out to extend 25 feet or more in cumulative length from the point of origin from an active operation. Notwithstanding the preceding, all track-out from an active operation shall be removed at the conclusion of each workday or evening shift.

(5) After January 1, 2005, no person shall conduct an active operation with a disturbed surface area of five or more acres, or with a daily import or export of 100 cubic yards or more of bulk material without utilizing at least one of the measures listed in subparagraphs (d)(5)(A) through (d)(5)(E) at each vehicle egress from the site to a paved public road.

(A) Install a pad consisting of washed gravel (minimum-size: one inch) maintained in a clean condition to a depth of at least six inches and extending at least 30 feet wide and at least 50 feet long.

(B) Pave the surface extending at least 100 feet and at least 20 feet wide.

(C) Utilize a wheel shaker/wheel spreading device consisting of raised dividers (rails, pipe, or grates) at least 24 feet long and 10 feet wide to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.

(D) Install and utilize a wheel washing system to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.

(E) Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the actions specified in subparagraphs (d)(5)(A) through (d)(5)(D).

(e) Additional Requirements for Large Operations

(1) Any person who conducts or authorizes the conducting of a large operation subject to this Rule shall implement the applicable actions specified in Table 2 of this Rule at all times and shall implement the applicable actions specified in Table 3 of this Rule when the applicable performance standards can not be met through use of Table 2 actions; and shall:

(A) submit a fully executed Large Operation Notification (Form 403 N) to the Executive Officer within 7 days of qualifying as a large operation;

(B) include, as part of the notification, the name(s), address(es), and phone number(s) of the person(s) responsible for the submittal, and a description of the operation(s), including a map depicting the location of the site;

(C) maintain daily records to document the specific dust control actions taken, maintain such records for a period of not less than three years; and make such records available to the Executive Officer upon request;

(D) after January 1, 2005, install and maintain project signage with project contact signage that meets the minimum standards of the Rule 403 Implementation Handbook, prior to initiating any earthmoving activities;

(E) after January 1, 2005, identify a dust control supervisor that:

(i) is employed by or contracted with the property owner or developer;

(ii) is on the site or available on-site within 30 minutes during working hours;

(iii) has the authority to expeditiously employ sufficient dust mitigation measures to ensure compliance with all Rule requirements;

(iv) has completed the AQMD Fugitive Dust Control Class and has been issued a valid Certificate of Completion for the class; and

(F) notify the Executive Officer in writing within 30 days after the site no longer qualifies as a large operation as defined by paragraph (c)(18).

(2) Any Large Operation Notification submitted to the Executive Officer or AQMD-approved dust control plan shall be valid for a period of one year from the date of written acceptance by the Executive Officer. Any Large Operation Notification accepted pursuant to paragraph (e)(1), excluding those submitted by aggregate-related plants and cement manufacturing facilities must be resubmitted annually by the person who conducts or authorizes the conducting of a large operation, at least 30 days prior to the expiration date, or the submittal shall no longer be valid as of the expiration date. If all fugitive dust sources and corresponding control measures or special circumstances remain identical to those identified in the previously accepted submittal or in an AQMD-approved dust control plan, the resubmittal may be a simple statement of no-change (Form 403NC).

(f) Compliance Schedule

The newly amended provisions of this Rule shall become effective upon adoption. Pursuant to subdivision (e), any existing site that qualifies as a large operation will have 60 days from the date of Rule adoption to comply with the notification and recordkeeping requirements for large operations. Any Large Operation Notification or AQMD-approved dust control plan which has been accepted prior to the date of adoption of these amendments shall remain in effect and the Large Operation Notification or AQMD-approved dust control plan annual resubmittal date shall be one year from adoption of this Rule amendment.

(g) Exemptions

(1) The provisions of this Rule shall not apply to:

(A) Agricultural operations directly related to the raising of fowls or animals and agricultural operations, provided that the combined disturbed surface area within one continuous property line and not separated by a paved public road is 10 acres or less.

(B) Agricultural operations within the South Coast Air Basin, whose combined disturbed surface area includes more than 10 acres provided that the person responsible for such operations:

(i) voluntarily implements the conservation practices contained in the Rule 403 Agricultural Handbook;

(ii) completes and maintains the self-monitoring form documenting sufficient conservation practices, as described in the Rule 403 Agricultural Handbook; and

(iii) makes the completed self-monitoring form available to the Executive Officer upon request.

(C) Agricultural operations outside the South Coast Air Basin, until January 1, 2005, whose combined disturbed surface area includes more than 10 acres provided that the person responsible for such operations:

(i) voluntarily implements the conservation practices contained in the Rule 403 Coachella Valley Agricultural Handbook; and

(ii) completes and maintains the self-monitoring form documenting sufficient conservation practices, as described in the Rule 403 Coachella Valley Agricultural Handbook; and

(iii) makes the completed self-monitoring form available to the Executive Officer upon request.

(D) Active operations conducted during emergency life-threatening situations, or in conjunction with any officially declared disaster or state of emergency.

(E) Active operations conducted by essential service utilities to provide electricity, natural gas, telephone, water and sewer during periods of service outages and emergency disruptions.

(F) Any contractor subsequent to the time the contract ends, provided that such contractor implemented the required control measures during the contractual period.

(G) Any grading contractor, for a phase of active operations, subsequent to the contractual completion of that phase of earth-moving activities, provided that the required control measures have been implemented during the entire phase of earth-moving activities, through and including five days after the final grading inspection.

(H) Weed abatement operations ordered by a county agricultural commissioner or any state, county, or municipal fire department, provided that:

(i) mowing, cutting or other similar process is used which maintains weed stubble at least three inches above the soil; and

(ii) any discing or similar operation which cuts into and disturbs the soil, where watering is used prior to initiation of these activities and a determination is made by the agency issuing the weed abatement order that, due to fire hazard conditions, rocks, or other physical obstructions, it is not practical to meet the conditions specified in clause (g)(1)(H)(i). The provisions this clause shall not exempt the owner of any property from stabilizing, in accordance with paragraph (d)(2), disturbed surface areas which have been created as a result of the weed abatement actions.

(I) sandblasting operations.

(2) The provisions of paragraphs (d)(1) and (d)(3) shall not apply:

(A) When wind gusts exceed 25 miles per hour, provided that:

(i) The required Table 3 contingency measures in this Rule are implemented for each applicable fugitive dust source type, and;

(ii) records are maintained in accordance with subparagraph (e)(1)(C).

(B) To unpaved roads, provided such roads:

(i) are used solely for the maintenance of wind-generating equipment; or

(ii) are unpaved public alleys as defined in Rule 1186; or

(iii) are service roads that meet all of the following criteria:

(a) are less than 50 feet in width at all points along the road;

(b) are within 25 feet of the property line; and

(c) have a traffic volume less than 20 vehicle-trips per day.

(C) To any active operation, open storage pile, or disturbed surface area for which necessary fugitive dust preventive or mitigative actions are in conflict with the federal Endangered Species Act, as determined in writing by the State or federal agency responsible for making such determinations.

(3) The provisions of (d)(2) shall not apply to any aggregate-related plant or cement manufacturing facility that implements the applicable actions specified in Table 2 of this Rule at all times and shall implement the applicable actions specified in Table 3 of this Rule when the applicable performance standards of paragraphs (d)(1) and (d)(3) can not be met through use of Table 2 actions.

(4) The provisions of paragraphs (d)(1), (d)(2), and (d)(3) shall not apply to:

(A) Blasting operations which have been permitted by the California Division of Industrial Safety; and

(B) Motion picture, television, and video production activities when dust emissions are required for visual effects. In order to obtain this exemption, the Executive Officer must receive notification in writing at least 72 hours in advance of any such activity and no nuisance results from such activity.

(5) The provisions of paragraph (d)(3) shall not apply if the dust control actions, as specified in Table 2, are implemented on a routine basis for each applicable fugitive dust source type. To qualify for this exemption, a person must maintain records in accordance with subparagraph (e)(1)(C).

(6) The provisions of paragraph (d)(4) shall not apply to earth coverings of public paved roadways where such coverings are approved by a local government agency for the protection of the roadway, and where such coverings are used as roadway crossings for haul vehicles provided that such roadway is closed to through traffic and visible roadway dust is removed within one day following the cessation of activities.

(7) The provisions of subdivision (e) shall not apply to:

(A) officially-designated public parks and recreational areas, including national parks, national monuments, national forests, state parks, state recreational areas, and county regional parks.

(B) any large operation which is required to submit a dust control plan to any city or county government which has adopted a District-approved dust control ordinance.

(C) any large operation subject to Rule 1158, which has an approved dust control plan pursuant to Rule 1158, provided that all sources of fugitive dust are included in the Rule 1158 plan.

(8) The provisions of subparagraph (e)(1)(A) through (e)(1)(C) shall not apply to any large operation with an AQMD-approved fugitive dust control plan

provided that there is no change to the sources and controls as identified in the AQMD-approved fugitive dust control plan.

(h) Fees

Any person conducting active operations for which the Executive Officer conducts upwind/downwind monitoring for PM_{10} pursuant to paragraph (d)(3) shall be assessed applicable Ambient Air Analysis Fees pursuant to Rule 304.1. Applicable fees shall be waived for any facility which is exempted from paragraph (d)(3) or meets the requirements of paragraph (d)(3).

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Backfilling	01-1 Stabilize backfill material when not actively handling; and 01-2 Stabilize backfill material during handling; and 01-3 Stabilize soil at completion of activity.	✓ Mix backfill soil with water prior to moving ✓ Dedicate water truck or high capacity hose to backfilling equipment ✓ Empty loader bucket slowly so that no dust plumes are generated ✓ Minimize drop height from loader bucket
Clearing and grubbing	02-1 Maintain stability of soil through pre-watering of site prior to clearing and grubbing; and 02-2 Stabilize soil during clearing and grubbing activities; and 02-3 Stabilize soil immediately after clearing and grubbing activities.	✓ Maintain live perennial vegetation where possible ✓ Apply water in sufficient quantity to prevent generation of dust plumes
Clearing forms	03-1 Use water spray to clear forms; or 03-2 Use sweeping and water spray to clear forms; or 03-3 Use vacuum system to clear forms.	✓ Use of high pressure air to clear forms may cause exceedance of Rule requirements
Crushing	04-1 Stabilize surface soils prior to operation of support equipment; and 04-2 Stabilize material after crushing.	✓ Follow permit conditions for crushing equipment ✓ Pre-water material prior to loading into crusher ✓ Monitor crusher emissions opacity ✓ Apply water to crushed material to prevent dust plumes

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Cut and fill	05-1 Pre-water soils prior to cut and fill activities; and 05-2 Stabilize soil during and after cut and fill activities.	✓ For large sites, pre-water with sprinklers or water trucks and allow time for penetration ✓ Use water trucks/pulls to water soils to depth of cut prior to subsequent cuts
Demolition – mechanical/manual	06-1 Stabilize wind erodible surfaces to reduce dust; and 06-2 Stabilize surface soil where support equipment and vehicles will operate; and 06-3 Stabilize loose soil and demolition debris; and 06-4 Comply with AQMD Rule 1403.	✓ Apply water in sufficient quantities to prevent the generation of visible dust plumes
Disturbed soil	07-1 Stabilize disturbed soil throughout the construction site; and 07-2 Stabilize disturbed soil between structures	✓ Limit vehicular traffic and disturbances on soils where possible ✓ If interior block walls are planned, install as early as possible ✓ Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes
Earth-moving activities	08-1 Pre-apply water to depth of proposed cuts; and 08-2 Re-apply water as necessary to maintain soils in a damp condition and to ensure that visible emissions do not exceed 100 feet in any direction; and 08-3 Stabilize soils once earth-moving activities are complete.	✓ Grade each project phase separately, timed to coincide with construction phase ✓ Upwind fencing can prevent material movement on site ✓ Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Importing/exporting of bulk materials	09-1 Stabilize material while loading to reduce fugitive dust emissions; and 09-2 Maintain at least six inches of freeboard on haul vehicles; and 09-3 Stabilize material while transporting to reduce fugitive dust emissions; and 09-4 Stabilize material while unloading to reduce fugitive dust emissions; and 09-5 Comply with Vehicle Code Section 23114.	✓ Use tarps or other suitable enclosures on haul trucks ✓ Check belly-dump truck seals regularly and remove any trapped rocks to prevent spillage ✓ Comply with track-out prevention/mitigation requirements ✓ Provide water while loading and unloading to reduce visible dust plumes
Landscaping	10-1 Stabilize soils, materials, slopes	✓ Apply water to materials to stabilize ✓ Maintain materials in a crusted condition ✓ Maintain effective cover over materials ✓ Stabilize sloping surfaces using soil binders until vegetation or ground cover can effectively stabilize the slopes ✓ Hydroseed prior to rain season
Road shoulder maintenance	11-1 Apply water to unpaved shoulders prior to clearing; and 11-2 Apply chemical dust suppressants and/or washed gravel to maintain a stabilized surface after completing road shoulder maintenance.	✓ Installation of curbing and/or paving of road shoulders can reduce recurring maintenance costs ✓ Use of chemical dust suppressants can inhibit vegetation growth and reduce future road shoulder maintenance costs

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Screening	12-1 Pre-water material prior to screening; and 12-2 Limit fugitive dust emissions to opacity and plume length standards; and 12-3 Stabilize material immediately after screening.	✓ Dedicate water truck or high capacity hose to screening operation ✓ Drop material through the screen slowly and minimize drop height ✓ Install wind barrier with a porosity of no more than 50% upwind of screen to the height of the drop point
Staging areas	13-1 Stabilize staging areas during use; and 13-2 Stabilize staging area soils at project completion.	✓ Limit size of staging area ✓ Limit vehicle speeds to 15 miles per hour ✓ Limit number and size of staging area entrances/exists
Stockpiles/ Bulk Material Handling	14-1 Stabilize stockpiled materials. 14-2 Stockpiles within 100 yards of off-site occupied buildings must not be greater than eight feet in height; or must have a road bladed to the top to allow water truck access or must have an operational water irrigation system that is capable of complete stockpile coverage.	✓ Add or remove material from the downwind portion of the storage pile ✓ Maintain storage piles to avoid steep sides or faces

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Traffic areas for construction activities	15-1 Stabilize all off-road traffic and parking areas; and 15-2 Stabilize all haul routes; and 15-3 Direct construction traffic over established haul routes.	✓ Apply gravel/paving to all haul routes as soon as possible to all future roadway areas ✓ Barriers can be used to ensure vehicles are only used on established parking areas/haul routes
Trenching	16-1 Stabilize surface soils where trencher or excavator and support equipment will operate; and 16-2 Stabilize soils at the completion of trenching activities.	✓ Pre-watering of soils prior to trenching is an effective preventive measure. For deep trenching activities, pre-trench to 18 inches soak soils via the pre-trench and resuming trenching ✓ Washing mud and soils from equipment at the conclusion of trenching activities can prevent crusting and drying of soil on equipment
Truck loading	17-1 Pre-water material prior to loading; and 17-2 Ensure that freeboard exceeds six inches (CVC 23114)	✓ Empty loader bucket such that no visible dust plumes are created ✓ Ensure that the loader bucket is close to the truck to minimize drop height while loading
Turf Overseeding	18-1 Apply sufficient water immediately prior to conducting turf vacuuming activities to meet opacity and plume length standards; and 18-2 Cover haul vehicles prior to exiting the site.	✓ Haul waste material immediately off-site

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Unpaved roads/parking lots	19-1 Stabilize soils to meet the applicable performance standards; and 19-2 Limit vehicular travel to established unpaved roads (haul routes) and unpaved parking lots.	✓ Restricting vehicular access to established unpaved travel paths and parking lots can reduce stabilization requirements
Vacant land	20-1 In instances where vacant lots are 0.10 acre or larger and have a cumulative area of 500 square feet or more that are driven over and/or used by motor vehicles and/or off-road vehicles, prevent motor vehicle and/or off-road vehicle trespassing, parking and/or access by installing barriers, curbs, fences, gates, posts, signs, shrubs, trees or other effective control measures.	

TABLE 2

DUST CONTROL MEASURES FOR LARGE OPERATIONS

FUGITIVE DUST SOURCE CATEGORY		**CONTROL ACTIONS**
Earth-moving (except construction cutting and filling areas, and mining operations)	(1a)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations each subsequent four-hour period of active operations; OR
	(1a-1)	For any earth-moving which is more than 100 feet from all property lines, conduct watering as necessary to prevent visible dust emissions from exceeding 100 feet in length in any direction.
Earth-moving: Construction fill areas:	(1b)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. For areas which have an optimum moisture content for compaction of less than 12 percent, as determined by ASTM Method 1557 or other equivalent method approved by the Executive Officer and the California Air Resources Board and the U.S. EPA, complete the compaction process as expeditiously as possible after achieving at least 70 percent of the optimum soil moisture content. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four-hour period of active operations.

TABLE 2 (Continued)

FUGITIVE DUST SOURCE CATEGORY		CONTROL ACTIONS
Earth-moving: Construction cut areas and mining operations:	(1c)	Conduct watering as necessary to prevent visible emissions from extending more than 100 feet beyond the active cut or mining area unless the area is inaccessible to watering vehicles due to slope conditions or other safety factors.
Disturbed surface areas (except completed grading areas)	(2a/b)	Apply dust suppression in sufficient quantity and frequency to maintain a stabilized surface. Any areas which cannot be stabilized, as evidenced by wind driven fugitive dust must have an application of water at least twice per day to at least 80 percent of the unstabilized area.
Disturbed surface areas: Completed grading areas	(2c)	Apply chemical stabilizers within five working days of grading completion; OR
	(2d)	Take actions (3a) or (3c) specified for inactive disturbed surface areas.
Inactive disturbed surface areas	(3a)	Apply water to at least 80 percent of all inactive disturbed surface areas on a daily basis when there is evidence of wind driven fugitive dust, excluding any areas which are inaccessible to watering vehicles due to excessive slope or other safety conditions; OR
	(3b)	Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR
	(3c)	Establish a vegetative ground cover within 21 days after active operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter; OR
	(3d)	Utilize any combination of control actions (3a), (3b), and (3c) such that, in total, these actions apply to all inactive disturbed surface areas.

TABLE 2 (Continued)

FUGITIVE DUST SOURCE CATEGORY		CONTROL ACTIONS
Unpaved Roads	(4a)	Water all roads used for any vehicular traffic at least once per every two hours of active operations [3 times per normal 8 hour work day]; OR
	(4b)	Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; OR
	(4c)	Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.
Open storage piles	(5a)	Apply chemical stabilizers; OR
	(5b)	Apply water to at least 80 percent of the surface area of all open storage piles on a daily basis when there is evidence of wind driven fugitive dust; OR
	(5c)	Install temporary coverings; OR
	(5d)	Install a three-sided enclosure with walls with no more than 50 percent porosity which extend, at a minimum, to the top of the pile. This option may only be used at aggregate-related plants or at cement manufacturing facilities.
All Categories	(6a)	Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 2 may be used.

TABLE 3

CONTINGENCY CONTROL MEASURES FOR LARGE OPERATIONS

FUGITIVE DUST SOURCE CATEGORY		CONTROL MEASURES
Earth-moving	(1A)	Cease all active operations; OR
	(2A)	Apply water to soil not more than 15 minutes prior to moving such soil.
Disturbed surface areas	(0B)	On the last day of active operations prior to a weekend, holiday, or any other period when active operations will not occur for not more than four consecutive days: apply water with a mixture of chemical stabilizer diluted to not less than 1/20 of the concentration required to maintain a stabilized surface for a period of six months; OR
	(1B)	Apply chemical stabilizers prior to wind event; OR
	(2B)	Apply water to all unstabilized disturbed areas 3 times per day. If there is any evidence of wind driven fugitive dust, watering frequency is increased to a minimum of four times per day; OR
	(3B)	Take the actions specified in Table 2, Item (3c); OR
	(4B)	Utilize any combination of control actions (1B), (2B), and (3B) such that, in total, these actions apply to all disturbed surface areas.
Unpaved roads	(1C)	Apply chemical stabilizers prior to wind event; OR
	(2C)	Apply water twice per hour during active operation; OR
	(3C)	Stop all vehicular traffic.
Open storage piles	(1D)	Apply water twice per hour; OR
	(2D)	Install temporary coverings.
Paved road track-out	(1E)	Cover all haul vehicles; OR
	(2E)	Comply with the vehicle freeboard requirements of Section 23114 of the California Vehicle Code for both public and private roads.
All Categories	(1F)	Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 3 may be used.

A-2 Transportation Conformity Working Group Project Documentation

TCWG Review of Qualitative Analyses

Qualitative PM Hot Spot Analysis Review

February 2007	Determination
LA000512 & LA0F011 Gerald Desmond Bridge Replacement and Ocean Boulevard from SR-47 to the Los Angeles River Final Draft (March 9, 2007)	Analysis deemed acceptable for NEPA circulation

TRANSPORTATION CONFORMITY WORKING GROUP
of the
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS'

February 27, 2007
Minutes

THE FOLLOWING MINUTES ARE A SUMMARY OF ACTIONS TAKEN BY THE TRANSPORTATION CONFORMITY WORKING GROUP. AN AUDIOCASSETTE TAPE OF THE ACTUAL MEETING IS AVAILABLE FOR LISTENING IN SCAG'S OFFICE.

The Transportation Conformity Working Group held its meeting at the SCAG office in Los Angeles.

In Attendance:

Naresh Amatya	SCAG
John Asuncion	SCAG
Rosemary Ayala	SCAG
Nasrin Behmanesh	Parsons
Scott Cohen	West Coast Environmental
Sheryll Del Rosario	SCAG
Kevin Haboian	Parsons
Gary Hansen	City of Westlake Village
Lori Huddleston	MTA/Metro
Shawn Kuk	SCAG
Michael Litschi	OCTA
Betty Mann	SCAG
Brad McAllester	MTA/Metro
Shirley Medina	RCTC
Jonathan Nadler	SCAG
Arnie Sherwood	ITS UC Berkley/SCAG
Carla Walecka	TCA

Via Teleconference:

Arman Behtash	Caltrans District 12
Ron Bloomburg	CH2MHill, Riverside County
Mike Brady	Caltrans Headquarters
Ben Cacatian	Ventura County APCD
Andrew Yoon	Caltrans District 7
Paul Fagan	Caltrans District 8
Eileen Gallo	Caltrans Headquarters
Carol Gomez	South Coast AQMD
Sandy Johnson	Caltrans District 11

July and the other was likely to occur prior to that. Page 5 of the Staff Report reflects that the Projects are expected to be operational by mid-2007.

4.4 AQMP Update

Carol Gomez, South Coast AQMD, informed the Working Group that there was a meeting between upper management and staff from AQMD and the California Air Resources Board (CARB) in Sacramento, which was intended to resolve certain issues. Ms. Gomez did not have the details of the meeting. AQMD plans to release the modifications to the Draft 2007 AQMP on its website by the end of the week. The public workshops will be held March 13 and 15 in the four counties.

4.5 Review of Qualitative PM Hot Spot Analysis

Jean Mazur, inquired if the project sponsor had been able to find an existing monitor that would be representative of the proposed project.

Andrew Yoon, Caltrans District 7, responded on behalf of the project sponsor, the Port of Long Beach. Mr. Yoon verified that the corridor is near the port, which has high heavy-duty diesel truck traffic, such that there are not many monitoring stations that are representative. The monitor used in the analysis is in north Long Beach, which is the most representative. There are a couple of MATES monitoring stations in Wilmington and on Pacific Coast Highway, which were installed for the short-term MATES study, limiting the amount of historical data available.

Mr. Nadler stated that the ports have started, or will start, to do their own air quality monitoring. Mr. Nadler also pointed out that since there would generally not be a perfect monitoring station, we still need to move forward with the analysis and conclusions using the best available data. Mr. Nadler stated that the project sponsor should include additional data if available and relevant. It is assumed that such data will not change the conclusions. Otherwise, the TCWG would need to review once again.

The TCWG concluded that they would conditionally approve the current draft analysis subject to EPA and FHWA concurrence which would presumably take place at a sub-group meeting next week. Staff will set the date and setup a conference call for those who wish to participate.

A-3 2008 RTIP and RTP Project Listings

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

RTP
2008 REGIONAL TRANSPORTATION PLAN

Making the Connections

Project List

LOS ANGELES COUNTY RTIP PROJECTS				
SYS-TEM*	RTP ID	ROUTE	DESCRIPTION	PROJECT COST ($1,000'S)
S	LA0D194	405	GARVEE DEBT SERVICE PAYMENTS: IN LOS ANGELES ON ROUTE 405/101 CONNECTOR GAP CLOSURE (2001 CFP 7248, 2001 CFP 8347) (EA# 20120K, PPNO 2336). (BOTH RIP & IIP)	$30,787
S	LA0D332	405	IN LOS ANGELES: FROM LA TIJERA BLVD TO JEFFERSON BLVD; ADD AUXILIARY LANE PPNO: 3348 EA: 24130	$38,711
S	LA0D77	405	CITY OF L.A.-AT ROUTE 405 & US 101 INTERCHANGE. CONSTRUCT FREEWAY CONNECTOR FROM SB RTE 405 TO NB&SB US 101 & ADD AUX LANE FROM BURBANK TO NB 101 CONNECTOR (EA# 199610, PPNO 2787)	$246,180
S	LAE0574	605	STUDY - CONSTRUCT I-605 INTERCHANGE CAPACITY IMPROVEMENTS IN IRWINDALE	$1,920
S	2009	710	NEAR SOUTH PASADENA FROM ROUTE 10 TO ROUTE 210 - PARTIAL RIGHT OF WAY FOR NEW 6 LANE FREEWAY WITH 2 HOV LANES (EA# 020090, PPNO 0219M) (PROPERTY MANAGEMENT)	$4,185
S	18790	710	RTE 10 TO DEL MAR BLVD OVERCROSSING FOR THE 710 FWY - WORK ON ENVIRONMENTAL CLEARANCE ISSUES & FUND INITIAL DESIGN. (EA# 187901, PPNO# 2215) (IIP) SAFETEA #2193	$15,352
S	LA0B952	710	ROUTE 710 EXPANSION BETWEEN THE PORTS IN THE CITY OF LONG BEACH TO CESAR CHAVEZ O/C IN EAST LOS ANGELES (EA 24990 PPNO 3612)	$40,500
S	LA996143	710	RTE 710 PCH TO DOWNTOWN L.B., PAVEMENT RECON, MEDIAN, LANDSCAPING IMPROVE (EA 2203U, 23640, PPNO: 2945,3248)	$6,600
S	LA996347	710	I-710/FIRESTONE BLVD.OVER LA RIVER BRIDGE WIDEN ON-RAMP MOD. & SNDWALL ALONG I-710 FROM FIRESTONE BLVD. TO SOUTH-ERN AVE. PHASE IV (HBRR: 53C1972) WIDEN FROM 4.7M TO 6.4M.	$19,000
S	LAE3773	710	RECONSTRUCT I-710 INTERCHANGES AS PART I-710 CORRIDOR IMPRVMNT PRGRM PROPOSING 4-TRUCK LNS (PORTS- RAIL YARDS), 10 GENERAL LNS (PORTS- SR60), & ARTERIAL IMPRVMNTS	$6,875
L	LA000373	0	AVIATION BLVD FROM MANHATTAN BEACH BLVD TO ARBOR VITAE WIDEN FROM 4 TO 6 LANES (ISTEA, 102-240, 1991)	$13,984
L	LA000389	0	DEL AMO BLVD FROM MADRONA AVE TO CRENSHAW BLVD CONSTRUCT 0 TO 4 LANES NEW GRADE SEPARATION (CFP 6361, 4314; PPNO 2371).	$30,084
L	LA000512	0	GERALD DESMOND BRIDGE REPLACEMENT (SAFETEA-LU PNRS #14 - SEC 1301B) (ALSO LA0F011)	$824,000
L	LA000720	0	ROSECRANS/AVIATION INTERSECTION (AVIATION WIDEN TO 3 LANES IN EACH DIRECTION) RAILROAD BRIDGE WIDENING (C-I:44419) SAFETEA-LU # 3799 AND # 563	$12,553
L	LA000800	0	HBRR LOCAL BRIDGE LUMP SUM FOR 2004/2005 - (PROJECTS ARE CONSISTENT WITH 40 CFR PART 93.126,127,128, EXEMPT TABLES 2 & 3)	$394,000
L	LA002738	0	BIKEWAY/PEDESTRIAN BRIDGE OVER LA R RIVER AT TAYLOR YARD CLASS I (CFP 738, 2077) (PPNO# 3156)	$5,000
L	LA0B100	0	LUMP SUM TRANSPORTATION ENHANCEMENT ACTIVITIES (EXCLUDING CATEGORY 7) (PROJECTS ARE CONSISTENT WITH 40 CFR PART 93.126,127,128, EXEMPT TABLES 2 & 3)	$84,273

LOS ANGELES COUNTY RTIP PROJECTS				
SYS-TEM*	RTP ID	ROUTE	DESCRIPTION	PROJECT COST ($1,000'S)
L	LA0F003	0	LOS ANGELES STREET, OVER BIG DALTON WASH, 0.5 MI S IRWINDALE AVE. WIDEN 2-LANE BRIDGE TO 4-LANE BRIDGE, ADD SHOULDERS, UPGRADE BRIDGE RAILING (# 53C0676)	$11,649
L	LA0F004	0	DELL AVE, OVER CARROLL CANAL, 0.2 KM S OF VENICE BLVD. REHABILITATE 1 LANE BRIDGE AND WIDEN TO 2 LANE BRIDGE, ADD SIDEWALKS, UPGRADE BRIDGE RAILINGS. (# 53C1688)	$3,500
L	LA0F005	0	DELL AVENUE, OVER LINNIE CANAL, 0.25 KM S OF VENICE BLVD. REHABILITATE 1 LANE BRIDGE & WIDEN TO 2 LANE BRIDGE, ADD SIDEWALKS, UPGRADE BRIDGE RAILINGS (# 53C1689)	$4,000
L	LA0F006	0	DELL AVENUE, OVER SHERMAN CANAL, 0.25 MI S VENICE BLVD. REHABILITATE 1 LANE BRIDGE & WIDEN TO 2 LANE BRIDGE ADD SIDEWALKS, UPGRADE BRIDGE RAILINGS. (# 53C1691)	$4,000
L	LA0F007	0	HYPERION AVE. OVER GLENDALE BL SB, LA RIVER, SOUTHBOUND GLENDALE. SEISMIC RETROFIT & RECONFIGURE SIDEWALKS, RESTORE HISTORIC BRIDGE RAILINGS (NO BRIDGE WIDENING) (# 53C1881)	$12,719
L	LA0F008	0	GLENDALE BLVD. OVER L.A RIVER, REHABILITATE 2 LANE BRIDGE & WIDEN TO INCLUDE SHOULDERS, SIDEWALKS, AND RESTORE HISTORIC BRIDGE RAILINGS (NON CAPACITY) # 53C1883)	$12,000
L	LA0F009	0	GLENDALE BLVD. - OVER LA RIVER. REHABILITATE 2 LANE BRIDGE & WIDEN TO INCLUDE SHOULDERS, SIDEWALKS, RESTORE HISTORIC RAILINGS (NON-CAPACTIY PROJECT) (# 53C1884)	$10,000
L	LA0F010	0	OLD ROAD, OVER SANTA CLARA RIVER, 1/4 MI N MAGIC MTN PKWY. REPLACE 4 LANE BRIDGE W/ 6 LANE BRIDGE (HBRRP PAY FOR 4 LANE, & NEWHALL LAND &FARMING PAYS FOR 2 ADDIT. LANES) (# 53C0327	$21,500
L	LA0F011	0	OCEAN BLVD. OVER ENTRANCE CHANNEL, UP RR, 1.0 MI E STATE ROUTE 47. REPLACE EXISTING 5 LANE GERALD DESMOND BRIDGE WITH NEW 6 LANE BRIDGE (BRIDGE #53C0013) (ALSO LA000512)	$26,500
L	LA0F016	0	PURCHASE, INSTALL, AND INTEGRATE OPTICOM PRIORITY CONTROL SYSTEM TO EXISTING TRAFFIC CONTROLLERS AT VARIOUS LOCATIONS WITHIN CITY LIMITS. (SAFETEA-LU#2345)	$217
L	LA0F019	0	PURCHASE OF BUS BENCHES, TRASH CANS, AND SMALL SHELTERS FOR VARIOUS TRANIST STOPS THROUGHOUT CITY OF LAKEWOOD.	$493
L	LA0F020	0	LOWER ARROYO SECO TRAIL AND TRAILHEAD IMPROVEMENT PROJECT (GRANT FROM RECREATIONAL TRAILS PROGRAM)	$258
L	LA0F030	0	I-110 FREEWAY/ 'C' STREET INTERCHANGE IMPROVEMENTS- MODIFICATION OF EXISTING INTERCHANGE	$24,798
L	LA0F033	0	PLANNING SERVICES ARROYO SECO PARKWAY SCENIC CORRIDOR & IMPLEMENTATION OF CORRIDOR MGMT PLAN. SCENIC BYWAY ORGZN & VISTOR INTERPRETATION & MARKETING PLAN.FHWA PRJ SB-2004-CA-51312	$372
L	LA0F038	0	IMPROVEMENTS TO THIS INTERSECTION INCLUDE DURATHERM DECORATIVE CROSSWALKS AND RESURFACING ON WESTERN AVE.	$151

ProjectID	County	Air Basin	Model	RTP ID	Program	Route	Begin	End	System	Conformity Category	Amend	Source
LA0D448	Los Angeles	SCAB	L421	LA0D448	CAN76				L	NON-EXEMPT	0	2008
							PTC	2,902	Agency	LANCASTER		

MAJOR ARTERIAL GAP CLOSURES. AVENUE J, 36TH TO 32ND WEST. 2OTH WEST, LANCASTER BLVD TO NEWGROVE ST. 20TH STREET EAST, AVENUE J-4 OT J-8

Fund	ENG	R/W	CON	Total	Prior	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	Total
LOCAL TRANS FUNDS	457	45	2,400	2,902		120	225	2,557				2,902
LA0D448 Total	457	45	2,400	2,902		120	225	2,557				2,902

ProjectID	County	Air Basin	Model	RTP ID	Program	Route	Begin	End	System	Conformity Category	Amend	Source
LA0D449	Los Angeles	SCAB	L422	LA0D449	CAR75				L	NON-EXEMPT	0	2008
							PTC	13,650	Agency	LANCASTER		

AVENUE M AND SR14 OVERCROSSING IMPROVEMENTS. WIDENING AVENUE M FROM 2 TO 7 LANES FROM 10TH STREET WEST TO 15TH STREET WEST.

Fund	ENG	R/W	CON	Total	Prior	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	Total
LOCAL TRANS FUNDS	1,750	400		2,150					250		1,900	2,150
LA0D449 Total	1,750	400		2,150					250		1,900	2,150

ProjectID	County	Air Basin	Model	RTP ID	Program	Route	Begin	End	System	Conformity Category	Amend	Source
LA9708289	Los Angeles	MDAB	L363	LA9708289	CAR63				L	NON-EXEMPT	0	2008
							PTC	10,800	Agency	LANCASTER		

AVE G, FROM RT 14 TO 25TH ST WEST WIDEN FROM 2 TO 6 LANES (0.2 MIME) (TOTAL 6 LANES BOTH DIR). INCLUDES INTER CHANGE IMPROVEMENTS.

Fund	ENG	R/W	CON	Total	Prior	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	Total
LOCAL TRANS FUNDS	1,700		9,000	10,700		500		10,200				10,700
LA9708289 Total	1,700		9,000	10,700		500		10,200				10,700

ProjectID	County	Air Basin	Model	RTP ID	Program	Route	Begin	End	System	Conformity Category	Amend	Source
LAE2906	Los Angeles	SCAB	L423	LAE2906	CAR63				L	NON-EXEMPT	0	2008
							PTC	4,515	Agency	LAWNDALE		

Inglewood Ave/Marine Ave intersection improvement. Purchase ROW for widening; add 1 thru NB lane Inglewood Ave (2 lane existing) & 1 thru WB lane Marine Ave (1 lane existing); Add lighting, signals, sidewalk.

Fund	ENG	R/W	CON	Total	Prior	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	Total
DEMO-SAFETEA-LU	476	362	1,762	2,600		476	362	1,762				2,600
CITY FUNDS			487	487			487					487
PROP "C20" FUNDS	119	290		409		119	290					409
PROP "C25" FUNDS			1,019	1,019			1,019					1,019
LAE2906 Total	595	652	3,268	4,515		595	2,158	1,762				4,515

ProjectID	County	Air Basin	Model	RTP ID	Program	Route	Begin	End	System	Conformity Category	Amend	Source
LA000512	Los Angeles	SCAB	1248	LA000512	CAR60				L	NON-EXEMPT	0	2008
							PTC	824,000	Agency	LONG BEACH		

GERALD DESMOND BRIDGE REPLACEMENT (SAFETEA-LU PNRS #14 - SEC 1301B)REPLACE EXISTING 5 LANE GERALD DESMOND BRIDGE WITH NEW 6 LANE BRIDGE. OCEAN BLVD. OVER ENTRANCE CHANNEL, UP RR, 1.0 MI E STATE ROUTE 47. REPLACE EXISTING 5 LANE GERALD DESMOND BRIDGE WITH

Fund	ENG	R/W	CON	Total	Prior	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	Total
BRIDGE - LOCAL	10,000	26,736	156,875	193,611	10,000					183,611		193,611
PROJECTS OF NATIONAL AND REGIONAL SIGNIFICANCE			100,000	100,000			35,000	50,000	15,000			100,000
SURFACE TRANS PROG	1,240			1,240	1,240							1,240
PROP "C25" FUNDS			17,306	17,306					8,524	8,782		17,306
PORT FUNDS	5,998	3,464	55,704	65,166	7,925	5,735	20,220	18,235	8,340	4,711		65,166

Appendix B

Title VI Policy Statement

DEPARTMENT OF TRANSPORTATION
OFFICE OF THE DIRECTOR
1120 N STREET
P. O. BOX 942873
SACRAMENTO, CA 94273-0001
PHONE (916) 654-5266
FAX (916) 654-6608
TTY (916) 653-4086

Flex your power!
Be energy efficient!

August 25, 2009

TITLE VI
POLICY STATEMENT

The California State Department of Transportation under Title VI of the Civil Rights Act of 1964 and related statutes, ensures that no person in the State of California shall, on the grounds of race, color, national origin, sex, disability, or age, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity it administers.

Randell H. Iwasaki

RANDELL H. IWASAKI
Director

Appendix C
SHPO Concurrence Letter

STATE OF CALIFORNIA – THE RESOURCES AGENCY
GRAY DAVIS, *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@mail2.quiknet.com

July 21, 2003

REPLY TO: FHWA030703B

Gary N. Hamby, Division Administrator
Federal Highway Administration
Region Nine, California Division
980 Ninth Street, Suite 400
SACRAMENTO CA 95814-2724

Re: Replacement of the Gerald Desmond Bridge, Port of Long Beach, Long Beach, Los Angeles County.

Dear Mr. Hamby:

Thank you for submitting to our office your June 30, 2003 letter and Historic Properties Survey Report (HPSR) regarding the proposed replacement of he Gerald Desmond Bridge, a structure located at the Port of Long Beach in Long Beach, Los Angeles County. The Gerald Desmond Bridge has been determined, by consensus, to be ineligible for inclusion on the National Register of Historic Places (NRHP). The proposed undertaking will replace the physically and functionally deficient bridge with a seismically resistant structure that will meet vehicular and shipping needs for its planned 100-year design life. The undertaking will also involve construction of two new high-voltage transmission towers adjacent to the existing towers, which will be left standing. The undertaking will also necessitate reconfiguration of adjacent freeway and arterial interchanges. The Area of Potential Effects (APE) for the proposed undertaking appears adequate and meets the definition set forth in 36 CFR 800.16(d). An archeological resources record search conducted at the South Central Coastal Information Center, California State University, Fullerton and a field reconnaissance survey of the project area by qualified archeologists in October 2002 revealed no known archeological resources.

FHWA is seeking my comments on its determination of the eligibility of five (5) pre-1957 architectural and engineering properties for inclusion on the NRHP in accordance with 36 CFR 800, regulations implementing Section 106 of the National Historic Preservation Act. Eight (8) post-1957 architectural and engineering properties were also identified within the project APE. I concur with FHWA's determination that these post-1957 properties are ineligible for inclusion on the NRHP. FHWA is also seeking my comments on its determination of the effects the proposed undertaking will have on historic properties in accordance with 36 CFR 800. A review of the HPSR leads me to concur with FHWA on the following:

- The Long Beach Generating Station is eligible for inclusion on the NRHP under Criteria A and D as defined in 36 CFR 60.4. The property has strong associations with the industrial development of the Long Beach Harbor and the Los Angeles area and has retained sufficient and continuing use of technology built to early 20th century specifications. This functioning technology affords an opportunity to study and understand early engineering techniques as they relate to early power plant development and operation.

- The four (4) remaining pre-1957 properties evaluated in the HPSR are not eligible for inclusion on the NRHP under any of the criteria established by 36 CFR 60.4. The properties have no strong associations with significant historical events or persons, and are not examples of outstanding architectural or engineering design or function.

- On the basis of the above comments, I can now concur with FHWA's determination that the proposed undertaking, as described, will have no adverse effect on historic properties.

Thank you again for seeking my comments on this undertaking. If you have any questions, please contact staff historian Clarence Caesar by phone at (916) 653-8902, or by e-mail at ccaes@ohp.parks.ca.gov.

Sincerely,

[signature] for

Dr. Knox Mellon
State Historic Preservation Officer

Appendix D
AQMD/CDFG Coordination Letters

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • www.aqmd.gov

FAXED: JULY 25, 2006

July 25, 2006

Robert Kanter, Ph.D.
Port of Long Beach
Planning Division
925 Harbor Plaza
Long Beach, CA 90801

Dear Dr. Kanter:

Reissued Notice of Preparation for the Gerald Desmond Bridge Replacement Project and Air Quality Analysis Protocol for the Gerald Desmond Bridge Replacement Project

The South Coast Air Quality Management District (SCAQMD) staff appreciates the opportunity to comment on the above-mentioned documents. The SCAQMD staff apologizes for not submitting comments earlier and appreciates the additional time that the Port of Long Beach has allowed. The Gerald Desmond Bridge Replacement Project is an important part of the Ports future expansion plans as this bridge is the primary route between the Port of Long Beach and the Port of Los Angeles and the 710 Freeway. In addition, the Gerald Desmond Bridge Replacement Project will be expanded from four to six lanes accommodating future car and truck traffic volume, and will provide vertical clearance for larger marine vessels.

The SCAQMD staff strongly recommends that the lead agency use the 10 in a million cancer risk threshold to determine project and cumulative significance. Using a percent increase in toxic emissions to determine if a Health Risk Assessment is needed or if the project is cumulatively significant is not an appropriate methodology. The Port of Long Beach's proposed approach is based on a Basin-wide average risk and does not account for many of the key variables that will determine the maximum individual cancer risk such as meteorological conditions, distance to the receptor, exposure duration, and potency of the toxic air contaminant. The SCAQMD staff is concerned that the project may pose a health risk that exceeds the 10 in a million significance threshold, however, the emissions are below the Port of Long Beach's recommended average screening emissions.

In calculating the health risk, the lead agency should account for all new impacts associated with implementation of the proposed project. If the Desmond Gerald Bridge will be placed in a different location that will affect existing traffic routes, the SCAQMD staff would view these as new localized impacts and the health risk should be appropriately quantified from all mobile sources on the bridge, bridge approaches, and from traffic routes associated with the bridge. In addition, localized impacts from the larger ships that would be able to pass under the taller proposed bridge should also be considered as this is an anticipated activity associated with the proposed project. The SCAQMD staff recognizes that the methodology for estimating regional and localized impacts may be different. The methodology for estimating regional emissions should assess the incremental increase in emissions on a regional basis that are associated with the proposed project.

In February 2006, the SCAQMD staff provided comments to the Port of Long Beach on the their *Draft Air Quality and Risk Assessment Protocol for Proposed Projects at the Port of Long Beach Dated October 17, 2005.* SCAQMD staff comments on the Air Quality and Risk Assessment Protocol are incorporated by reference. Please find additional, more detailed comments on the Gerald Desmond Bridge Project-Specific Air Protocol in Attachment I.

The SCAQMD staff appreciates the opportunity to work with the Port of Long Beach to ensure that project-related emissions are accurately identified, categorized and evaluated. Please call me at 909 396-3105 if you have any questions regarding this letter.

Sincerely,

Susan Nakamura
Planning & Rules Manager

Attachment I

General Comments

1. The Protocol should reference recent South Coast Air Quality Management District (AQMD) Guidance – The following two guidance documents developed recently by AQMD staff should be referenced and followed in the protocol:
   a. *Supplemental Guidelines for Preparing Risk Assessments to Comply with the Air Toxics "Hot Spots" Information and Assessment Act (AB2588).* The document is available at: http://www.aqmd.gov/prdas/AB2588/pdf/AB2588_Guidelines.pdf. This document is a supplement to OEHHA's document entitled, "Air Toxics Hot Spots Program Risk Assessment Guidelines" (referred to as the OEHHA Guidelines). Facilities required to submit risk assessments to the AQMD must follow the OEHHA Guidelines. While the information provided in the OEHHA Guidelines is complete, there are several areas in which the user is referred to their local air districts for specific or additional requirements. This supplemental guidance addresses those and other issues that have arisen during the implementation of the AB2588 Program and various AQMD toxic rules.
   b. *Health Risk Assessment Guidance for Railyards and Intermodal Facilities.* The document is contained in the October Board package for Rule 3503 (agenda item #27). The document provides dispersion modeling and health risk assessment guidance for railyard and intermodal facilities. (Includes methodology for analyzing mobile sources)
   c. Guidance for performing a mobile source health risk assessment ("Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis") which can be found at the following SCAQMD website: www.aqmd.gov/ceqa/handbook/mobile_toxic/mobile_toxic.html.
2. The SCAQMD staff has developed a methodology to quantify localized emissions impacts from PM10, CO, and NOx emissions. Please refer to the SCAQMD's website for the methodology and localized significance thresholds for PM10, CO, and NOx.
3. $PM_{2.5}$ Impacts – The criteria pollutant, $PM_{2.5}$, is not considered in the protocol. The protocol must address $PM_{2.5}$ emissions and impacts. As you are aware, the SCAQMD staff is in the process of developing $PM_{2.5}$ CEQA significance thresholds for both regional and localized impact analyses. Staff intends to bring the recommendation to the Governing Board in October 2006.
4. Mitigation Measures - If air quality or health risk impacts are found to be significant, the Port must require implementation of mitigation measures by all applicable sources unless substantial evidence supports a finding that implementation of a measure is not feasible. (Cal. Pub. Res. Code §§21081, 21081.5). The following documents contain feasible mitigation measures that the Port must consider for projects with significant

air quality impacts. In addition, the AQMD staff will identify additional mitigation measures during the review of a specific proposed project.

SCAQMD's "Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis". March 28, 2003. http://www.aqmd.gov/ceqa/handbook/mobile_toxic/mobile_toxic.html
Riverside Air Quality Task Force "Good Neighbor Guidelines", September 12, 2005. http://www.wrcog.cog.ca.us/publications/Good+Neighbor+Policies+Final-091205.pdf
California Environmental Protection Agency, "Draft Emission Reduction Plan for Ports and International Goods Movement in California", December 1, 2005. http://www.arb.ca.gov/planning/gmerp/dec1plan/cover_toc.doc

- Chapter 11 of the SCAQMD CEQA Air Quality Handbook has sample air quality mitigation measures.
SCAQMD's Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. This document can be accessed at the following internet address: www.aqmd.gov/prdas/aqguide/aqguide.html.

In addition, pursuant to CEQA Guidelines Section 15126.4 (a)(1)(D), any impacts resulting from mitigation measures must also be addressed.

5. Project Emissions - Quantification of project emissions for the air quality analysis for CEQA documents should include project related emissions for both indirect and direct sources that affect California. For example, if the proposed project will create an increase in truck trips where deliveries would be outside of the SCAB, the emissions from the increase in truck trips from the project site to the edge of California should be included in the air quality analysis. Emission estimates for the HRA would be limited to those emissions that occur within the proposed project boundaries.

6. Peak Daily Emissions – The protocol states on page 7, that "to calculate the worst-case interim emission, the air emissions associated with each of these phases will be calculated separately." It would seem that there is the potential for overlapping phases, for example the demolition of the existing bridge and operation of the new bridge. The emissions from each phase and overlapping of phases should be calculated to estimate the peak daily construction and demolition emissions.

7. Future Mobile Source Regulations - For rules adopted or amended after the EMFAC2002 model was developed, the effect of future requirements can be accounted for in the future emission estimates provided the methodology and assumptions used is reviewed and approved by the local and state air quality agencies. This is to ensure that there is not a discrepancy regarding how future emission reductions are accounted and that there is potential double counting of emission reductions. In addition, it should be clear the SCAQMD CEQA guidance allows project to take credit for future year emission reductions from adopted rules and regulations only. Adjustments for proposed rules and regulations are not allowed.

8. Off-road Emissions - Emission factors from ARB's OFFROAD model for the years of interest represent model year emission factors, not fleet averages for the specified year. It appears that the authors are aware that the OFFROAD model is for model year engines and not fleet averages, but it should be made clearer in the discussion. CARB can provide emission factors that are representative of the overall fleet-mix for a specific equipment type and size category, or the Port use OFFROAD emission factors representative of their specific fleet for a specific equipment type and size category and model year. The second approach will allow the Port to tailor the fleet of equipment used in a specific project based on the useful life of each piece of equipment used at the Port.

9. Ocean-going vessels (OGVs) – OGVs can be treated as a series of point, area, or volume sources. The subject protocol is considering either a point or volume source treatment. Either treatment is acceptable. However, ARB's concurrence should be sought since ARB uses an area source treatment for OGVs in their report titled, *Diesel Particulate Matter Exposure Assessment Study for the Ports of Los Angeles and Long Beach.* In addition, if OGVs are treated as a series of point sources, then the approach must address potential building downwash effects.

10. Modeling Domain – Typically, SCAQMD staff requires impacts to be evaluated beginning from the fenceline. It is not clear from the protocol where project impacts would begin to be evaluated. This issue should be discussed in the protocol.

11. Time Domain for the Quantitative HRA – It is not clear from the protocol what the time domain for the quantitative HRA is. Would the HRA include emissions from the interim years or would the build-out emissions be assumed for the HRA?

12. Wilmington meteorological site is preferable for a Port of Long Beach impact assessment. It was used by ARB in their Port HRA and is proposed for use by the Port of Los Angeles for their expansion projects. In addition it is more current and proximate to the proposed project than SCAQMD's North Long Beach site.

13. Exposure assumption – The SCAQMD staff recommends that the exposure duration for schools and day care facilities assume 70 years, if the SCAQMD's significance threshold is used..

14. OEHHA Reference – The date for the OEHHA reference should be August 2003.

SCAQMD rules and relevant air quality reports and data are available by calling the SCAQMD's Public Information Center at 909 396-2039. Much of the information available through the Public Information Center is also available via the SCAQMD's website: www.aqmd.gov.

The Port of Long Beach

P. O. BOX 570 · LONG BEACH, CA 90801-0570 · TELEPHONE (562) 437-0041 · FAX (562) 901-1725

July 5, 2006

Ms. Susan Nakamura
South Coast Air Quality Management District
Planning and Rules Manager
21865 Copely Drive
Diamond Bar, CA 91765

Subject: Gerald Desmond Bridge Project Specific Air Protocol

Dear Ms. Nakamura:

On December 3, 2005, we sent you a revised Notice of Preparation and a Project-Specific Air Protocol (PSAP) for the Gerald Desmond Bridge Replacement Project. Since that time, Ms. Stacey Crouch of my staff has attempted to contact you both by telephone and by e-mail to determine if the South Coast Air Quality Management District (SCAQMD) had any comments or questions regarding the PSAP, and if so, if you would like to meet to discuss them. To date, we have had no response from the SCAQMD.

The California Environmental Quality Act (CEQA) anticipates that the EIR preparation and certification process should be accomplished within a year's time frame, per CEQA Guideline 15108. This is a high priority project to the Port of Long Beach. Accordingly, if we do not hear from you by July 17, 2006, we will assume that the SCAQMD does not have comments or questions on the PSAP. You will have an opportunity to comment on the revised draft Environmental Impact Report/Environmental Assessment when it is released later this year.

If you have any questions or comments or would like to schedule a meeting to discuss the PSAP please contact Ms. Crouch at (562) 590-4160.

Sincerely,

Robert Kanter

Robert Kanter, Ph.D.
Director of Planning
and Environmental Affairs

SEC:s

cc: E. Chang, SCAQMD
M. Bogner, Engineering
K. Haboian, Parsons

PORT OF LONG BEACH

The Port of Long Beach

P. O. BOX 570 · LONG BEACH, CA 90801-0570 · TELEPHONE (562) 437-0041 · FAX (562) 901-1725

December 3, 2005

Ms. Susan Nakamura
South Coast Air Quality Management District
Planning and Rules Manager
21865 Copley Drive
Diamond Bar, CA 91765

Subject: Gerald Desmond Bridge Project-Specific Air Protocol

Dear Ms. Nakamura:

The Port of Long Beach (Port) is proposing to replace the aging Gerald Desmond Bridge joining Terminal Island to downtown Long Beach. The existing bridge is a tied-arch truss bridge which was constructed in 1968 and seismically upgraded in 1997, and it currently provides two through traffic lanes and one climbing lane in each direction.

The purpose of the proposed project is to replace the existing Gerald Desmond Bridge with a bridge that would:

- Provide sufficient roadway capacity to accommodate current car and truck traffic volumes and meet future needs;
- Reduce approach grades;
- Be structurally sound and seismically resistant; and
- Provide vertical clearance that would allow for safer passage of some existing container ships and new-generation vessels currently being constructed.

The Port in cooperation with Caltrans/Federal Highways Administration is preparing an Environmental Impact Report/Environmental Assessment (EIR/EA). The Lead Agencies originally issued an NOP on October 24, 2002. Following issuance of the original NOP, a draft EIR/EA was released on June 14, 2004, for public review. Subsequent to the public comment period for the draft EIR/EA, the Port elected to add a Toll-Operation Alternative and to expand the limits of the proposed project study area. The proposed project may result in potentially significant impacts on air quality associated with construction and operations activities. The EIR/EA will include air quality analyses prepared using the methodology described in the *Draft Air Quality and Risk Assessment Analysis Protocol for Proposed Projects at the Port of Long Beach* dated October 17, 2005 and incorporated by reference herein, and project specific protocol – *Air Quality*

Analysis Protocol for the Gerald Desmond Bridge Replacement Project dated November 2005 (attached).

Also attached is a Reissued Notice of Preparation for the revised draft Environmental Impact Report/Environmental Assessment (EIR/EA). The Ports anticipates the revised draft EIR/EA will be available for public review and comment in the summer of 2006. Per California Environmental Quality Act requirements, your agency will be provided a copy of the revised draft EIR/EA for review at that time.

If you have any questions regarding the proposed project or the air quality protocol we are proposing, please contact Stacey Crouch, of my staff, at (562) 590-4160.

Sincerely,

Robert Kanter

Robert Kanter, Ph.D.
Director of Planning and
Environmental Affairs

Attachments

cc: M. Bogner, Engineering
K. Haboian, Parsons

AIR QUALITY ANALYSIS PROTOCOL FOR THE GERALD DESMOND BRIDGE REPLACEMENT PROJECT

December 2005

The methodology in this protocol describes the general procedures to be followed in the Environmental Impact Report (EIR)/Environmental Assessment (EA) process, including describing existing conditions, environmental consequences, and mitigation. The following sections describe the methodologies to be followed in documenting ambient air quality, source characterization, emissions development, significance thresholds, modeling analyses, cumulative analyses, and mitigation.

SECTION 2: BASELINE AIR QUALITY

2.1 Criteria Air Pollutants

Ambient air quality data from the following representative air monitoring sites, operated and validated by SCAQMD or the California Air Resources Board (CARB), will be used:

- Wilmington (Mahar Avenue) [ARB Site No. 70996] – approximately 2.2 miles northwest of the Gerald Desmond Bridge
- Long Beach (East Pacific Coast Highway) [ARB Site No. 70110] – approximately 3.6 miles northeast of the Gerald Desmond Bridge
- North Long Beach Station [ARB Site No. 70072] – approximately 4.4 miles north of the Gerald Desmond Bridge
- South Coastal Los Angeles County 2 [SCAQMD Station No. 077] – approximately 4.4 miles north of the Gerald Desmond Bridge.

The most recent 3 years of monitoring data are required for documenting background ambient air quality. The North Long Beach Station will be the primary data source for documenting background ambient air quality for the Gerald Desmond Bridge project since it has complete data for the most recent 3 years from 2002 to 2004. The Wilmington monitoring station at Mahar Avenue has only sulfur dioxide (SO_2) data from 2002. The air monitoring station at East Pacific Coast Highway monitors particulate matter ($PM_{2.5}$ and PM_{10}) only and began operation in 2003. The South Coastal Los Angeles County 2 station monitors particulate matter and lead (Pb) only, and it began operation in 2004. Monitoring data from the East Pacific Coast Highway and South Coastal Los Angeles County 2 stations will be used in conjunction with the North Long Beach Station's monitoring data to determine the highest background levels of particulate matter and Pb in the area.

The established criteria air pollutants – those air pollutants with the National Ambient Air Quality Standards (NAAQS) or the California Ambient Air Quality Standards (CAAQS) will be analyzed. Criteria air pollutants consist of carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), SO_2, particulate matter less than 10 micrometers in aerodynamic diameter (PM_{10}), particulate matter less than 2.5 micrometers in aerodynamic diameter ($PM_{2.5}$), and Pb (CARB, 2005).

SECTION 3: SOURCE DEFINITION

Sources to be evaluated are defined as equipment or operations having the ability to emit one or more pollutants into the atmosphere potentially causing air quality degradation. These sources can be either directly related to a proposed project or indirectly affected by a proposed project.

Direct emission sources are those located within the project boundary that are essential to the operation of the proposed project. In the context of the Gerald Desmond Bridge, direct emissions are those associated with vehicular traffic using the bridge. Direct emissions are also associated with the construction and demolition activities necessary to develop the overall project. These can include construction and demolition equipment and other mobile sources, such as haul/debris trucks and personal cars used by construction workers.

Indirect sources are defined in the SCAQMD *CEQA Air Quality Handbook* as facilities, buildings, structures, installations, real properties, roads, or highways that attract, or may attract, mobile sources of pollution (SCAQMD, 1993). The indirect source would be those roads and highways that would receive additional traffic (mobile sources) that is diverted from using the new bridge, possibly due to implementation of a Toll-Operation Alternative.

3.1 Construction

Typically, construction emissions occur from combustion sources and from fugitive sources. Combustion sources, whether they are direct or indirect sources, emit NO_x, CO, PM_{10}, SO_x, VOCs, and various air toxics. Sources include construction and demolition equipment, haul/debris trucks, and worker traffic. Fugitive construction emissions (generally PM_{10}) are primarily due to traveling over unpaved roads and site preparation.

3.2 Operation

Direct sources related to the operation of the Gerald Desmond Bridge typically would consist of mobile sources composed of personal passenger cars, light trucks, heavy-duty gas and diesel trucks, buses, and motorcycles. Air emissions of VOCs, CO, NO_x, SO_x, and PM_{10} will be the primary air pollutants released from the vehicles that will be calculated. Air toxics are anticipated to be released mostly from heavy-duty diesel truck engines and will be calculated if there would be a 0.8 percent or more increase of TAC as a direct result of the operation of the new bridge (see previous discussion).

SECTION 4: Project Emission Quantification

Project emissions will be estimated for both direct and indirect sources that affect the SCAB. Operational emissions from mobile sources using the Gerald Desmond Bridge will be calculated based on the length of the bridge and the emission factors of the specific vehicle mix using the bridge. An estimate of No Build emissions of mobile sources will also be calculated using the same methodology. The net increase of the Build and No Build emissions will be

When the demolition of the bridge takes place, SCAQMD's Rule 1403 would be followed. The purpose of the rule is to specify work practice requirements to limit asbestos emissions from demolition activities, including the removal and associated disturbance of asbestos-containing materials (ACM).

4.3 TAC Emissions

If an HRA is needed, TAC will be identified, as defined in the latest SCAQMD-adopted iteration of Rule 1401. PM_{10} emissions will be used as a surrogate for DPM from all diesel internal combustion engines to estimate potential cancer and chronic health effects. The latest version of the EMFAC2002 model will be used to estimate diesel truck traffic PM_{10} emissions as DPM.

SECTION 5.0: Significance Thresholds and Analysis

Table 5-1 presents the thresholds of significance for air quality in terms of mass daily thresholds for criteria air pollutants.

5.1 Criteria Air Pollutants

The mass daily thresholds presented in Table 5-1 are emissions-based thresholds representing the first tier of a potential two-tier process for assessing the potential significance of criteria air pollutants on the regional level. There are two categories of mass daily thresholds: "construction" and "operational." The construction thresholds are set at higher levels for NO_x and VOCs, in recognition of the short-term nature of construction versus operational emissions. The operational emissions thresholds are tied to thresholds contained in SCAQMD Rule 1304 for permitting proposed new emission sources within SCAQMD's jurisdiction. The maximum daily emissions of criteria air pollutants from the project's emission sources will be estimated for the period between the CEQA baseline and the horizon year of 2030. The CEQA baseline is the existing environmental setting or baseline physical conditions before a project commences.

The project will be implemented in three phases. The construction phase includes construction of the new bridge, partial demolition of the existing bridge, and the continual operation of the existing bridge. This scenario would end with completion of construction and opening of the new bridge. The operational phase includes the operation of the new bridge, along with simultaneous demolition of the old bridge. Demolition activities would end with the complete removal of the old bridge. Finally, the operational phase will continue to reach the maximum capacity over time until 2030. To calculate the worst-case interim emission, the air emissions associated with each of these phases will be calculated separately. The emissions analyzed will be for the identified worst-case interim year (as defined in Section 4), the project build year of approximately 2011 or 2012, and the project build-out year of 2030.

SECTION 6.0: Local Scale Air Quality and TAC Hot Spot Analysis

Due to the nature of this project, only CO and PM_{10} hot spot analysis is required under the transportation conformity rules. The CO hot spot analysis will be conducted quantitatively, and the PM_{10} local scale analysis will be conducted qualitatively. TAC hot spot analysis may also need to be performed if the TAC emissions would increase by 0.8 percent or more as a result of the proposed project.

6.1 CO Hot Spot Quantitative Analysis

The CO hot spots will be selected in the vicinity of the bridge and will include the new bridge itself. The worst-case intersections will be selected based on the traffic analysis. Three impacted intersections with the worst level of service (LOS) and three impacted intersections with the highest traffic volumes will be selected for the CO hot spot analysis. These selected intersections may be the same (i.e., worst LOS and highest volumes). The analysis will follow the guidelines from the *Transportation Project Level Carbon Monoxide Protocol,* which was prepared by the University of California at Davis for Caltrans. Both screening and detailed analysis may be done for the selected intersections.

6.2 PM_{10} Qualitative Analysis

A qualitative analysis of PM_{10} will be conducted following FHWA guidance. This analysis deals primarily with project operational emissions. It is typically necessary to address construction-stage PM_{10} emissions from projects for CEQA purposes, since practically all of California is nonattainment for PM_{10} under State standards. However, construction activities lasting 5 years or less are considered temporary impacts under the Transportation Conformity Rule, and PM_{10} hot-spot analysis during the construction period is generally not required.

6.3 TAC Analysis

If required (see Section 7.2), the Hotspots Analysis and Reporting Program (HARP) is a tool that assists with the requirements of the CARB Air Toxics "Hot Spots" Program. HARP is a computer software package that combines the tool of emission inventory database, facility prioritization calculation, air dispersion modeling, and risk assessment analysis. All of these components are tied to a single database, allowing information to be shared and utilized. The results obtained from HARP would be compared with the criteria of the TAC listed in Table 5-1.

SECTION 7: MODEL METHODOLOGIES

The following section describes the basis for the modeling analysis, including the model selection, emission source parameters, meteorological data, receptor locations, and calculation of impacts for CO and TAC hot spot modeling.

which recommends the use of the midpoint between the mean (65th percentile for the inhalation pathway) and high-end (95th percentile) values (i.e., the 80th percentile) as the minimum exposure level for risk management decisions where a single cancer risk value must be used for a residential receptor (CARB, 2004).

In the HRA, the estimated excess cancer risks would be considered to be additive, without taking into account any difference in cancer target, or any antagonistic or synergistic effects. Likewise, for conservative purposes, the Hazard Quotient (HQ) for all non-cancer substances are assumed to be additive to calculate an overall Hazard Index (HI), regardless of target organ systems for individual substances. If the calculated HI would be above 1.0, the risks based on target organ systems would be segregated.

7.2.1 Emission Source Characteristics

Emission sources would be identified by specific locations using a referenced Cartesian grid system. Typically, the Universal Transverse Mercater (UTM) system is utilized. Although it is not essential, this system allows easier reference to outside maps, electronic terrain systems, and comparison with other regulatory systems within the SCAB. The emission source is the heavy-duty diesel trucks traveling on the bridge, and it will be characterized as volume sources for both ISCST3 and HARP. The size of the volume source will be determined by the width of the roadway, and the height of the volume source will be 4 meters.

7.2.2 Meteorological Data

SCAQMD conducted an extensive 1-year meteorological monitoring and validation program throughout the SCAB to develop hourly meteorological data sets for use in regulatory modeling within the region. The North Long Beach Monitoring Station data will be used to characterize conditions in the Gerald Desmond Bridge area; SCAQMD has approved this station for use in numerous previous Port projects. This dataset will be used to calculate TAC exposure concentrations.

7.2.3 Receptor Locations

Modeling receptor locations are essential in the evaluation of potential impacts. In most applications, a system of regularly spaced intervals sufficient to capture the maximum concentration location is required. Typically, 100-meter receptor spacing will be used out to a distance of 1,000 meters, followed by 250-meter spacing out to 2,500 meters, and then 500-meter spacing to a distance of 5,000 meters. If the maximum is predicted beyond the 100-meter grid system, secondary modeling will be conducted with a 100-meter spacing around the identified maximum location to better define the prediction. Because of the limitations of the HARP software, only one grid can be modeled at a time. The approach to defining receptor locations in the risk assessment will be to use a coarse grid to identify the general area in which impacts are highest, and then to use refined grids to locate the MEI.

Rules 1401 and 212 will be used in this assessment to evaluate the significance of non-cancer impacts and the population cancer burden calculated for nearby populations. The risk thresholds are presented in Table 5-1.

In accordance with OEHHA guidelines, the HRA would present the potential acute non-cancer, chronic non-cancer, and incremental cancer health impacts at the point of maximum offsite impact, at the maximum exposed individual resident, at the maximum exposed individual worker, and at specified sensitive receptor locations. The HRA would also present an estimate of population exposure for potential incremental cancer burden.

The HARP model allows the calculation of risk for several exposure scenarios. The OEHHA 70-year exposure scenario assumes that a residential receptor will be present at one location for 24 hours per day, 365 days per year, for 70 years. This scenario represents an upper-bound exposure to TAC emissions. In addition, the HARP model allows the calculation of a 30-year residential scenario (the Environmental Protection Agency's [EPA] recommended upper-bound residential scenario), a 9-year adult residential scenario (EPA's recommended average residence time for adults), a 9-year child residential scenario, and a worker exposure scenario. The HARP program also allows calculation of an upper-bound, 80^{th} percentile (for inhalation pathway only, as discussed in Section 7.2), and average risk for each of these exposure scenarios. This allows the Gerald Desmond Bridge project to place the 70-year exposure scenario into perspective and provides a comparative analysis of potential upper-bound versus average risks.

Uncertainty Analysis

If an HRA is required for the proposed project, the risk characterization would also include a discussion of uncertainties in the risk assessment process. These uncertainties arise from the assumptions made in the risk assessment process, including assumptions regarding emission estimates, mitigation measures to be employed, source characterization, exposure scenarios, and toxicity factors. In general, the process, as dictated by OEHHA guidelines and SCAQMD requirements does not allow for decisions to be made regarding the exposure scenarios or toxicity factors. However, there are uncertainties involving emission factors and emission estimation techniques, mitigation measures, and source characterization that may require additional consideration. The following discussion addresses some of these individual issues further:

Emission Estimation Techniques

Emissions are estimated using the best available emission factors for the various emission sources. Emission factors are periodically updated or may be augmented with actual test data from testing of equipment, vehicles, marine vessels, and other project-related sources. Furthermore, there may be new developments in emission estimation software (such as the CARB OFFROAD emission factor software and the EMFAC model) that must be taken into account

MATES II study is currently being updated by SCAQMD and will be released as MATES III. The Gerald Desmond Bridge HRA would take into account the results of the updated study when they become available.

MITIGATION MEASURES

Criteria Air Pollutants

When the significance threshold emission criterion of a criteria pollutant is exceeded by emissions associated with the project or any alternatives, mitigation measures would be identified. The mitigation measures developed for the Gerald Desmond Bridge project would be consistent with CEQA requirements and the latest version of the SCAQMD *CEQA Air Quality Handbook*. To the extent possible, quantification of the emission reductions from each mitigation measure (or set of mitigation measures) would be estimated. The environmental document preparer would document each mitigation measure, the effectiveness of the control, and the basis for emission quantification. The evaluation for significant impacts (after mitigation) would be conducted in the identical manner as described for the unmitigated emissions, and any significant impacts would be identified.

TAC

In similar fashion, mitigation measures would be identified if there would be an exceedance of TAC significance thresholds for the project or any of the alternatives. The latest version of the SCAQMD *Air Toxics Control Plan* (ATCP) provides a summary of proposed air toxics control measures and also provides an evaluation of the potential risk reductions in the SCAB due to implementation of control measures. For each mitigation measure, effective emission reductions would be estimated consistent with the ATCP. As with criteria pollutants, an evaluation of the resultant risks from the project (or alternative) emissions, after mitigation, would be assessed for significant impacts. The environmental document preparer would identify all significant impacts remaining after mitigation is applied.

REISSUED NOTICE OF PREPARATION

Date	December 5, 2005	SCH #2002101141
To:	Responsible and Trustee Agencies and Interested Parties	
From:	Robert Kanter, Director of Planning and Environmental Affairs	
Subject:	Gerald Desmond Bridge Replacement Project	

The Port of Long Beach (Port) in cooperation with the California Department of Transportation and Federal Highways Administration (Caltrans/FHWA) will act as the lead agencies for the subject in accordance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act, respectively. The Port and Caltrans/FHWA will prepare a combined Environmental Impact Report (EIR) and Environmental Assessment (EA) for the project described below.

The Port and Caltrans/FHWA originally issued a Notice of Preparation (NOP) on October 24, 2002. Following issuance of the original NOP/Notice of Intent, a draft EIR/EA was released for public review on June 14, 2004, for a 60-day review period. Subsequent to the public comment period for the draft EIR/EA, the Port elected to add a Toll-Operation Alternative and to expand the limits of the proposed project study area. The project study area was expanded to assess the impacts associated with adding a toll district. The revised draft EIR/EA will incorporate quantitative analysis to assess the project's potential to cause growth-inducement within the Port and in surrounding communities.

As a result of the added Toll-Operation Alternative and the expanded project study area, the Port has reissued this NOP to afford responsible and trustee agencies the opportunity to provide comments and input on the revisions to the proposed project.

This reissued NOP is also to inform you that the following additional environmental factors are being considered to have potentially significant impacts and will be reanalyzed accordingly: light and glare, air quality, noise, traffic, and growth inducement.

If you submitted comments in response to the October 2002 NOP, we have addressed those comment in the June 2004 draft EIR/EA and will also address them in the revised draft EIR/EA. Accordingly, we ask that you provide any additional comments, you may have on this NOP, at this time. We need to know the applicable permit and environmental review requirements of your agency and the scope and content of the environmental information that is germane to your agency's statutory responsibilities in connection with the proposed project. This is important if your agency will need to use the EIR/EA when considering permits or approval for the project by your agency.

Along with a No-Build Alternative, a North-side Alignment Alternative and a Toll-Operation Alternative will be analyzed in the revised draft document as follows: 1) North-side Alignment Alternative (same as the North-side Alignment Alternative described in the June 2004 draft EIR/EA; and 2) Toll-Operation Alternative [either as part of a toll district scenario involving the

Gerald Desmond, Vincent Thomas, and Schuyler Heim bridges, or tolling only at the Gerald Desmond Bridge (same footprint as the North-side Alignment Alternative)].

The North-side Alignment Alternative assumes that the proposed new Bridge would operate similar to a freeway. The new bridge would be relinquished to Caltrans and would become part of Route 710.

The Toll-operation Alternative is assumed to have automatic License Plate Recognition (LPR) technology, and would operate without toll booths. Except for the toll element, the bridge design features would be the same as that of the previously analyzed alternatives.

The proposed project limits (i.e., bridge alignment alternatives and project improvements footprint) remain the same as that presented in the previously released draft EIR/EA. However, the project study area has been revised and expanded as follows: Willow/Sepulveda to the north, I-110 to the west, and the Los Angeles River to the east. The south end of the project study area has not changed, being located south of Ocean Boulevard. The Gerald Desmond Bridge/Ocean Boulevard portion of the project is located in the Middle Harbor and Terminal Island planning districts of the Port, and the I-710 portion is located in the Northeast Harbor Planning District. The Gerald Desmond Bridge is one of three bridges connecting surface highways to Terminal Island (see attached figure). The EIR/EA will consider whether the Toll-Operation alternative would cause traffic diversion in the study area.

Project Title: Gerald Desmond Bridge Replacement Project

Project Location: Back Channel, Port of Long Beach, Los Angeles County, California

Project Description: The proposed project consists of replacement of the aging four-lane Gerald Desmond Bridge with a six-lane bridge that would be a landmark in the Port and City of Long Beach. For further information about the project, see the attached "Additional Project Information."

Your input on the proposed project at this stage in the CEQA process is one of the mechanisms to ensure that the concerns of your agency are brought forth to the Port early in the process. Please send your response as early as possible but ***no later than January 5, 2006***.

In addition, please send your response and the name of a contact person in your agency, as well as any comments or questions regarding the proposed project to Robert Kanter, Ph.D., Port of Long Beach, Planning Division, 925 Harbor Plaza, Long Beach, CA 90802

Robert Kanter

Robert Kanter, Ph.D.
Director of Planning and
Environmental Affairs

SEC:s

Attachments

Additional Project Information

Purpose and Need of Project

The purpose of the proposed project is to replace the aging 156-foot vertical clearance, four-lane Gerald Desmond Bridge, constructed in 1968 with a higher six-lane bridge that would be an engineering landmark within the Port and the City of Long Beach. The new cable-stayed bridge would have two additional lanes and a 200-foot vertical clearance over the Back Channel. It has a planned 100-year design life. In addition, it would enable the Port to remove the existing, physically deteriorated structure from service, accommodate projected increases in vehicular traffic on the bridge, and allow for the increased size in container ships in the future. The new bridge with a higher vertical clearance would meet maritime demand by accommodating larger ships.

The Gerald Desmond Bridge is one of only three bridges that provide access to Terminal Island. The current structure has a steel superstructure (truss and girder) that supports a reinforced concrete deck, all supported by reinforced concrete substructures. In 1997, the structure underwent seismic retrofit and fatigue retrofit; it continues to deteriorate.

Alternatives Evaluated

There are two build alternatives being considered for the project: 1) a new bridge on the north side of the current structure with a 200-foot vertical clearance over the Back Channel, called the North-side Alignment Alternative and 2) a Toll-Operation Alternative (same footprint as the North-side Alignment Alternative) with two scenarios. One scenario is part of a study for a tolling district for all three bridges on Terminal Island; Gerald Desmond, Vincent Thomas, and Schuyler Heim. The other is a stand alone toll facility on the Gerald Desmond Bridge. An alternative to locate the new bridge on the south side of the existing bridge was evaluated in the June 2004 draft EIR/EA and found to be non-viable primarily due to unacceptable impacts on the Port's new Pier T container terminal south of Ocean Boulevard. An option to upgrade rather than replace the existing structure was also considered; this was not a viable alternative, as the bridge would be closed for an extended period of time causing major diversion of traffic to local arterials and severely impacting those facilities. The viability of constructing a tunnel to replace the bridge was considered, but it was found to be infeasible due to the high costs and the challenges associated with its constructability. Finally, different types of bridge design options were analyzed, which included Single Mast Tower, H-Tower with Vertical Legs, H-Tower with Slanted Legs, and Delta Tower.

Environmental Setting

The Gerald Desmond Bridge is located in an industrialized area in the Port. The area is highly disturbed and includes land uses such as lumber terminals, a liquid bulk terminal, a scrap metal terminal, a container terminal, and oil production facilities.

Methodology

The technical studies to support the revised draft EIR/EA are being prepared in accordance with various Port Protocols and other applicable laws and procedures, and they are outlined in the following table

METHODOLOGIES

Technical Study	Port Guidance Procedural Guide	Applicable Laws, Procedures, and Agencies
Air Quality Technical Study	Environmental Protocol Environmental Impact Report Standards and Practices, 2005.	UC Davis Transportation Project-Level Carbon Monoxide Protocol, Revised December 1997 FHWA Guidance for Qualitative Project Level "Hot Spot" Analysis in PM-10 Nonattainment and Maintenance Areas, September 2001
Energy Technical Study	Environmental Protocol Environmental Impact Report Standards and Practices, 2005.	California Energy Commission On-road & Rail Transportation Energy Demand Forecasts for California, April 1999
Geologic Resources Technical Study	Environmental Protocol Environmental Impact Report Standards and Practices, 2005.	State Mining and Geology Board Guidelines for Evaluating and Mitigating Seismic Hazards in California Special Publication 117, 1997
Historic Properties Survey Report	Environmental Protocol Environmental Impact Report Standards and Practices, 2005. City of Long Beach Green Building Policy for Municipal Buildings, 2003. City of Long Beach Municipal Code Public Facilities and Historical Landmarks (Chapter 16.04), 1982.	US Department of the Interior National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation, 1995. Caltrans Environmental Handbook Volume 2: Cultural Resources, January 2004.
Initial Site Assessment	N/A	California Department of Toxic Substance Control (DTSC), 2005. National Council for Science and the Environment (NCSE), 2005. Summaries of Environmental Laws Administered by the EPA, 2005. ASTM E1527-00, Standard Practice for Environmental Site Assessments: Phase 1 Environmental Site Assessment Process, 2005.
Land Use Technical Study	Environmental Protocol Environmental Impact Report Standards and Practices, 2005. Port of Long Beach Master Plan, 1999.	Caltrans Environmental Handbook Volume 4: Community Impact Assessment, June 1997.
Natural Environment Study	Environmental Protocol Environmental Impact Report Standards and Practices, 2005. Ports of Long Beach and Los Angeles Year 2000 Biological Study of San Pedro Bay, 2002.	Caltrans Environmental Handbook Volume 3: Biological Resources, January 2000.
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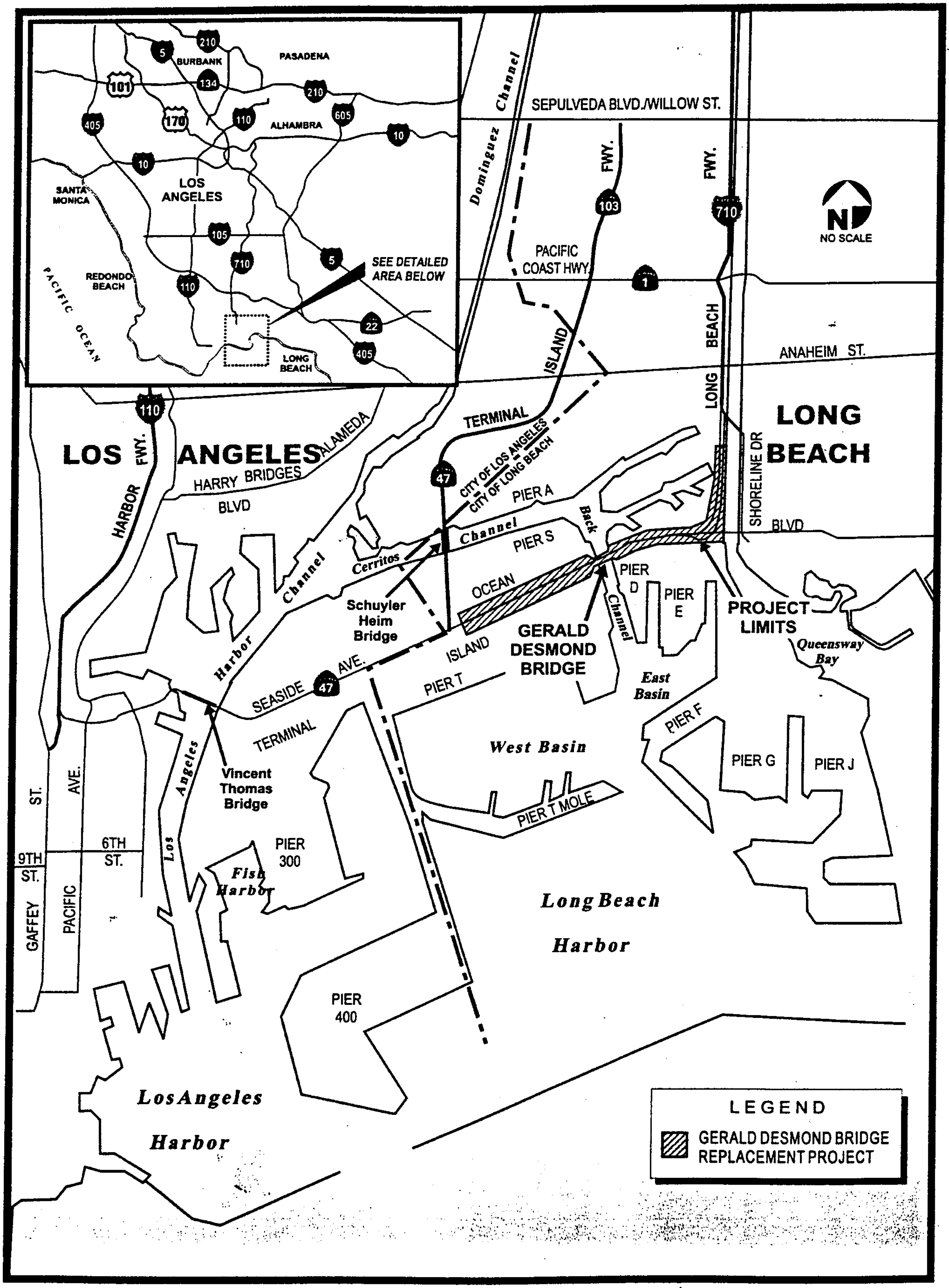
Figure - Vicinity and Study Area Map



State of California - The Resources Agency ARNOLD SCHWARZENEGGER, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
Marine Region
20 Lower Ragsdale Drive, Suite 100
Monterey, CA 93940

February 2, 2006

Dr. Robert Kanter
Director of Planning and Environmental Affairs
Port of Long Beach
P.O. Box 570
Long Beach, CA 90801-0570

Dear Dr. Kanter:

The Department of Fish and Game (Department) has reviewed the Port of Long Beach's (POLB) Draft Gerald Desmond Bridge Replacement Project Bat Monitoring and Mitigation Plan, received January 17, 2006. The POLB is proposing to demolish and reconstruct the aging Gerald Desmond Bridge, a site currently utilized by bats. The monitoring and mitigation plan is intended to reduce impacts to bats during demolition and construction activities.

The Department has the following comments on the bat monitoring and mitigation plan.

Section 1: Project Introduction

Existing Conditions: last sentence:
We also need to know "When" the bats are roosting.

Section 2: Project Impacts and Potential Mitigation

Construction Impacts:
Does this mean that the new bat roosts will be available on the new bridge prior to the demolition of the old bridge?

Mitigation Measures:
Item 3. Create roosting opportunities on the new bridge should be in place prior to Item 2., *Preclude access to the existing bridge prior to its demolition.*

Measure 1. Species Identification:

- Surveys should be conducted evening/night...usually up until midnight/1 AM depending on activity.
- It will take more than one day to survey the entire existing bridge—you may want to say "survey period"
- Surveys should be scheduled to get a June survey date.

- Surveys need to be conducted during appropriate weather and lunar conditions.
- If possible, the biologist should start collecting guano to "rub" into the new bridges roosting areas.
- In the established roost areas, a temperature probe should be used to ascertain roost temperature during use. So temperature can be monitored in the new roost site. Bats utilize areas based on Temperature.

Measure 2. Precluding Bat Access:

- A biological monitor will need to monitor the mesh to ensure bats don't get tangled in the mesh and expire.

Measure 3. Creation of Roosting Opportunities:

- Another opportunity for roosting habitat is to remove the foam/felt in the hinges of the new deck that are used when pouring the concrete.

As always, Department personnel are available to discuss our comments, concerns, and recommendations in greater detail. To arrange for a discussion please contact Ms. Marilyn Fluharty, Environmental Scientist, California Department of Fish and Game, 4949 Viewridge Avenue, San Diego, CA 92123, telephone (858) 467-4231.

Sincerely,

Thomas Napoli
Staff Environmental Scientist
Marine Region

cc: Betty Courtney
Department of Fish and Game
Region 5, San Diego

Marilyn Fluharty
Department of Fish and Game
4949 Viewridge Avenue
San Diego, CA 92123

Appendix E

Glossary of Engineering Terms

Glossary of Engineering Terms

1. **Abutment:** *Part of a bridge substructure. Refers to the first and last supports of a bridge.*
2. **Anchor arm spans:** *Located at the outermost end, it counterbalances the arm of span extending in the opposite direction from a major point of support. Often attached to an abutment.*
3. **Approaches:** *Part of bridge or bridges leading up to the main span.*
4. **Arch:** *A structural form utilizing a semi-circular substructure.*
5. **Beam:** *A horizontal structure member supporting vertical loads by resisting bending.*
6. **Bent:** *Part of a bridge substructure. A single or multi-column frame commonly made of reinforced concrete or steel that supports a vertical load and is placed transverse to the length of a structure. Bents are commonly used to support beams and girders.*
7. **Bent cap:** *Refers to the horizontal element of a bent.*
8. **Bored tunnel:** *A tunnel constructed with a boring machine excavating and advancing automatically underground.*
9. **Bulb-tee girder:** *A type of precast concrete girder, where the cross section resembles a capital T with an extra "bulb" at the bottom of the stem.*
10. **Cable-stayed:** *A variation of suspension bridge in which the tension members extend from one or more towers at varying angles to carry the deck. Allowing much more freedom in design form, this type does not use cables draped over towers, nor the anchorages at each end, as in a traditional suspension bridge.*
11. **Cantilever arm:** *A structural member that projects beyond a supporting column or wall and is counterbalanced and/or supported at only one end.*
12. **Cast-in-place concrete girder:** *A concrete girder poured in the field in its final position.*
13. **Columns:** *Vertical supporting elements of a bridge.*
14. **Composite deck:** *A deck positively connected to the supporting beams or girders at regular intervals ensuring that the two behave as one, thereby increasing the overall carrying capacity.*
15. **Concrete box girder:** *A hollow concrete girder.*
16. **Concrete immersed tube tunnel:** *Tunnel made of pre-fabricated segments, sunk and connected at the bottom of a body of water.*
17. **Concrete segmental box girder**: *A concrete box girder built of small segments, bonded and pre-stressed together to form one long concrete box girder. Each segment can be either pre-cast or cast-in-place.*
18. **Deck:** *The portion of the superstructure in contact with vehicle tires.*
19. **Deck overlay:** *usually a thin application (in the order of 1 to 2") of new material across the deck of a bridge.*
20. **Functionally obsolete:** *A structure including substandard components, such as older railing or sidewalk and having a roadway geometry that does not meet today's standards. A functionally obsolete bridge may be structurally sufficient, but unable to handle its current volume of traffic.*
21. **Girder:** *A girder is a larger beam.*
22. **Main span:** *Refers to the longest span of a bridge structure (usually significantly longer than other spans). Also refers to the portion of the structure spanning the longest distance.*
23. **Overstressed:** *Stressed beyond acceptable range for a given material.*
24. **Piles:** *Long vertical steel or concrete elements drilled or driven deep into the ground to form part of a foundation. Piles are typically used in groups.*
25. **Pile Caps:** *A rectangular concrete element built on top of a group of piles. A column can be built above a pile cap.*
26. **Precast concrete girder:** *A concrete girder poured offsite, then transported to the construction site and lifted in place at a later time.*
27. **Seismically resistant:** *Characteristic of a structure designed to withstand earthquake loading.*
28. **Self-anchored suspension bridge:** *A suspension bridge where the main cables anchor in the superstructure itself instead of at the abutments.*

29. **Structurally deficient:** *A structure having a deck, superstructure, or substructure with a structural condition rating of 4 or less (poor or worse condition). This is a very low load rating and would require structural strengthening or bridge replacement.*
30. **Steel box girder:** *A hollow steel girder.*
31. **Steel casings:** *Steel pipe placed around another element for various applications.*
32. **Steel I-girder:** *A steel girder where the cross section resembles a capital I.*
33. **Steel plate girder:** *A steel girder built up with steel plates welded together.*
34. **Steel tied arch:** *Bridge built with a semicircular member over the deck, using the deck as a tie. This bridge usually involves cables connecting the deck to the arch.*
35. **Steel truss:** *Bridge built with steel truss members as main carrying elements.*
36. **Stringers:** *Secondary beams designed to support the deck.*
37. **Substructure:** *Any portion of a bridge structure below the superstructure, including abutments, columns, walls, and foundations that support the superstructure.*
38. **Superstructure:** *The portion of a bridge structure that carries the traffic load and transfers it to the substructure.*
39. **Suspension bridge*****:*** *A bridge that carries its deck with many tension members attached to main cables draped over tower piers and anchored at each abutment.*
40. **Sway bracing:** *Additional cross-members aimed at minimizing load-carrying member lateral sway, which could induce instability.*
41. **Tie-in:** *Location where approaches and main span meet.*
42. **Truss:** *A structural form that is used in the same way as a beam, but because it is made of a web-like assembly of smaller members, it can be made longer, deeper, and therefore, stronger than a* ***beam*** *or* ***girder*** *while being lighter than a beam of similar dimensions.*

Appendix F

Visual Plume Analysis

GERALD DESMOND BRIDGE/LONG BEACH GENERATING PLANT VISIBLE PLUME ANALYSIS

WILLIAM WALTERS, P.E., ASPEN ENVIRONMENTAL GROUP

INTRODUCTION

The following provides the assessment of the Long Beach Generating Plant (Long Beach) turbine exhaust stack visible plumes. A modeling analysis for the turbines was completed based on information provided for full-load and part-load operating conditions. This analysis was completed to determine if the visible plumes would be expected to impact motorists on the adjacent Gerald Desmond Bridge. This modeling analysis and its conclusions are based on the modeling inputs used; if any of these inputs (meteorological data, exhaust data, modeling input data) are inaccurate, they could affect the results of this analysis.

SITE DESCRIPTION

The Long Beach plant includes seven separate Brown Boveri-Sulzer Model 11D gas turbines. These turbines are air cooled and equipped with steam/water injection. The steam/water injection, which is used for emissions control, is always operational. The turbines are operated in a combined cycle mode, with two steam turbines. The 7 turbine exhausts are sent to four 235.3-ft-high (71.7-m-high) stacks, with Units 1 and 2, Units 3 and 4, and Units 6 and 7 sharing exhaust stacks and Unit 5 having its own exhaust stack. Table 1 provides the exhaust parameters provided for modeling, which include full-load and one partial-load condition.

Table 1 – Turbine Exhaust Parameters

Parameter	HRSG Exhaust Parameters			
Stack Height	235.3 feet – All Stacks			
Stack Diameter	20 feet – All Stacks, except Unit 5 Stack at 15 feet			
Stack	**Moisture Content (% by Volume)**	**Moisture Content (% by Weight)**	**Exhaust Flow Rate (klb/hr)[a]**	**Exhaust Temp (°F)**
Full-Load Conditions				
Unit 1 &2	13.95	8.93	5,049	343
Unit 3 & 4	12.81	8.19	4,791	347
Unit 5	14.29	9.15	2,609	336
Unit 6 & 7	13.14	8.41	4,976	333
Partial-Load Conditions[b]				
Unit 1 &2	11.80	7.54	3,828	337
Unit 3 & 4	11.58	7.40	3,798	345
Unit 5	10.70	6.82	2,009	345
Unit 6 & 7	12.40	7.93	3,683	332

Source: Parsons, 2003.
Notes:
[a] Values estimated based on exhaust flow rates, exhaust temperatures, and moisture contents.
[b] Partial load conditions range from 75% to 81.7% load.

The Long Beach plant stacks parallel the Gerald Desmond Bridge and are located approximately 100 ft (30.5 m) from the bridge. The stack height is more than 15 ft (4.5 m) higher than the bridge deck height at its highest point, which is some distance east northeast from the Long Beach plant. The bridge deck height directly adjacent to the exhaust stacks ranges approximately 35 to 50 ft (10.6 to 15.25 m) below the height of the exhaust stacks.

METEOROLOGICAL DATA

The meteorological data used in the plume frequency modeling analysis is 1990 to 1995 HUSWO data available for Long Beach that was obtained from the National Climatic Data Center (NCDC, 2001). This HUSWO data set does not have complete data for hours from 11:00 p.m. to 5:00 a.m. daily. The data provided for these incomplete data hours is limited to dry bulb temperature readings. An attempt to include this incomplete data has been made based on a statistical identification of potential plume hours.

The meteorological data used to determine plume impact potential to the bridge deck is 1981 Long Beach meteorological data obtained from the South Coast Air Quality Management District (SCAQMD) website. This data has all of the meteorological parameters necessary to run the ISCST3 model.

VISIBLE PLUME MODELING ANALYSIS

Staff modeled the turbine exhaust plumes using the CSVP model with a 6-year meteorological data set from Long Beach. Table 2 provides the CSVP model visible plume frequency results.

Table 2 – Predicted Hours with Turbine Exhaust Steam Plumes Long Beach 1990-1995 Meteorological Data

Exhaust Stack	Modeled Plumes (hrs)	Percent
Full Load		
Units 1 & 2	21	0.050
Units 3 & 4	6	0.014
Unit 5	50	0.120
Units 6 & 7	13	0.031
Partial Load		
Units 1 & 2	1	0.002
Units 3 & 4	0	0
Unit 5	0	0
Units 6 & 7	6	0.014

*A total of 41,617 hours were modeled.

The predicted visible plume frequencies are very low, but they are higher than might be expected for the given turbine exhaust temperatures. The reason that any visible plumes are predicted is due to the fact that water/steam injection is used for nitrogen oxide (NO_x) emissions control, and that elevates the exhaust moisture content enough to predict plume formation under the most severe meteorological conditions. The partial-load operating conditions have lower exhaust moisture contents without substantially lower exhaust temperatures; therefore, the plume frequencies at partial load were predicted to be lower than at full-load operation. For the 1990 to 1995 meteorological data set modeled, the maximum temperature where a visible plume is predicted is

46.9 degrees Fahrenheit (°F) when the relative humidity is 100%, and the minimum relative humidity where a plume is predicted is 53% when the ambient temperature is 28.9°F.

The modeled meteorological data had 897 hours where the temperature was at or below 46.9°F. The incomplete meteorological data in this data set had a total of 716 hours where the temperature was at or below 46.9°F. Therefore, the maximum plume potential for Turbine 5 (worst-case turbine), assuming a similar distribution of relative humidity, would be 90 hours for the entire 1990 to 1995 period (52,583 hours), or approximately a 0.17% frequency.

The meteorological data from the CSVP modeling analysis indicates the Turbine 5 wind direction would be towards the bridge for 21 out of the 50 hours (42%) when plumes were predicted to occur. Twenty-two of the 50 hours (44%) were noted as calm wind conditions. Additionally, out of the 21 plume hours where the wind was directed towards the bridge, 10 of these (48%) were during hours where fog or rain was indicated to occur in that hour, and 6 of these (29%) were during hours where visibility was indicated to be less than 0.1-mile.

CONCENTRATION MODELING ANALYSIS

The CSVP modeling analysis data indicates that plumes could form under the worst-case meteorological conditions when the stack exhaust has diluted to between 13.4 to 6.8 g/m^3. These concentrations refer to the worst-case initial condensation point and end condensation point on the saturation curve. This means that when the initial stack concentration of 70.9 g/m^3 (Turbine 5) has been diluted to 13.4 g/m^3, it has the appropriate temperature and moisture content to begin condensation, and when the stack exhaust has diluted to less than 6.8 g/m^3, then the moisture content will be less than is necessary for condensation. For simplification, the intersection points with the saturation curve are used to describe when the plume will begin forming droplets and become visible and when the plume will stop forming droplets and no longer be visible. The Long Beach plant exhaust stacks were modeled using ISCST3 model using 1 year of Long Beach meteorological data obtained from the SCAQMD website. The base modeling input variables were obtained from existing ISCST3 modeling files (Parsons, 2003). This modeling analysis was performed to determine the worst-case modeled exhaust concentrations on the bridge deck.

This modeling analysis is considered to be conservative because the actual temperature and relative humidity of the hours modeled are not being considered in the determination of the worst-case concentrations. The plume height, and consequentially the determined concentration, is a function of ambient temperature; given the same exhaust conditions, the plume heights are higher when the ambient temperatures are lower. Additionally, ISCST3 has certain simplifying assumptions that allow very near field concentrations from a single large-diameter stack or from multiple stacks to be modeled at a higher concentration than their initial exhaust concentration (i.e., in violation of thermodynamic laws). Therefore, this modeling analysis is expected to result in a conservative estimate of the potential for visible plume occurrence on the bridge deck.

This ISCST3 modeling analysis indicates that the worst-case 1-hour moisture concentration on the bridge deck would be approximately 0.04 g/m^3, which would be much lower than the exhaust concentration necessary for a visible plume to occur. However, it should be noted that plumes, like odors, are more of an instantaneous phenomena. Using Turner's $1/5^{th}$ power law adjustment, the worst-case instantaneous concentration, defined for these purposes as the maximum one second concentration, would be 5.14 times the maximum 1-hour concentration. This would mean that the instantaneous maximum bridge deck concentration would be on the order of 0.2 g/m^3, which is still well below exhaust concentration necessary for a visible plume to occur.

A model run with receptors located approximately 110 ft (33.5 m) above maximum bridge deck height (receptor height 100 m, 33 m above the bridge deck) indicates that the 1-hour worst-case plume concentration would be approximately 0.2 g/m^3 (instantaneous maximum 1.1 g/m^3). A model run with receptors located approximately 270 ft (82 m) above the bridge deck height (receptor height 150 m, 83 m above the bridge deck) indicates that the 1-hour worst-case plume concentration would be approximately 1.3 g/m^3 (instantaneous maximum 6.8 g/m^3). Finally, a model run with receptors located approximately 435 ft (132.5 m) above the bridge deck height (receptor height 200 m) indicates that the 1-hour worst-case plume concentration would be approximately 9.8 g/m^3 (instantaneous maximum 50.5 g/m^3). Therefore, the modeling indicates that visible plumes may be expected to begin to occur at approximately 270 ft (83 m) or higher above the bridge deck, but not on the bridge deck or even 110 ft (33 m) above the bridge deck.

This finding is consistent with the stack design of the power plant, which minimizes stack downwash, and the relatively high temperature and velocity of the exhausts that would cause significant plume rise.

CONCLUSIONS

Visible plumes from the Long Beach power plant are predicted to occur, but very infrequently. However, the visible plume heights are predicted to be well above the bridge deck and are not expected to interfere with bridge traffic visibility.

REFERENCES

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Parsons. 2003. Full Load and Partial Load Turbine Exhaust Data and ISCST3 modeling input files. August 2003.

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Appendix G

Traffic Study Methodology

Traffic Forecasting Model Methodology

In addition to the existing/baseline condition (year 2005), a level of service (LOS) analysis was conducted for the year 2015, which is the year in which the proposed project is scheduled to be open to traffic, and year 2030, which is the design horizon year for the proposed project. To complete this analysis, a traffic forecasting model was developed as part of the study to forecast future traffic volumes with and without the project in the years 2015 and 2030.

The model was based upon the travel demand forecasting model (Port Model) developed for the Ports of Long Beach/Los Angeles Transportation Study (2001). That Port Model, completed in 2000, is based on the Southern California Association of Governments' (SCAG) Regional Travel Demand Forecasting Model. Elements of the SCAG Heavy-Duty Truck (HDT) model were used, as well as input data from the City of Long Beach model and the City of Los Angeles Transportation Improvement Mitigation Program (TIMP) models for Wilmington and San Pedro. TRANPLAN is the software platform used for modeling. Special model features include the following:

<u>Network Coverage</u>

The roadway network used for traffic assignment in the SCAG model was augmented in the area of the ports to include all of the public roadways. Outside the area of the ports, the SCAG 2000 and 2030 roadway networks were used. The future networks include planned and programmed highway improvements included in SCAG's Destination 2030: 2004 Regional Transportation Plan (RTP), which is the current plan for the region in which the project is located. The future year networks do not include truck lanes or other widening on the State Route (SR) 710 freeway nor improvements to the SR 47 Expressway or Schuyler Heim Bridge on SR 47; however, a sensitivity analysis was performed with these improvements in place.

<u>Traffic Analysis Zone Disaggregation</u>

The traffic analysis zones (TAZs) used for trip generation in the SCAG model were disaggregated into more refined zones within the area of the ports. A TAZ was provided for each of the ports' container terminals.

<u>Coding of Highway Grades and Reduced Capacities</u>

An important feature of the model, which was explicitly accounted for and coded to the network, are locations of steep uphill and downhill grades. These include the Gerald Desmond Bridge, Schuyler Heim Bridge, and Ocean Boulevard/SR 710 connector ramps.

<u>Implementation of Truck Passenger Car Equivalencies (PCEs)</u>

The presence of vehicles other than passenger cars in the traffic stream affects traffic flow in two ways: (1) these vehicles, which are much larger than passenger cars, occupy more roadway space (and capacity) than individual passenger cars, (2) the operational capabilities of these vehicles, including acceleration, deceleration, and maintenance of speed, are generally inferior to passenger cars and result in the formation of large gaps in the traffic stream that reduce highway capacity. On long sustained grades, and segments with impaired capacities where trucks operate considerably slower, formation of these large gaps can have a profound impact on the traffic stream. The above characteristics are also accounted for in the model as discussed below.

<u>Grades and Passenger Car Equivalents</u>

Grades are coded in the TRANPLAN network as they are in the field to an accuracy of one percent. The grade is coded in directly, and then TRANPLAN has a specialized PCE procedure that converts assigned truck traffic to PCEs. It is not impedance; it is simply a conversion to PCEs. In this way, the effect of the truck volume is accounted for in the analysis using PCEs. The PCE factors are the same as those used in the Southern California HDT Model, which was based on the 1997 Highway Capacity Manual (HCM) PCE factors. They were developed by SCAG for the HDT model, and they include a sliding scale of PCE factors that takes into account the grade, the length of grade, and the percent of truck traffic.

While the SCAG PCE factors were used in the assignment of forecast traffic to the roadway network, they were not used in the assessment of roadway LOS. HCM vehicle density calculations were used to determine LOS. To adhere to the HCM procedures more closely, HCM PCE factors were used in LOS analysis. A standardized set of port-provided PCE factors for all trucks based on the HCM factors was utilized in the LOS analysis. The PCE factors for each vehicle type used in the LOS analysis are:

1.0 for motorcycles, cars, pickup trucks, sport-utility vehicles (SUVs), and vans;

1.1 for bobtails (tractor trailer combinations operated without a trailer);

2.0 for buses, 2-axle trucks, and 3-axle trucks; and

2.0 for container trucks, chassis trucks, and all other 4-axle or larger trucks.

Trips from Other Non-Port Zones

Trips generated by major developments within the area of the ports for which specific trip generation rates were not included in the Port Model were added to the model at the TAZ locations. Those developments include, but are not limited to, Queensway Bay, Cabrillo Marina, and the Port of Los Angeles Industrial Center.

Port Area Trip Distribution

Distribution of port trips was accomplished predominantly through information developed in the Ports Transportation Study, including results of user surveys and traffic counts. The port trip tables were allocated to known locations for major destinations, including off-dock rail yards, warehouse/industrial facilities, and other intermodal transfer facilities. The locations of these facilities by TAZ were identified, and they were explicitly coded into the trip tables. These port trips are not part of the gravity model distribution process. Both trips internal to the ports and with one trip end internal to the ports were addressed using this methodology.

2015 and 2030 Port Trip Tables

The port trip tables were developed in two parts. First, the port model zone trip tables were developed in a similar manner to those used in the Ports Transportation Study and model. Those trip tables were developed based on a detailed port area zone system and specialized trip generation rates for autos and trucks in the port. Second, special trip generation rates for autos were developed for the port studies and applied to 2015 and 2030 TEU forecasts. Truck trip generation for container terminals was developed using the QuickTrip model, which is discussed below.

2030 Regional Trip Tables

The 2030 regional trip tables for the Port Model were developed using the SCAG 2030 trip tables. Regional person-trip productions and attractions on a zonal level were obtained from SCAG for the entire SCAG modeling area for year 2030. For the traffic zones within the ports, trip productions and attractions were disaggregated to the more refined zones described above. The port and regional person productions and attractions were then converted into vehicle trips based on SCAG's socio-economic data (SED), trip distribution model, mode-split factors, and average auto-occupancy tables. Trips included in the model are drive alone, high-occupancy vehicle (HOV), HOV 3+, port autos, light heavy-duty trucks, medium heavy-duty trucks, heavy heavy-duty trucks, bobtails, chassis, and container trucks. Consistent with the SCAG model, the year 2030 trip tables reflect the throughput of 42 million TEUs at the ports.

Traffic Assignment

The total daily trips for all types of land uses in the region were allocated into SCAG's AM, MD, PM, and off-peak periods. Since the Port Model analyzes conditions for the AM, MD, and PM peak hours, the SCAG model data were converted to peak-hour values. This was accomplished by the application of conversion factors developed in cooperation with SCAG. SCAG previously applied similar factors to perform peak-hour analysis in other areas of the region. The factors were applied and calibrated as part of the original Port Model development in 1999 and have been consistently used since then. The resulting models include unique hourly trip tables for the peak activity hours of the ports. The trip tables contain peak-hour trip generation estimates that were developed specifically for the port zones. The hours for which trip tables have been developed are 8:00 AM to 9:00 AM, 2:00 PM to 3:00 PM, and 4:00 PM to 5:00 PM, representing the AM peak hour, MD peak hour, and PM peak hour, respectively. The TRANPLAN model uses an Equilibrium Traffic Assignment method, which is an iterative process. After each of the model iterations, the roadway volume/capacity ratios are calculated, and traffic is then reassigned to the shortest route until a predefined systemwide "closure" is achieved between two consecutive iterations. Equilibrium-type multi-class assignments are used.

QuickTrip Model

The QuickTrip model is well documented in the *Ports of Long Beach and Los Angeles Transportation Study* (2001). It is a spreadsheet model for truck trip generation analysis that was developed in a collaborative effort between the staff of both ports and a team of consultants. The model builds upon a gate trip generation model that was previously developed, with considerable refinements. It includes detailed input variables, such as mode split (rail versus truck moves), time of day factoring, weekend moves, empty return factors, and other characteristics that affect the numbers of trucks through the gates. The end product is a forecast of truck trip generation, by type of truck trip, for each hour of the day, by direction. The model was carefully validated against gate counts at each container terminal gate, and it was found to replicate within 2 to 12 percent overall, depending on the peak hour.

Post-Processing of Model Assignment Results

Model volume post processing is a procedure that is applied to remove any model validation differences and make the future roadway, ramp, and intersection forecasts more accurate at the intersection and link levels. The intersection turning movement volumes and the link volumes on roadway segments from the year 2005 model were compared to actual turning movement and link volumes from ground counts. Based on that comparison, adjustment factors (the difference in volumes by traffic movement) are developed for the model volumes so that they match the ground counts. That same adjustment factor is then carried forward to the future 2030 model. For example, if the model underestimates a given intersection traffic movement by 50 vehicles, then an adjustment of 50 added vehicles is made to the model output for that movement's volume for model runs of forecast years. In this way, the localized micro-level inaccuracies in the model are accounted for and corrected at the intersection level.

Forecasting Model Validation (Base Year 2005)

Within the port area, the model has been validated for individual roadway links. Model validation concentrated on Ocean Boulevard/ Seaside Avenue, from the vicinity of SR-710/downtown Long Beach (in the POLB) to Navy Way (in the POLA). Traffic ground counts were previously collected in August and September 2005 on two consecutive weekdays. Count locations are shown in **Table G-1**. The port area travel demand model was updated from 1999 base year conditions to 2005 base year conditions. To develop regional background trips, the SCAG trip regional tables were interpolated between the 1999 model trip tables and the 2030 model trip tables. This accounted for trips outside of the port area. For Port-area trips, the QuickTrip truck generation model was utilized to estimate 2005 truck trips. Year 2005 port area auto trips were estimated using auto trip generation rates developed for the Port of Long Beach and Los Angeles Transportation Study. For 2005, the following TEU throughput totals were used to develop the QuickTrip model truck trip generation forecasts: 6.8 million TEUs per year (616,330 per month) for the POLB, and 7.5 million TEUs per year (681,100 per month) for the POLA.

The goal of model validation was to adjust model parameters so that the model will most closely match ground counts, within acceptable thresholds. Typically, subregional travel demand models are validated at the screenline level and on major facilities. For this project, however, a screenline approach was not appropriate since the focus area consists of Ocean Boulevard and the bridge facility and nearby ramp systems; therefore, the validation focused on the specific roadways themselves. Based on the National Cooperative Highway Research Program (NCHRP) Report 255 "Highway Traffic Data for Urbanized Area Project Planning and Design," typical "acceptable deviation" for individual roadway links with volumes of 50,000 vehicles per day or less (Ocean Boulevard carries an ADT of just under 60,000 vehicles currently) is 20 percent (NCHRP Report 255, page 41, Figure A-3).

Ground counts are known to vary by 10 to 20 percent depending on the prevailing conditions on the days that the counts were collected; therefore, a model that replicates counts to within that threshold for major facilities is considered to be accurately estimating travel patterns. This is also consistent with the NCHRP report, as noted in the prior paragraph. For individual lower volume links, such as on- and off-ramps, validation to those thresholds is not feasible, as they carry very low volumes and are subject to significant fluctuation in daily ground counts; therefore, the focus of model validation was on Ocean Boulevard itself, although every ramp was also reviewed during the validation process.

The validation results at the link level indicate that the model is replicating existing/baseline volumes to within 10 to 25 percent for nearly all link locations along Ocean Boulevard/Seaside Avenue at the highest volume locations. During the AM peak hour, 8 locations have model volumes within 10 percent of ground counts, and during the PM peak hour, 8 locations are within 25 percent. Truck validation differences are somewhat larger than auto or total vehicles in percentage terms. This is to be expected, as truck volumes are only 30 to 35 percent of auto volumes at most locations. Lower-volume facilities, including ramps, tend to have somewhat higher differences between ground counts and the model; however, many of those locations carry very few trips (less than 50 to 100 trips in many locations). For lower-volume streets and ramps, validation is based on parameters contained in the NCHRP Report 255.

Table G-1
Count Locations and Specifications Summary

Location	Type of Count	Time Period
Terminal Island Freeway and Ocean Boulevard intersection	Manual	6-9 AM, 2-6 PM
Pier S Avenue and Ocean Boulevard intersection	Manual	6-9 AM, 2-6 PM
Terminal Island Freeway SB Off-Ramp and New Dock Street intersection	Manual	6-9AM; 2-6 PM
Terminal Island Freeway NB On-Ramp and New Dock Street Intersection	Manual	6-9 AM, 2-6 PM
Pier S Avenue and New Dock Street intersection	Manual	6-9 AM, 2-6 PM
Navy Way and Seaside Avenue intersection	Manual	6-9 AM, 2-6 PM
Pico Avenue / Pier B Street and 9th Street intersection	Manual	6-9 AM, 2-6 PM
Pico Avenue and Pier C Street intersection	Manual	6-9 AM, 2-6 PM
Pico Avenue and Pier D Street intersection	Manual	6-9 AM, 2-6 PM
Pico Avenue and Broadway intersection	Manual	6-9 AM, 2-6 PM
Pico Avenue and Pier E Street intersection	Manual	6-9 AM, 2-6 PM
Pico Avenue WB Off-Ramp from Ocean Boulevard (one-lane)	24-Hour Machine	24-hour
Pico Avenue WB On-Ramp to Ocean Boulevard (one-lane)	24-Hour Machine	24-hour
Pico Avenue EB Off-Ramps from Ocean Boulevard (one-lane)	24-Hour Machine	24-hour
Pico Avenue. EB on-ramp to Ocean Boulevard (one-lane)	24-Hour Machine	24-hour
Gate 5 / Pier T Avenue WB Off-Ramp (one-lane)	24-Hour Machine	24-hour
SB SR 710 Connector Ramp to WB Ocean Boulevard (two-lane ramp)	24-Hour Machine	24-hour
NB SR 710 Connector Ramp from EB Ocean Boulevard (two-lane ramp)	24-Hour Machine	24-hour
Ocean Boulevard east of the Pico Avenue ramps, but west of the Harbor Scenic Drive On-Ramp	24-Hour Machine	24-hour

Source: Iteris, 2008.

To achieve acceptable validation results, multiple model runs were made for each peak hour, and a series of model adjustments were made. The adjustments included the following:

- Increasing or decreasing facility speeds and capacities on a segment-by-segment basis where assigned volumes where either too high or too low, with different adjustments made by peak hour as appropriate;
- Correcting the model network where errors in coding were detected;
- Adjusting the TAZ loading points to provide more accurate representation of travel patterns from local streets to the arterial system; and
- Refining the regional peak-hour trip tables to achieve the proper level of background traffic.

Year 2015 Model Development

A key task during development of the 2015 model for both ports was to generate 2015 trip ends based on SCAG's regional trip tables. Regional production and attraction of "person trips" and regional HDT trip tables were obtained from SCAG for 2005 and 2030. Use of the regional 2030 trip tables ensures that cumulative traffic from planned growth region wide is included in the model forecasts. The SCAG regional trip table for 2015 was interpolated between 2005 and 2030. The person trips were aggregated to the current Port Model's trip purposes and zone system. The trip distribution models were then run. Next, the person trips were converted to vehicle trips using the SCAG mode choice model. Time-of-day trip tables were generated using the SCAG peak period and peak-hour adjustment factors.

A second key task was development of port-specific trip tables for 2015 trips to and from port zones themselves. Use of the 2015 forecast trip tables ensures that cumulative traffic from planned growth in the vicinity of the ports and not included in the SCAG regional projections is included in the model forecasts. The port area peak-hour auto, bobtail, chassis, and container trip tables were generated based on the 2015 TEUs using the Quick Trip model. The total estimated TEU throughput for both ports for 2015 is approximately 27 million TEUs. For the peak month, this equates to approximately 2.5 million TEUs. The TEU throughput for each terminal was provided by the POLB. **Table G-2** summarizes the 2015 TEU throughput by terminal and the resultant truck and auto trips. Truck trips are disaggregated into bobtail, chassis, and container truck trips, representing the major types of truck trips in the ports. For both ports, the combined forecast 2015 trip generation totals for container terminals accounts for approximately 90 percent of port truck trips.

A third key task was to develop model roadway networks for the project conditions with and without the proposed bridge. New links were added to the network, and new lane configurations were coded in the model network based on the configuration with each condition. Finally, the full model, including post-processing, was run and traffic volume forecasts were generated.

<u>Year 2030 Model Development</u>

The first task during development of the 2030 model for both ports was to generate 2030 trip ends based on SCAG's regional trip tables. Regional production and attraction of "person trips" and regional HDT trip tables were obtained from SCAG for 2030. The person trips were aggregated to the current Port Model's trip purposes and zone system. The trip distribution models were then run. Next, the person trips were converted to vehicle trips, and time-of-day trip tables were generated.

The second task was development of port-specific trip tables for 2030 trips to and from port zones themselves. The port area peak-hour auto, bobtail, chassis, and container trip tables were generated based on the 2030 TEUs using the Quick Trip model. The total estimated TEU throughput for both ports for 2030 is approximately 42 million TEUs. For the peak month, this equates to approximately 3.8 million TEUs. The TEU throughput for each terminal was provided by the POLB. **Table G-3** summarizes the 2030 TEU throughput by terminal and the resultant truck and auto trips. Truck trips are disaggregated into bobtail, chassis, and container truck trips, representing the major types of truck trips in the ports. For both ports, the combined forecast 2030 trip generation totals for container terminals accounts for approximately 90 percent of port truck trips.

The third task was to develop model roadway networks for the project conditions with and without the proposed bridge. New links were added to the network, and new lane configurations were coded in the model network based on the configuration with each condition. Finally, the full model, including post-processing, was run, and traffic volume forecasts were generated.

Table G-2

2015 Peak Month Container Terminal Trip Generation Estimates

Year 2015		AM Peak Hour (8:00AM - 9:00AM)														
		Autos		Bobtail		Chassis		Container		Total Trucks			Total Vehicles		
Terminal	TEU	In	Out	In	Out	In	Out	In	Out	In	Out	Total	In	Out	Total
Pier A	166,252	135	135	85	56	26	13	120	94	232	163	395	367	298	664
Pier C	38,886	31	31	26	17	14	5	32	28	72	50	122	103	82	185
Pier DEF	200,420	162	162	82	49	11	9	129	86	221	144	365	383	307	690
Pier GJ	184,557	149	149	101	57	38	14	137	95	276	166	442	426	315	741
Pier J South	237,335	192	192	110	65	23	14	166	111	300	190	489	492	382	874
Pier S	91,664	74	74	46	30	13	7	66	51	124	88	213	199	163	361
Pier T	266,845	216	216	142	80	50	19	196	134	388	233	621	604	449	1,053
Total POLB	1,185,959	961	961	592	355	175	81	846	599	1,613	1,034	2,648	2,574	1,995	4,569
YML	213,496	173	173	116	69	43	17	158	115	317	200	517	490	373	863
Trapac	139,428	113	113	76	46	28	11	104	76	208	133	341	321	246	567
SSAT	57,641	47	47	39	26	21	8	47	42	106	76	183	153	123	276
TI East	149,922	121	121	69	42	14	9	104	72	188	123	310	309	244	553
TI West	186,948	151	151	96	57	30	13	135	96	260	165	426	412	317	729
Pier 300	197,156	160	160	82	49	7	9	133	86	221	144	365	381	304	685
Pier 400	329,755	267	267	136	79	10	14	221	139	367	233	600	634	500	1,134
Total POLA	1,274,346	1,032	1,032	613	368	152	81	903	626	1,668	1,075	2,742	2,700	2,107	4,807
Total Ports	2,460,305	1,993	1,993	1,205	722	327	162	1,749	1,225	3,281	2,109	5,390	5,274	4,102	9,376

Year 2015		MD Peak Hour (2:00PM - 3:00PM)														
		Autos		Bobtail		Chassis		Container		Total Trucks			Total Vehicles		
Terminal	TEU	In	Out	In	Out	In	Out	In	Out	In	Out	Total	In	Out	Total
Pier A	166,252	50	85	99	95	31	22	140	160	269	277	546	319	362	680
Pier C	38,886	12	20	30	30	16	9	37	49	83	88	171	95	107	202
Pier DEF	200,420	60	102	95	94	12	18	150	164	256	276	532	316	378	694
Pier GJ	184,557	55	94	117	112	44	27	159	187	320	327	647	376	421	797
Pier J South	237,335	71	121	128	121	27	25	192	207	347	353	700	418	474	892
Pier S	91,664	27	47	53	52	15	12	76	88	144	152	296	172	199	371
Pier T	266,845	80	136	165	156	58	37	228	260	450	453	903	530	589	1,119
Total POLB	1,185,959	356	605	687	660	203	151	981	1,114	1,870	1,925	3,795	2,226	2,529	4,756
YML	213,496	64	109	134	130	49	32	183	216	367	377	745	431	486	917
Trapac	139,428	42	71	88	86	33	21	120	144	241	252	493	283	323	606
SSAT	57,641	17	29	45	45	24	13	55	72	123	130	253	141	159	300
TI East	149,922	45	76	80	77	16	16	121	133	217	227	444	262	303	566
TI West	186,948	56	95	111	111	34	26	157	187	302	324	626	358	419	777
Pier 300	197,156	59	101	95	94	8	17	154	165	256	276	532	316	376	692
Pier 400	329,755	99	168	157	154	12	28	257	271	426	454	880	525	622	1,147
Total POLA	1,274,346	382	650	711	698	176	153	1,047	1,188	1,933	2,038	3,972	2,316	2,688	5,004
Total Ports	2,460,305	738	1,255	1,397	1,357	379	303	2,028	2,302	3,804	3,963	7,766	4,542	5,218	9,759

Year 2015		PM Peak Hour (4:00PM - 5:00PM)														
		Autos		Bobtail		Chassis		Container		Total Trucks			Total Vehicles		
Terminal	TEU	In	Out	In	Out	In	Out	In	Out	In	Out	Total	In	Out	Total
Pier A	166,252	125	243	53	78	17	18	76	132	146	229	374	270	471	742
Pier C	38,886	29	57	16	21	9	6	20	34	45	61	106	74	117	192
Pier DEF	200,420	150	293	51	66	7	13	81	115	139	194	333	289	487	776
Pier GJ	184,557	138	269	64	96	24	24	86	160	174	280	453	312	549	861
Pier J South	237,335	178	347	69	107	15	23	104	183	188	313	501	366	659	1,026
Pier S	91,664	69	134	29	36	8	8	41	61	78	105	183	147	239	386
Pier T	266,845	200	390	89	142	31	34	123	238	244	414	658	444	804	1,248
Total POLB	1,185,959	889	1,732	372	547	110	125	532	923	1,014	1,595	2,609	1,903	3,327	5,230
YML	213,496	160	312	73	108	27	26	99	180	199	314	513	359	625	984
Trapac	139,428	105	204	48	66	18	16	65	109	131	192	322	235	395	630
SSAT	57,641	43	84	24	31	13	9	30	50	67	89	156	110	174	284
TI East	149,922	112	219	43	60	9	13	66	103	118	176	294	230	395	625
TI West	186,948	140	273	60	78	19	18	85	132	164	228	392	304	501	805
Pier 300	197,156	148	288	51	66	4	12	83	116	139	194	333	287	482	769
Pier 400	329,755	247	481	85	111	6	20	139	194	231	325	556	478	806	1,285
Total POLA	1,274,346	956	1,861	385	519	95	114	567	884	1,048	1,518	2,565	2,004	3,378	5,382
Total Ports	2,460,305	1,845	3,592	757	1,066	205	239	1,099	1,807	2,062	3,113	5,175	3,907	6,705	10,612

Source: Iteris, 2008.

Table G-3

2030 Peak Month Container Terminal Trip Generation

Year 2030		AM Peak Hour (8:00AM - 9:00AM)													
		Autos		Bobtail		Chassis		Container		Total Trucks			Total Vehicles		
Terminal	TEU	In	Out	In	Out	In	Out	In	Out	In	Out	Total	In	Out	Total
Pier A	289,471	234	234	143	120	51	29	197	201	390	350	740	625	585	1,209
Pier C	52,962	43	43	33	26	17	7	40	41	90	75	165	133	118	251
Pier DEF	302,120	245	245	125	102	29	22	186	175	340	299	639	585	544	1,129
Pier GJ	293,839	238	238	160	138	70	35	208	226	438	399	837	676	637	1,313
Pier J South	385,840	313	313	152	124	17	24	242	217	410	364	775	723	677	1,400
Pier S	121,940	99	99	63	49	25	12	84	81	172	142	314	270	241	511
Pier T	402,402	326	326	215	177	91	45	282	291	589	513	1,102	915	839	1,754
Total POLB	1,848,574	1,497	1,497	890	736	301	174	1,238	1,233	2,429	2,143	4,572	3,926	3,640	7,566
YML	339,721	275	275	137	115	47	29	188	193	372	337	709	648	612	1,260
Trapac	205,005	166	166	82	66	28	16	113	110	223	192	416	389	358	748
SSAT	100,901	82	82	55	45	32	14	64	71	150	130	280	232	212	444
TI East	213,158	173	173	95	75	41	20	122	125	258	220	478	430	393	823
TI West	290,472	235	235	119	102	43	26	161	171	323	299	623	559	535	1,093
Pier 300	268,077	217	217	110	88	40	22	149	148	298	258	556	515	475	990
Pier 400	560,196	454	454	229	188	83	47	311	316	623	551	1,175	1,077	1,005	2,082
Total POLA	1,977,530	1,602	1,602	827	680	312	174	1,110	1,134	2,249	1,988	4,237	3,851	3,590	7,440
Total Ports	3,826,104	3,099	3,099	1,717	1,416	613	348	2,348	2,366	4,678	4,131	8,808	7,777	7,230	15,006

Year 2030		MD Peak Hour (2:00PM - 3:00PM)													
		Autos		Bobtail		Chassis		Container		Total Trucks			Total Vehicles		
Terminal	TEU	In	Out	In	Out	In	Out	In	Out	In	Out	Total	In	Out	Total
Pier A	289,471	87	148	166	164	59	39	228	274	452	478	930	539	626	1,165
Pier C	52,962	16	27	38	38	20	11	46	61	105	110	215	121	137	258
Pier DEF	302,120	91	154	145	138	34	30	215	235	394	403	797	485	557	1,042
Pier GJ	293,839	88	150	185	182	81	47	241	299	507	528	1,035	595	678	1,273
Pier J South	385,840	116	197	176	163	20	31	280	285	476	479	954	591	676	1,267
Pier S	121,940	37	62	73	73	28	18	98	121	199	213	411	235	275	510
Pier T	402,402	121	205	249	234	106	60	327	385	683	679	1,361	803	884	1,687
Total POLB	1,848,574	555	943	1,032	992	348	236	1,435	1,662	2,816	2,889	5,705	3,370	3,832	7,202
YML	339,721	102	173	159	155	54	39	218	259	432	453	885	534	627	1,160
Trapac	205,005	62	105	95	95	32	24	131	159	259	277	536	320	382	702
SSAT	100,901	30	51	64	64	37	20	74	102	174	185	360	205	237	441
TI East	213,158	64	109	110	110	47	29	142	181	299	320	619	363	429	792
TI West	290,472	87	148	138	138	50	34	187	231	375	403	778	462	551	1,013
Pier 300	268,077	80	137	127	121	46	30	173	202	346	353	698	426	489	916
Pier 400	560,196	168	286	266	250	96	62	361	418	723	730	1,453	891	1,016	1,907
Total POLA	1,977,530	593	1,009	959	931	362	238	1,287	1,552	2,607	2,722	5,329	3,200	3,730	6,930
Total Ports	3,826,104	1,148	1,951	1,990	1,923	710	474	2,722	3,213	5,423	5,611	11,033	6,570	7,562	14,132

Year 2030		PM Peak Hour (4:00PM - 5:00PM)													
		Autos		Bobtail		Chassis		Container		Total Trucks			Total Vehicles		
Terminal	TEU	In	Out	In	Out	In	Out	In	Out	In	Out	Total	In	Out	Total
Pier A	289,471	217	423	90	118	32	28	124	198	245	345	590	462	767	1,230
Pier C	52,962	40	77	21	26	11	8	25	42	57	76	133	96	154	250
Pier DEF	302,120	227	441	79	118	18	26	117	202	214	346	560	440	787	1,228
Pier GJ	293,839	220	429	100	139	44	36	130	229	275	404	679	495	833	1,328
Pier J South	385,840	289	563	95	151	11	29	152	264	258	444	701	547	1,007	1,554
Pier S	121,940	91	178	39	51	15	13	53	84	108	148	256	199	326	525
Pier T	402,402	302	588	135	223	57	57	177	368	370	649	1,019	672	1,236	1,908
Total POLB	1,848,574	1,386	2,699	559	828	189	196	778	1,388	1,526	2,412	3,938	2,912	5,111	8,023
YML	339,721	255	496	86	115	29	29	118	192	234	336	570	489	832	1,321
Trapac	205,005	154	299	52	67	17	17	71	113	140	196	337	294	496	790
SSAT	100,901	76	147	34	44	20	14	40	71	94	129	223	170	276	446
TI East	213,158	160	311	59	77	26	20	77	127	162	225	387	322	536	858
TI West	290,472	218	424	75	97	27	24	101	163	203	284	487	421	708	1,129
Pier 300	268,077	201	391	69	105	25	26	94	176	187	307	494	389	698	1,087
Pier 400	560,196	420	818	144	226	52	57	196	378	392	661	1,053	812	1,479	2,291
Total POLA	1,977,530	1,483	2,887	520	732	196	187	697	1,220	1,413	2,138	3,551	2,896	5,025	7,922
Total Ports	3,826,104	2,870	5,586	1,079	1,560	385	382	1,475	2,608	2,939	4,550	7,489	5,809	10,136	15,945

Source: Iteris, 2008

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Appendix H

Minimization/Mitigation Monitoring Program

MINIMIZATION AND MITIGATION SUMMARY
GERALD DESMOND BRIDGE REPLACEMENT PROJECT

ENVIRONMENTAL COMMITMENTS						
NO.	**DESCRIPTION OF COMMITMENT**	**RESPONSIBLE PARTY/ MONITOR**	**TIMING/PHASE**	**TASK COMPLETED (Sign and Date)**	**COMMITMENT SOURCE**	**COMMENTS**
TRAFFIC AND CIRCULATION: North- and South-side Alignment Alternatives						
TC-1	Prior to the start of construction Stage 2, the following improvements will be made to the intersection of Pico Avenue, Pier B Street, and 9th Street to mitigate the project's temporary adverse effect during construction at that intersection during Stage 2: ▪ Add dual northbound (NB) right-turn lanes; ▪ Restripe eastbound (EB) through/right lane to a right-turn lane; ▪ Provide one (1) EB through lane; and ▪ Continue two (2) State Route (SR) 710 southbound (SB) off-ramp lanes to Pico Avenue.	POLB/Contractor	Prior to construction Stage 2		Traffic Study EIR/EA	
TC-2	Prior to the start of construction Stages 3 and 4, the following improvements will be made to the intersection of Pico Avenue, Pier B Street, and 9th Street to mitigate the project's temporary adverse effect during construction at that intersection during Stages 3 and 4: ▪ Remove NB-SB split-signal phasing; ▪ Restripe NB through lane to a NB left-turn lane; ▪ Widen SB approach and provide two (2) left-turn lanes and one (1) through lane; and ▪ Continue two (2) on-ramp lanes to NB SR 710.	POLB/Contractor	Prior to construction Stages 3 and 4		Traffic Study EIR/EA	
TC-3	Prior to the start of construction Stage 2, a traffic signal will be installed at the intersection of Pico Avenue and Pier D Street to mitigate the project's temporary adverse effect during construction at that intersection during Stage 2, 3, and 4. The traffic signal will be permanent and will not be removed after completion of construction of a Bridge Replacement Alternative.	POLB/Contractor	Prior to construction Stage 2		Traffic Study EIR/EA	

ENVIRONMENTAL COMMITMENTS

NO.	DESCRIPTION OF COMMITMENT	RESPONSIBLE PARTY/ MONITOR	TIMING/PHASE	TASK COMPLETED (Sign and Date)	COMMITMENT SOURCE	COMMENTS
TC-4	Prior to the start of construction Stages 3 and 4, the following improvements will be made to the intersection of Pico Avenue and Pier E Street to mitigate the project's temporary adverse effect during construction at that intersection during Stages 3 and 4: ▪ Permanently signalize the intersection (the signal will not be removed after completion of construction of a Bridge Replacement Alternative); ▪ Restripe NB through lane to a NB right-turn lane, providing a single NB through lane; ▪ Add dual free-flow westbound (WB) right-turn lanes; and ▪ Continue two (2) EB Ocean Boulevard off-ramp lanes to Pico Avenue. The *Middle Harbor Redevelopment Project Draft Environmental Impact Statement (DEIS)/Draft Environmental Impact Report (DEIR) and Application Summary Report (ASR)* prepared for the Port and United States Army Corps of Engineers (USACE) includes signalization of the Pico Avenue/ Pier D Street and Pico Avenue/ Pier E Street intersections. If these signals are implemented as part of that project prior to the start of construction Stage 2 for the Pico Avenue/Pier D Street intersection and construction Stage 3 for the Pico Avenue/Pier E Street intersection, then that would remove the need for the signalization component of the proposed mitigations under TC-3 and TC-4, respectively.	POLB/Contractor	Prior to construction Stages 3 and 4		Traffic Study EIR/EA	
TC-5	During the design phase of a Bridge Replacement Alternative, the Port shall add a third NB left-turn lane to mitigate the project effect at the Navy Way/Seaside Avenue intersection. POLA is currently considering two potential projects at the Navy Way/Seaside Avenue intersection. One project would provide grade separation of left turns and the other would implement a centerline barrier on Seaside Avenue that would eliminate left turns. Either project would remove the signal at the intersection, thereby eliminating the adverse effect of the proposed Bridge Replacement Alternatives at the intersection. If either of these projects or any other comparable project is implemented prior to construction of the Bridge Replacement Alternatives, then the adverse effect of the Bridge Replacement Alternatives at the intersection would be removed and the proposed mitigation measure would not be required.	POLB/Contractor	During Design		Traffic Study EIR/EA	

ENVIRONMENTAL COMMITMENTS						
NO.	**DESCRIPTION OF COMMITMENT**	**RESPONSIBLE PARTY/ MONITOR**	**TIMING/PHASE**	**TASK COMPLETED (Sign and Date)**	**COMMITMENT SOURCE**	**COMMENTS**
TC-6	The Port will coordinate with the Long Beach City Traffic Engineer and provide funding for restriping and/or signalization improvements at the intersection of Ocean Boulevard and Magnolia Avenue as mitigation for the effect of a Bridge Replacement Alternative at the intersection.	POLB	Prior to initiation of construction		Traffic Study EIR/EA	
HAZARDOUS WASTE AND MATERIALS: North- and South-side Bridge Replacement and Rehabilitation Alternatives						
HM-1	A Phase II Site Investigation shall be performed in construction areas where excavation will exceed 5 feet (ft) (1.5 meters [m]) below ground surface (bgs), where groundwater may be encountered and in areas where underground storage tanks (USTs) were removed without closure. The results of the Phase II investigation would be incorporated into the Safety Plan to protect construction workers against known contamination in construction areas. A Hazardous Waste Management Plan based on the results of the Phase II investigation will also be incorporated into the Final Design to ensure proper disposal of contaminated materials and contaminated groundwater found in the construction areas.	POLB/Contractor	Prior to final design		Initial Site Assessment, EIR/EA	
HM-2	A risk assessment shall be performed prior to construction to determine how construction activities will impact the water-bearing levels and, as applicable, to determine health risks to construction workers.	POLB/Contractor	Prior to final design		Initial Site Assessment, EIR/EA	
HM-3	To minimize cross-contamination of the water-bearing zones, the construction contractor shall employ construction techniques to minimize the need for dewatering.	POLB/Contractor	Construction		Initial Site Assessment, EIR/EA	
HM-4	The Port shall conduct a survey to screen for asbestos-containing materials (ACMs) in all affected buildings and the bridge prior to the demolition activities. ACMs will be removed prior to demolition to mitigate any ACM hazard.	POLB/Contractor	Prior to building or bridge demolition		Initial Site Assessment, EIR/EA	
HM-5	Prior to construction, the Port shall test areas within the proposed project corridor where soil may be disturbed for aerially deposited lead (ADL). If ADL levels meet or exceed the action level set forth by the hazardous waste management plan for the project, then ADL-contaminated soils shall be removed in accordance with federal, state, and local regulations	POLB/Contractor	Prior to construction		Initial Site Assessment, EIR/EA	

ENVIRONMENTAL COMMITMENTS						
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HM-6	A Safety Plan will be required to address any exposure to hazardous materials. The Safety Plan will include proper personal protective equipment (PPE) work requirements, soil and air space monitoring requirements, documentation and reporting requirements, and action levels.	Contractor	Prior to construction		Initial Site Assessment, EIR/EA	
HM-7	The contractor shall prepare a Lead Compliance Plan in accordance with California Code of Regulations (CCR) Title 8 Section 1532.1. The Lead Compliance Plan shall be approved by an Industrial Hygienist certified in Comprehensive Practice by the American Board of Industrial Hygiene	Contractor	Prior to construction		Initial Site Assessment, EIR/EA	
HM-8	If it is determined that the project would require the removal or disturbance of any existing yellow thermoplastic traffic lane striping in the project area, then Caltrans standard measures shall be implemented to ensure the proper removal, storage, and disposal of the material, as applicable.	Contractor	Prior to final design		Initial Site Assessment, EIR/EA	
PUBLIC HEALTH AND SAFETY						
HS-1	An Accident and Terrorist Vulnerability assessment of the build alternative shall be completed and all recommendations incorporated into the project during final design. The assessment will analyze and consider applicable protection measures for the construction and operational phases of the proposed project.	POLB	Prior to final design		EIR/EA	
HS-2	A bridge construction and demolition schedule shall be submitted to the Long Beach Police and Fire Departments, United States Coast Guard (USCG), and Caltrans at least 2 weeks prior to initiation of work to provide adequate time for the agencies to plan for alternate routes in case of emergencies.	POLB	Prior to construction		EIR/EA	
HS-3	Prior to initiation of construction activities, all businesses, tenants, and utility companies (i.e., Southern California Edison [SCE], gas, water, oil, and telecommunications) within the area of the proposed construction/demolition or rehabilitation shall be notified of the schedules and associated roadway and ramp closures related to the proposed project.	POLB	Prior to construction		EIR/EA	
HS-4	All marine transportation and recreational boating companies shall be notified 2 weeks prior to initiation of planned construction/demolition or rehabilitation activities potentially affecting normal operations within the Back Channel.	POLB	Prior to and during construction		EIR/EA	

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HS-5	The USCG and all POLB tenants shall be regularly notified of scheduled work over the Back Channel during the construction and demolition phases of the project.	POLB	Prior to and during construction		EIR/EA	
HS-6	An emergency response and health and safety plan shall be prepared in accordance with all applicable federal, state, and OSHA standards. The plan should address potential emergency situations and assure the safety and health of workers by setting and enforcing standards to reduce occupational injuries and accidents. POLB will review and approve the plans prior to initiation of construction activities.	Contractor, POLB	Prior to and during construction		EIR/EA	
AIR QUALITY: North- and South-side Alignment Alternatives						
AQ-C1	Construction processes shall adhere to all applicable South Coast Air Quality Management District (SCAQMD) rules and regulations concerning the operation of construction equipment and dust control.	POLB/Contractors	Construction		Air Quality Technical Study EIR/EA	
AQ-C2	Construction equipment shall be properly tuned and maintained in accordance with manufacturer's specifications.	POLB/Contractors	Prior to and during construction		Air Quality Technical Study EIR/EA	
AQ-C3	During construction, trucks and vehicles in loading and unloading queues must be kept with their engines off when not in use to reduce vehicle emissions. Construction emissions shall be phased and scheduled to avoid emissions peaks, where feasible, and discontinued during second-stage smog alerts.	POLB/Contractors	Construction		Air Quality Technical Study EIR/EA	
AQ-C4	To the extent feasible, use electricity from power poles rather than temporary diesel or gasoline power generators.	POLB/Contractors	Construction		Air Quality Technical Study EIR/EA	
AQ-C5	As part of the Port's commitment to promote the Green Port Policy and implement the Clean Air Action Plan (CAAP), the proposed project construction would employ all applicable control measures included in the CAAP and relevant clean air technologies. Project heavy-duty construction equipment would use clean fuels, such as ultra-low sulfur fuel, or compressed natural gas and oxidation catalysts.	POLB/Contractors	Construction		Air Quality Technical Study EIR/EA	

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AQ-C6	Construction activities that affect traffic flow on the arterial roadways shall be scheduled to off-peak hours to the extent possible. Additionally, construction trucks shall be directed away from congested streets or sensitive receptor areas.	POLB/Contractors	Construction		Air Quality Technical Study EIR/EA	
AQ-C7	During the construction period, temporary traffic controls, such as flaggers and improved signal flow for synchronization to maintain smooth traffic flow, shall be provided.	POLB/Contractors	Construction		Air Quality Technical Study EIR/EA	
AQ-C8	Trucks used for construction prior to 2015 shall use engines with the lowest certified NO_X emission levels, but not greater than the 2007 NO_X emission standards.	POLB/Contractors	Construction		Air Quality Technical Study EIR/EA	
AQ-C9	Where feasible, construction equipment shall meet the EPA Tier 4 non-road engine standards. The equipment with Tier 4 engine standards becomes available starting in year 2011.	POLB/Contractors	Construction		Air Quality Technical Study EIR/EA	
CEQA (AQ-1)	Cumulative Air Quality Impact Reduction Program. To help reduce cumulative air quality impacts of associated with the Gerald Desmond Bridge Replacement Project, the Port will require the Project to provide funding in support of the Schools and Related Sites Guidelines for the Port of Long Beach Grant Programs and Healthcare and Seniors Facility Program Guidelines for the Port of Long Beach Grant Programs. The contribution to be made to the Port of Long Beach Schools and Related Sites and Healthcare and Seniors Facility Grant Programs will be determined at the completion of the public comment period for the environmental document, based on the alternative selected for implementation. The distribution of these funds to potential applicants and projects will be determined through a public evaluation process and approved by the Board of Harbor Commissioners. The timing of the payments pursuant to this mitigation measure shall be made by the latter of the following two dates: (1) the date that the Port issues a Notice to Proceed or otherwise authorizes the commencement of construction on the project; or (2) the date that the Gerald Desmond Bridge Replacement Project Final EIR/EA is conclusively determined to be valid, either by operation of PRC Section 21167.2 or by final judgment or final adjudication.	POLB	Prior to Construction		Air Quality Technical Study EIR/EA	

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BIOLOGICAL RESOURCES: Bridge Replacement Alternatives						
BR-1	Artificial Nest Boxes (Peregrine Falcon): A minimum of two nesting ledges with artificial nest boxes will be installed on the new bridge in different locations prior to demolition of the existing bridge. The boxes will be available prior to the nesting season. The new nest locations will be approved by the California Department of Fish and Game (CDFG) and will be selected to minimize disturbance to the extent feasible. Should the peregrine falcons not use the new bridge for nesting despite the nest boxes, alternate suitable nesting sites are available in the project vicinity (e.g., hotels, silos, bridges, Long Beach City Hall).	POLB/Contractor	Construction		Natural Environment Study/, EIR/EA	
BR-2	Precluding Nesting on the Existing Bridge (Peregrine Falcon)*:* Once the nest boxes are in place on the new bridge, and a minimum of 2 months prior to initiation of demolition activities within 500 ft (152 m) of the exiting nesting locations, measures and/or structures approved by CDFG to discourage nesting at the previously used nest sites would be implemented under the supervision of a CDFG-approved raptor biologist. If existing nest sites are occupied, then exclusion activities could not occur until 30 days after the last young leaves the nest, or until nest abandonment, whichever occurs first (see No Work Zone under BR-3 Monitoring Program).	POLB/Contractor	Construction		Natural Environment Study, EIR/EA	
BR-3	Monitoring Program (Peregrine Falcon): The proposed monitoring program is based on measures from the Peregrine Falcon Monitoring and Mitigation Program (PFMMP) for the Gerald Desmond Bridge (BioResource Consultants, 1998) used from 1998 through 2004. Modified measures from the 1998 PFMMP as proposed for the North- and South-side Alignment Alternatives are provided below. A mitigation and monitoring plan will be prepared and submitted to CDFG for concurrence prior to initiation of construction activities. • *Timing of Monitoring:* A raptor biologist will initiate monitoring at least 1-year prior to the beginning of construction and at least 2 months prior to nest site selection, generally January to mid-February. Monitoring will continue through the breeding season, which generally extends through mid-July. Monitoring will occur at the existing and new bridge and begin prior to the placement of artificial nest boxes on the new bridge and prior to attempts to	POLB/Contractor	Preconstruction/ Construction/ Postconstruction		Natural Environment Study, EIR/EA	

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	preclude nesting at the existing bridge. Monitoring during construction will continue once weekly during the breeding season until the breeding season or construction is complete, whichever occurs first. Post-construction monitoring will occur for 3 years after construction. Surveys will be conducted once monthly from January through July to document peregrine falcon nesting at the new bridge. • *Biological Monitor:* A raptor biologist with several years of experience observing peregrine falcon behavior and approved by the Port, Caltrans, and CDFG will be selected to conduct the monitoring. • *Monitoring Effort:* All monitoring will be conducted with the use of binoculars and/or spotting scope and document peregrine falcon activity in the vicinity of the existing and new bridge. Monitoring during construction will require an average of 8 to 12 hours of observation per week to determine whether peregrine falcons are exhibiting normal breeding behavior and are nesting on the old bridge, or if they have relocated to an alternate nesting site. If peregrines attempt to nest on the existing bridge while construction activities are occurring, then a qualified peregrine monitor will observe the pair for a minimum of 16 hours per week to determine the effect of the construction on peregrine behavior. This level of effort will continue as long as incubating peregrines or nestlings under the care of adults occupy the nesting site. If the young fledge, then the observations will continue for a minimum of 30 days after the last young leaves the nest ledge. If the raptor biologist reports that the peregrines are exhibiting behavior that may indicate potential nest abandonment, then visual screens or other methods as approved by CDFG would be implemented at the nesting locations. If nest abandonment occurs, then the Port, in coordination with CDFG, will determine the feasibility of creating temporary nesting ledges at alternate locations in areas with less intense construction activities. Nesting on the new structures shall be discouraged until construction of the new bridge is completed. The Port, in coordination with CDFG, will develop measures to be					

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	implemented by a raptor biologist, where feasible, or under the direction of a raptor biologist, where precluded by construction site safety concerns, to discourage nesting. Such measures may include continued removal of nesting materials or installation of CDFG-approved exclusion devices. • *No Work Zone:* During construction of the new bridge and prior to exclusion efforts for bridge demolition activities, the existing nest ledges and boxes would be available for nesting. If a nesting attempt is made on the new bridge while under construction, then a “No Work Zone” of approximately 250 ft (76 m) will be enforced until the raptor biologist implements CDFG-approved methods to discourage nesting on the areas under construction. Prior to exclusion activities on the existing bridge, nesting ledges on the new bridge will be available for use. During demolition, if falcons attempt to nest on the existing bridge, despite efforts to deter nesting, then a “No Work Zone” of approximately 250 ft (76 m) will be enforced until the raptor biologist implements CDFG-approved methods to further exclude nesting on the Gerald Desmond Bridge during demolition activities. Should a nest be successfully established within the construction area during construction of the new bridge or demolition of the Gerald Desmond Bridge, the Port will instruct construction crews to adhere to a “No Work Zone” around the nest site. The Port will coordinate with the United States Fish and Wildlife Service (USFWS) and CDFG to obtain permission to remove the nest in accordance with the Migratory Bird Treaty Act (MBTA). This “No Work Zone” will extend around the nest for a radius of approximately 250 ft (76 m) and be maintained until removal of the nest is authorized – 30 days after the last young leaves the nest or until nest abandonment, whichever occurs first. Demolition activities can continue at other locations outside of the “No Work Area.” • *Reporting:* Quarterly reports summarizing monitoring observations of nesting peregrines, including breeding behavior, nest data, disturbances, and reproductive success, will be submitted during construction of the new bridge. During demolition, post-construction monitoring reports will be prepared to provide details on placement of artificial nest boxes and					

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	exclusion activities and use of the nesting ledges on the new bridge. Reports will be prepared by the raptor biologist and submitted to the Port, Caltrans, and CDFG.					
BR-4	Placement of Bat Boxes: Bat roosting boxes on the new bridge will be made available a minimum of 2 months prior to demolition activities within 500 ft (152 m) of active roosts at the existing bridge. Bat roosting boxes will be designed and built during construction of the new bridge, which is scheduled to occur before demolition of the existing bridge, to be ready for placement once the under-bridge structures are complete. The location and design of artificial roosts will also consider the temperature measured at roosts on the existing bridge during the preconstruction period. A variety of designs and recommendations are available (Langenstein *et al.,* 1998; Keeley and Tuttle, 1999). In addition to, or in lieu of, bat roosting boxes, the new bridge may be designed to incorporate potential roosts as part of the structure (Exhibit 2.3.5-5), or such structures may be designed and added to the new bridge post-construction (Exhibit 2.3.5-6). Bats prefer roosting sites with crevices 0.5- to 1.25 inches (in.) (1.27 to 3.175 centimeters [cm]) wide (Keeley and Tuttle, 2000). Bats also use soffits if they are left open; therefore, bridge design could also include soffits that could be left open without damaging the bridge or hindering access for maintenance or other ongoing bridge work. One such type of artificial roost is the Texas bat-abode, which has an external panel on either side and 1- by 2-in. (2.5- by 5.1-cm) wooden spacers sandwiched between 0.5- to 0.75-in. (1.2- to 1.9-cm) plywood partitions (Exhibit 2.3.5-6). The internal partitions will be designed to provide crevices 0.75-in. (1.9 cm) wide and at least 12 in. (31 cm) deep. Smooth roost surfaces need to be textured to provide footholds for bats on one or both sides of each plywood partition, creating irregularities at least every 0.125-in. (0.3-cm). Footholds for bats are constructed of rough-sided paneling, or panels coated with polyurethane or epoxy paint sprinkled with rough grit, or attaching plastic mesh with silicone caulk or rust-resistant staples.	POLB/Contractor	Construction		Natural Environment Study, EIR/EA	

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BR-5	Precluding Roosting on the Existing Bridge: Prior to demolition, bats must be excluded from the existing bridge. Methods for excluding bats include use of a chemical repellant (i.e., naphthalene), use of floodlights, high-frequency noise, and placement of physical barriers such as nets to prevent bats from using roost sites (Greenhall, 1982). The exclusion method will be approved by the Port, Caltrans, and CDFG. The mechanical exclusion device is considered the safest and the most reliable (Exhibits 2.3.5-2 through 2.3.5-4). These barriers are commonly screens of mesh, hardware cloth, or wire, with mesh openings no greater than 0.25-in. (0.64-cm). The best time for bat proofing is November through March, after juvenile bats have learned to fly (Bat Conservation and Management, Inc., 2005). Exclusion work will be performed by contractors approved by Caltrans as experienced with excluding bats on bridges. This exclusion process may require 1 to 2 weeks, or potentially longer, given the size of the existing bridge. Bat exclusion via netting is accomplished by first affixing mesh netting over known entry points using I-bolts, which allows bats to exit the bridge but not return. Bats returning to the bridge would first return to their normal point of entry, and then they would seek new roosts once they have determined that it is not possible to return to their old roosting site. This process will be monitored by a CDFG-approved bat biologist each night for at least 7 consecutive nights, or until no bats are observed to exit the structure from known roosting areas at nightfall. During this time, monitoring will be performed to ensure that bats do not discover and use new roosts on the existing bridge and that no bats become entangled in netting. If any new roosts are discovered on the existing bridge, they will be covered with mesh according to the above procedure. Very small crevices or fissures in the bridge may be sealed using caulk or a similar filling agent. Should numerous bats still be observed exiting the bridge at night after installation of exclusion cloth, it may be necessary to add another exclusion method, such as floodlights illuminating access points or crevices used by attract bats (bats will not roost in a well-lit area).	POLB/Contractor	Construction		Natural Environment Study, EIR/EA	
BR-6	**Bat Monitoring Program:** A monitoring program will be implemented throughout the construction phases of the project, as applicable. CDFG concurrence on the proposed monitoring program will be obtained prior to initiation of bat monitoring/ survey	POLB/Contractor	Pre-construction/ Construction/ Post		Natural Environment Study, EIR/EA	

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	activities. All surveys/monitoring will be conducted by an approved CDFG bat biologist. Preconstruction monitoring will focus on bat species identification, locations of bat roosts, and documentation of roost characteristics based on Fenton (2003) and O'Shea *et al.* (2003). If CDFG species of special concern are identified, the Port will coordinate with CDFG and incorporate additional monitoring/protection measures as applicable. Timing of Monitoring: Bat preconstruction surveys will be initiated a minimum of 1-year prior to the initiation of construction. The surveying and monitoring regime will consist of quarterly monitoring surveys, including a survey in June (i.e., prime bat roosting season). Each survey will include daytime and nighttime surveys (see Monitoring Effort) focused on identifying specific locations of bat roosts and roost access points. One month prior to the initiation of demolition of the existing bridge, the frequency of preconstruction surveys at the existing bridge and new bridge will increase to once weekly. This will coincide with placement of bat roosts on the new bridge. Quarterly construction monitoring will be completed. If CDFG sensitive bat species are identified during the preconstruction surveys or during quarterly surveys, then monthly monitoring during the bat breeding season will be completed and will focus on construction effects on bats. If it is determined that construction disturbance is affecting CDFG sensitive species, then the Port will coordinate with CDFG to incorporate additional protection measures, as applicable. Monitoring during the demolition phase will focus on ensuring that all bats have been excluded after installing the bat boxes on the new bridge and prior to initiating demolition activities. Subsequent to installation of exclusion devices, roosting areas will be monitored for 7 consecutive nights, or until no bats are observed to exit the structure from known roosting areas at nightfall. During this time, monitoring will be performed to ensure that no bats become entangled in netting and that the bats do not discover and use new roost areas on the existing bridge. If any new roosts are discovered, exclusion netting will be installed, and the monitoring process will continue until bats have been excluded from the bridge. Post-construction monitoring will be conducted quarterly for 3 years and will document use of new bat roosts.		construction			

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	• *Biological Monitor:* A qualified bat biologist thoroughly familiar with Anabat™ equipment and approved by CDFG, Caltrans, and the Port will conduct all bat monitoring and supervise the design and placement of new bat roosts and bat exclusion methods and devices. • *Monitoring Effort*: The quarterly surveys will be performed during appropriate lunar/weather conditions and focus on identifying active bat roosts on the existing bridge. Each quarterly survey will include one survey during the day to search for urine staining and accumulation of bat feces or guano, and one evening/night survey period using a sonic bat (i.e., Anabat™ or Sonobat™). Several visits may be required per survey to determine specific roost locations and roost access points, and information necessary for designing bat exclusion devices on the existing bridge. During the quarterly preconstruction surveys, once the specific locations of bat roosts are determined, temperatures of existing roosting sites will be recorded so that selection of the location and type of artificial roosts on the new bridge can ensure duplication to the extent feasible of the thermal regime at existing bat roosts. Monitoring during construction and demolition will focus on whether construction activities are disturbing bats at the existing and new bridge. If disturbances to bats are documented, and monitoring has identified the presence of maternity roosts or CDFG sensitive species, then the Port will coordinate with CDFG to identify measures to minimize effects on the maternity roosts and sensitive species. • *Reporting:* Quarterly reports summarizing the monitoring efforts and observations at the new and existing bridge will be prepared and submitted to the Port, Caltrans, and CDFG. Following construction, a final report will be prepared and include the name of the bat monitor, survey methods and dates, survey times and weather conditions, the type of artificial bat roosts used at the new bridge, and exclusion devices at the existing bridge. The final report will also include photos and detailed observations, and a conclusions and recommendations section for agency use in future projects.					

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BR-7	Initial construction activities for the new transmission towers/ lines shall not begin during the nesting season (April through August) if double-crested cormorants have active nests on the transmission towers. Construction activities associated with the transmission tower/lines will be initiated prior to or after the breeding season or after the young have fledged.	POLB/Contractor	Construction		Natural Environment Study, EIR/EA	
BR-8	Construction and operational bridge lighting during and following construction will be designed to minimize the potential for bird collisions with the bridge structure. Lighting types known to minimize adverse effects (i.e., low-pressure sodium lights, high-pressure sodium lights, or light-emitting diode [LED] lights) will be used, and lighting types known to be disruptive to migrating wildlife, such as mercury vapor lamps (Jones, 2000), will be avoided. Additionally, lighting will be shielded to ensure that light is focused where it is needed, focusing lighting inward and minimizing the amount of lighting used to the maximum extent possible.	POLB/Contractor	Construction		Natural Environment Study, EIR/EA	
BIOLOGICAL RESOURCES: Bridge Rehabilitation Alternative						
BR-1b	***Artificial Nest Boxes:*** Prior to the final design phase, the Port, in coordination with CDFG, will select temporary locations for alternate nesting sites on the Gerald Desmond Bridge that would minimize the amount of disturbance within 250 ft (76 m) of new perch locations. Construction will be phased to complete adjacent seismic retrofit activities and painting operations at the new nesting locations outside of the nest site selection and breeding periods. Subsequent to completing the adjacent seismic retrofit activities, the temporary nesting ledges will be installed, and be continually available for use.	POLB/Contractor	Construction		Natural Environment Study/, EIR/EA	
BR-2b	***Precluding Nesting on the Existing Bridge:*** To ensure no mortality of peregrines due to construction-related mishaps associated with bridge deck replacement, CDFG-approved exclusion methods will be installed at existing nest sites under the supervision of a CDFG-approved raptor biologist before initiating rehabilitation activities. Exclusion will occur prior to the nest site selection or after the breeding season. Due to the proximity of the bridge deck replacement activities to the existing nest sites, exclusion devices will remain until completion of the rehabilitation activities.	POLB/Contractor	Construction		Natural Environment Study, EIR/EA	

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BR-3b	***Monitoring Program:*** The proposed monitoring program is based on measures from the PFMMP for the Gerald Desmond Bridge (BioResource Consultants, 1998) used from 1998 through 2004. Modified measures from the 1998 PFMMP, as proposed for the Rehabilitation Alternative, are provided below. A mitigation and monitoring plan will be prepared and submitted to CDFG for concurrence prior to initiation of rehabilitation activities. • *Timing of Monitoring:* A raptor biologist will initiate monitoring at least 1-year prior to the beginning of rehabilitation and at least 2 months prior to nest site selection, generally January to mid-February. Monitoring will continue through the breeding season, which generally extends through mid-July. Monitoring will occur at the existing nesting locations and at the alternate nesting locations after placement of artificial nest boxes. Monitoring during construction will continue once weekly during the breeding season until the breeding season or construction is complete, whichever occurs first. Post-construction monitoring will occur for 3 years after construction. Surveys will be conducted once monthly from January through July to document peregrine falcon nesting at the existing sites. • *Biological Monitor:* A raptor biologist with several years of experience observing peregrine falcon behavior and approved by the Port, Caltrans, and CDFG will be selected to conduct the monitoring. • *Monitoring Effort:* All monitoring will be conducted with the use of binoculars and/or spotting scope and document peregrine falcon activity in the vicinity of the bridge. Monitoring during bridge rehabilitation will require an average of 8 to 12 hours of observation per week to determine whether peregrine falcons are exhibiting normal breeding behavior and are nesting at the temporary locations, or if they have relocated to an alternate nesting site. If peregrines attempt to nest at the temporary nesting locations during rehabilitation activities, then a qualified peregrine monitor will observe the pair for a minimum of 16 hours per week to determine the effect of the construction on peregrine behavior. This level of effort will continue as long as incubating peregrines	POLB/Contractor	Preconstruction/ Construction/ Postconstruction		Natural Environment Study, EIR/EA	

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	or nestlings under the care of adults occupy the nesting site. If the young fledge, then the observations will continue for a minimum of 30 days after the last young leaves the nest ledge. If the raptor biologist reports that the peregrines are exhibiting behavior that may indicate potential nest abandonment, then visual screens or other methods approved by CDFG would be implemented at the nesting locations. Nesting on the Gerald Desmond Bridge in locations other than the temporary nesting locations shall be discouraged until rehabilitation activities are complete. The Port, in coordination with CDFG, will develop measures to be implemented by a raptor biologist. where feasible. or under the direction of a raptor biologist. where precluded by construction site safety concerns. to discourage nesting within areas under construction. Such measures may include continued removal of nesting materials or installation of additional CDFG-approved exclusion devices. • *No Work Zone:* During bridge rehabilitation activities, alternate nest ledges and boxes will be available for nesting. If a nesting attempt is made at a new location that would be under construction during the nesting season, then a “No Work Zone” of approximately 250 ft (76 m) will be enforced until the raptor biologist implements CDFG-approved methods to discourage nesting at the new location. Should a nest be successfully established within the construction area during bridge rehabilitation, the Port will instruct construction crews to adhere to a “No Work Zone” around the nest site. The Port will coordinate with USFWS and CDFG to obtain permission to remove the nest in accordance with the MBTA. This “No Work Zone” will extend around the nest for a radius of approximately 250 ft (76 m) and be maintained until removal of the nest is authorized or 30 days after the last young leaves the nest, or until nest abandonment, whichever occurs first. Rehabilitation activities can continue at other locations outside of the “No Work Area.” • *Reporting:* Quarterly reports summarizing monitoring observations of nesting peregrines, including breeding behavior, nest data, disturbances, and reproductive success, will be submitted during bridge rehabilitation activities. During post-construction monitoring, quarterly reports will provide details on					

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	nesting attempts, breeding behavior, and reproductive success. Reports will be prepared by the raptor biologist and submitted to the Port, Caltrans, and CDFG.					
BR-5b	**Precluding Roosting on the Existing Bridge:** Prior to beginning construction activities on each section of the bridge, bats will need to be excluded from that section. Bat proofing will occur outside of the breeding season (October 30 through March 1) after juvenile bats have learned to fly. Bat exclusion will be staged to ensure that roosting sites in areas not currently under construction will be available at all times during the project to minimize the potential effects on bats. Exclusion methods for the Rehabilitation Alternative will be the same as discussed under BR-5.	POLB/Contractor	Construction		Natural Environment Study, EIR/EA	
BR-6b	***Bat Monitoring Program:*** A monitoring program will be implemented throughout the project, as applicable. CDFG concurrence on the proposed monitoring program will be obtained prior to initiation of bat monitoring/survey activities. All surveys/monitoring will be conducted by an approved CDFG bat biologist. Preconstruction monitoring will focus on bat species identification and locations of bat roosts and access points. If CDFG species of special concern are identified during preconstruction surveys, then the Port will coordinate with CDFG and incorporate additional monitoring and protection measures, as applicable. During exclusion activities, monitoring of the exclusion devices will occur to ensure that entanglement of bats is not occurring. Monitoring will continue as long as bats are observed exiting the existing bridge. Subsequent to exclusion, monitoring during bridge rehabilitation activities will continue, focusing on locations where additional exclusion may be required. Post-construction monitoring will document re-colonization of the bridge and former roost areas. • *Timing of Monitoring:* Preconstruction surveys will be initiated a minimum of 1-year prior to the initiation of bridge rehabilitation activities. The surveying and monitoring regime will consist of quarterly monitoring surveys, including a survey in June (i.e., prime bat roosting season). One month prior to rehabilitation activities, surveys will increase to weekly and consist of daytime and nighttime surveys (see Monitoring Effort) focused on species identification, identifying specific locations of bat roosts,	POLB/Contractor	Pre-construction/ Construction/ Post construction		Natural Environment Study, EIR/EA	

ENVIRONMENTAL COMMITMENTS

NO.	DESCRIPTION OF COMMITMENT	RESPONSIBLE PARTY/ MONITOR	TIMING/PHASE	TASK COMPLETED (Sign and Date)	COMMITMENT SOURCE	COMMENTS
	access points, and roost characteristics. Monitoring during the bat exclusion phase will focus on ensuring that all bats have been excluded prior to initiating bridge rehabilitation activities. Subsequent to installation of exclusion devices, roosting areas will be monitored for 7 consecutive nights or until no bats are observed to exit the structure from known roosting areas at nightfall. During this time, monitoring will be performed to ensure that no bats become entangled in netting and that the bats do not discover and use new roost areas on the existing bridge. If any new roosts are discovered, then exclusion netting will be installed, and the monitoring process will continue until bats have been excluded from the bridge. Post-construction monitoring will be conducted quarterly for 3 years to document the post-construction bat re-colonization of the bridge. • *Biological Monitor:* A qualified bat biologist, thoroughly familiar with Anabat™ equipment and approved by CDFG, Caltrans, and the Port, will conduct all bat monitoring and supervise the design and placement of bat exclusion methods and devices. *Monitoring Effort:* The quarterly surveys will be performed during appropriate lunar/weather conditions and focus on identifying active bat roosts on the existing bridge. Each quarterly survey will include one survey during the day to search for urine staining and accumulation of bat feces or guano, and one evening/night survey period using a sonic bat (i.e., Anabat™ or Sonobat™). Several visits may be required per survey to determine specific roost locations and roost access points, and information necessary for designing bat exclusion devices for the bridge. Monitoring during construction will focus on the presence of bats in the bridge area and to identify areas that would require further exclusion. • *Reporting:* Quarterly reports summarizing the monitoring efforts and observations will be prepared and submitted to the Port, Caltrans, and CDFG. Following construction, a final report will be prepared and include the name of the bat monitor, survey methods and dates, survey times and weather conditions, and exclusion devices used. The final report will also include photos					

ENVIRONMENTAL COMMITMENTS						
NO.	**DESCRIPTION OF COMMITMENT**	**RESPONSIBLE PARTY/ MONITOR**	**TIMING/PHASE**	**TASK COMPLETED (Sign and Date)**	**COMMITMENT SOURCE**	**COMMENTS**
	and detailed observations, and conclusions and recommendations for agency use in future projects.					
BR-8b	Bridge lighting during construction will be designed to minimize the potential for bird collisions with the bridge structure. Lighting will be shielded to ensure that light is focused inward on the construction area and minimize spillover that could affect migratory birds.	POLB/Contractor	Construction		Natural Environment Study, EIR/EA	
BIOLOGICAL RESOURCES: North- and South-side Alignment and Bridge Rehabilitation Alternatives						
BR-9	Project landscaping will be limited to slopes near the bridge ramps and will follow the provisions set forth in Executive Order (EO) 13112, which mandates preventing the introduction of and controlling the spread of invasive plant species on highway rights-of-way (ROWs). No invasive species listed in the National Invasive Species Management Plan or the State of California Noxious Weed List shall be used in the landscaping plans for the proposed project.	POLB/Contractor	Final design		Natural Environment Study, EIR/EA	
Climate Change: North- and South-side Alignment Alternatives						
CEQA (GHG)-1	Greenhouse Gas Emission Reduction Program Guidelines (GHG Program). To partially address the cumulative GHG impacts of the Gerald Desmond Bridge Replacement Project, the Port will require this project to provide funding for the GHG Program . The contribution to be made to the Port of Long Beach GHG Grant Program will be determined at the completion of the public comment period for the environmental document, based on the alternative selected for implementation. This contribution will be used to pay for measures pursuant to the GHG Emission Reduction Program Guidelines, which include, but are not limited to, generation of green power from renewable energy sources, ship electrification, goods movement efficiency measures, cool roofs to reduce building cooling loads and the urban heat island effect, building upgrades for operational efficiency, tree planting for biological sequestration of CO_2, energy-saving lighting, and purchase of renewable energy certificates (RECs). The timing of the payments pursuant to this mitigation measure shall be made by the latter of the following two dates: (1) the date that the Port issues a Notice to Proceed or otherwise authorizes commencement of construction on the project; or (2) the date that the Gerald Desmond Bridge Replacement Final EIR/EA is	POLB	Prior to Construction		Air Quality Technical Study EIR/EA	

ENVIRONMENTAL COMMITMENTS						
NO.	DESCRIPTION OF COMMITMENT	RESPONSIBLE PARTY/ MONITOR	TIMING/PHASE	TASK COMPLETED (Sign and Date)	COMMITMENT SOURCE	COMMENTS
	conclusively determined to be valid, either by operation of PRC Section 21167.2 or by final judgment or final adjudication. At the project level, there are common measures that have the potential to reduce GHG emissions. These measures include using reclaimed water, landscaping, energy-efficient lighting, and idling restrictions.					

Appendix I

Draft Transmission Towers and Lines Relocation Options at the Port of Long Beach

Gerald Desmond Bridge Replacement Project

Transmission Towers & Lines Relocation Options at the Port of Long Beach

December 2008

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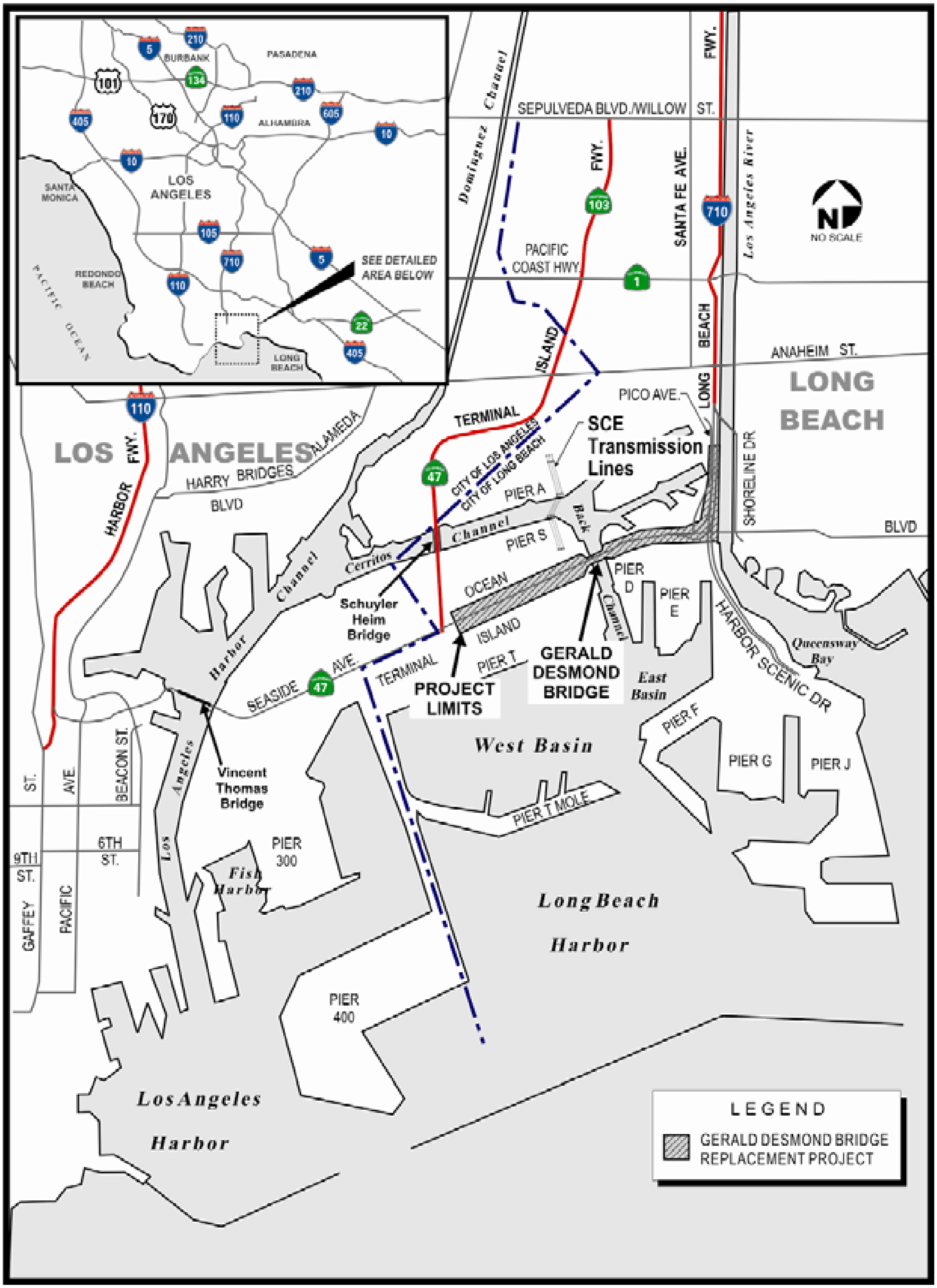
Introduction

The Gerald Desmond Bridge is a steel tied-arch truss bridge that connects downtown Long Beach to Terminal Island (Figure 1), The North- and South-side Alignment Alternatives (Bridge Replacement Alternatives) for the proposed Gerald Desmond Bridge Replacement Project would provide a new bridge with 200 feet [ft] (61 meters [m]) of vertical clearance above mean high water level (MHWL) within the Back Channel that could accommodate the larger container vessels currently in service and planned for the future. However, the vertical clearance afforded by the existing transmission and power lines that cross the Cerritos Channel from Piers S and A is approximately 153 feet [ft] (46.6 meters [m]) above MHWL and would be a potential hazard to navigation. The resulting navigational hazard will require raising or otherwise relocating the transmission and power lines. The information presented in this document summarizes the analysis and different options considered for relocating the Southern California Edison (SCE) lines.

History

Southern California Edison's (SCE) high-voltage transmission and power lines cross the Cerritos Channel from Long Beach Generation (also referred to as the Long Beach Generating Station [LBGS]) to Pier A via three 200-foot high steel lattice power transmission towers constructed in 1912 and 1924. The towers were erected in order to carry the high tension lines from the plant to the Edison distribution system discussed below. The existing vertical clearance was based on the need to clear the masts of sailing ships. This clearance is now insufficient to accommodate the larger container vessels currently in service and planned for the future. The transmission towers were evaluated by Parsons for eligibility on the National Register of Historic Places (NRHP). The State Historic Preservation Officer (SHPO) concurred with Parson's findings that the transmission towers are eligible for listing on the NRHP (Parsons, 2003).

The SCE Long Beach Substation, located on Terminal Island, was built in the 1920s as a networking point for SCE facilities. Initially, SCE owned not only the switchgear station but also an adjacent tank farm and power plant. The power plant had multiple generators, and the output of these generators was transformed to supply both of the 66-kV power lines, which then supplied energy to the adjacent switchgear station, and to the 220-kV transmission lines. The 220-kV lines then transported energy to either of SCE's main distribution hubs, Hinson Substation or Lightipe Substation, both north of the Cerritos Channel. The Hinson Substation is located just south of Interstate 405 (I-405).The Lightipe Substation is located north of State Route 91 (SR-91) near Interstate I-710. SCE has divested ownership of the tank farm and the power plant. NRG Energy, Inc., has taken ownership of the power plant, and Pacific Pipeline System, LLC, has taken ownership of the tank farm.


SEE DETAILED AREA BELOW
LOS ANGELES
LONG BEACH
SEPULVEDA BLVD./WILLOW ST.
PACIFIC COAST HWY.
ANAHEIM ST.
PICO AVE.
SCE Transmission Lines
Schuyler Heim Bridge
PROJECT LIMITS
GERALD DESMOND BRIDGE
Vincent Thomas Bridge
West Basin
East Basin
Long Beach Harbor
Los Angeles Harbor
NO SCALE
LEGEND
GERALD DESMOND BRIDGE REPLACEMENT PROJECT

The power plant was taken out of service for lack of a power sale contract and decommissioned in 2005. In response to record electricity demand in summer 2006, regulators encouraged SCE to pursue power generation projects that could be available by summer 2007. In response to SCE's request for new generating capacity by independent operators, NRG Energy, Inc. submitted their application for a Harbor Development Permit to re-commission four of the seven gas turbine generators at the existing LBGS in November, 2006 for a peaking plant. A peaking power plant is a power plant that generally runs only when there is a high demand, known as peak demand, for electricity. This typically occurs in the afternoon, especially during the summer months when the air conditioning load is high. Construction began in April 2007 and the plant was operational by August 2007. The peaking plant is operating under a 10-year power purchase agreement with SCE

Existing Conditions

The SCE high-voltage transmission, power and distribution lines cross the Cerritos Channel from LBGS to Pier A. Transmission lines operate at or above 200 kV, power lines between 50 and 200 kV and distribution lines operate under 50-kV (PUC, 1994). The vertical clearance afforded by the these lines, approximately 153 ft (46.6 m) above the mean high water level (MHWL), is 3 ft (1-m) less than vertical clearance afforded by the Gerald Desmond Bridge. This existing vertical clearance currently limits the air draft of vessels transiting to Piers A and S. Pier A is located to the north of Cerritos Channel and Pier S is located on Terminal Island to the south of Cerritos Channel.

The proposed Bridge Replacement Alternatives would provide approximately 200 ft (61 m) of air draft to accommodate the larger container vessels currently in service and planned for the future. The SCE lines would be a potential hazard to navigation; therefore, it would be necessary to raise or otherwise relocate the SCE lines. This relocation would be done in accordance with the applicable laws and regulations governing power and transmission lines over navigable waters. It is important to note that the existing Gerald Desmond Bridge is one of the lowest bridges in any large commercial port in the world.

Currently, there are 12 sets of cables (7 circuits) on 3 sets of towers that cross the Cerritos Channel (see Figure 2).

The switchgear station, as originally constructed, functioned as a junction point for connecting multiple circuits from north of the Cerritos Channel with the multiple generation facilities at the power plant. It also provided three additional circuits to supply power requirements on Terminal Island. The multiple generator connections are no longer in service, and the remaining circuits are as follows:

Figure 2
Existing Electrical Placement

Supplying Terminal Island:

1. 66-kV Circuit to Dock Substation with connection to Fuel Substation
2. 66-kV Circuit to Dock Substation with connection to APL Substation
3. 66-kV Circuit to Dike Substation

Supplying the Main Land - Towers Crossing the Cerritos Channel:

1. 66-kV Bundled Circuit (two sets of cables) to Hinson Substation (main source near I-405 with connection to State Substation in North Long Beach
2. 66-kV Bundled Circuit to Seabright Substation (near Cesar Chavez Park)
3. 66-kV Bundled Circuit to Bowl Substation (in North Long Beach)
4. 66-kV Bundled Circuit to Pico Substation (branching off at Anaheim Street on the north boundary of the Harbor District)
5. 66-kV Bundled Circuit to Hinson Substation
6. 66-kV Circuit to Harbor Cogen Substation (north of Pier A) with connection to Hanjin (Pier A) Substation
7. 12.5-kV Circuit from Dike Substation on Terminal Island to Harbor Cogen Substation

Separate from the above power circuits, SCE has two transmission circuits with separate towers that were built to carry the 220-kV output of the power plant from Long Beach Substation to Hinson Substation and Lightipe Substation.

Regulatory Compliance

This analysis would require compliance with Federal Aviation Administration (FAA) regulations, the Public Utilities Commission of the State of California (PUC) General Order 131-D, PUC General Order 128, the United States Army Corps of Engineers (USACE) regulations, the California Coastal Commission (CCC) regulations and, the United States Coast Guard (USCG). The preceding regulatory requirements are examples of some responsible agencies; compliance with other agencies and/or regulatory requirements may be necessary. These would be identified through the preferred option and during the design and permitting processes.

Per FAA regulations, all proposed construction and/or alteration of objects that may affect the navigable space are required to file a notice. Overhead transmission lines, as well as the height of supporting structures that are 200 ft (61 m) or greater, are required to file this notice with FAA (FAA, 2000a).

Also, FAA regulations require any obstruction to navigable space to have marking and lighting to reduce navigational hazards. This FAA standard was established using the criteria in Title 14, Part 77 of the *Code of Federal Regulations* (CFR) (FAA, 2000b).

PUC General Order 131-D requires that any new, upgraded, or relocated power lines or substations that are designed for immediate or eventual operation at any voltage between 50-kV and 200-kV require review under the California

Environmental Quality Act during the project planning phase and the relocation plan approval stage (PUC, 1994).

PUC General Order 128 sets uniform requirements for underground electrical supply and communication systems, the application of which will ensure adequate service and secure safety to all persons engaged in the construction, maintenance, operation, or use of underground systems and to the public in general (PUC, 1998).

The USACE is responsible for implementing Section 10 of the Rivers and Harbors Act of 1899. Section 10 of the Rivers and Harbors Act establishes permit requirements to prevent unauthorized obstruction or alteration of any navigable water of the United States. A Section 10 permit for modification of the SCE lines crossing Cerritos Channel will be obtained through coordination with the USACE as applicable (USACE, 2008a).

As part of the requirements of the CCC, the 1999 Port Master Plan establishes regulatory compliance with the Coastal Zone Management Act (CZMA). Specifically, the Port designates land uses and water uses where known throughout the Port area (Port, 1999).

The USCG monitors compliance with the Maritime Transportation and Security Act of 2002, which requires U.S. port facilities to establish and implement detailed security plans and procedures (Port, 2006). The Prevention Department of the USCG focuses on gaining compliance with regulatory standards, and design and maintenance of waterway systems to prevent incidents.

Options to Relocate and/or Raise Transmission Towers and Lines

Analysis of four relocation options for raising and/or relocating the SCE lines crossing the Cerritos Channel, as well as the advantages and disadvantages of each option, both from a project and operational standpoint are summarized below.

Option 1

Option 1 would relocate all lines (12.5-, 66- and 220-kV lines) from over the Cerritos Channel to beneath the Cerritos Channel. Figure 3 shows the proposed configuration for Option 1.

Pros

Relocating all of the lines under the Cerritos Channel would free up air space for ships to traverse the channel, thereby, reducing navigational hazards. Reducing navigational hazards along the Cerritos Channel would prevent service interruption to ships utilizing the Back Channel. The existing towers would be left in place and would not require additional coordination with the State Historic Preservation Officer (SHPO). The SHPO has concurred that by leaving the existing towers in place the project would not have an adverse affect on the eligible NRHP resource and therefore would not affect the project schedule.

Cons

Relocating the lines under the Cerritos Channel would require specialized protective steel poles. The lead time for manufacturing these custom-made steel poles and specialized cables would require a minimum of 1-year.

While underground facilities are not as susceptible to wind and debris-blown damage, they are more susceptible to water intrusion and local flood damage, which can make repairs more time consuming and costly. Damage and corrosion of underground electrical systems often show up days or even months later, causing additional outages and inconvenience to customers (FPL, 2006). Additionally, all SCE lines produce heat; therefore, they have a limit on the amount of power that they can carry to prevent overheating. Underground lines cannot dissipate heat as well as overhead lines. Factors, such as the type of soil, surrounding soil conditions, adjacent underground utilities, and the depth of installation, all affect the ability of the wire to dissipate heat (ATC, 2006)

The estimated cost of placing the 12.5-kV distribution line and 66-kV power lines below the Cerritos Channel is approximately $12 million (Port, 2005). Placing lines underground can be 5 to 15 times more costly than an overhead transmission line (FPL, 2006). Additionally it is assumed that to effectively dissipate the heat, placing the 220-kV transmissions lines beneath the channel may require the lines to be divided into multiple lines, further increasing the cost to relocate the lines beneath the Cerritos channel.

Further Analysis

Further analysis to determine approximately how many miles of transmission cables would be required to reroute the lines under the Cerritos Channel. This would determine the approximate cost, and would be done during the preliminary design stage of the project.

Option 1

Figure 3
Under the Cerritos Channel

Option 2

Option 2 would raise the existing towers to accommodate a 200-ft (61-m) vertical clearance for all lines (12.5-, 66- and 220-kV lines). Figure 4 shows the proposed configuration for Option 2.

Pros

Raising the existing towers would enable taller ships to traverse the Cerritos Channel. Reducing navigational hazards along the Cerritos Channel would prevent service interruption to ships utilizing the Back Channel.

Cons

The original design of the tower foundations may not be adequate to support the additional height and weight of steel required to raise the towers. Additionally, the existing transmission towers on Piers S and A, were determined to be eligible for listing in the NRHP. Raising these towers would require modification of the NRHP eligible resource and necessitate further coordination and concurrence from the SHPO. This effort would require additional time to be added to the project schedule.

Further Analysis

A cost-benefit analysis would be required to determine the overall cost of raising the existing towers. Additionally, further analysis is required to determine the height of the new towers to accommodate a 200-ft (61-m) vertical clearance above the MHWL. This would be done during the preliminary design stage.

Option 2

Figure 4
Raise Existing Towers

Option 3

Option 3 would construct new towers adjacent to the existing towers on Piers S and A to accommodate a 200-ft (61-m) clearance. Subsequent to construction of the new towers, all SCE lines (12.5-, 66- and 220-kV lines) would be relocated to the new towers. Figure 5 shows the proposed configuration for Option 3.

Pros

Relocating the lines to the new towers at a higher elevation would enable taller ships to traverse the Cerritos Channel. Reducing navigational hazards along the Cerritos Channel would prevent service interruption to ships utilizing the Back Channel. The existing towers would be left in place. Building the new towers adjacent to the existing towers would not require additional coordination with the SHPO. The SHPO has concurred that by leaving the existing towers in place the project would not have an adverse affect on the eligible NRHP resource and therefore would not affect the project schedule.

Cons

The construction of the new towers on Piers S and A would require coordination with the tenants at these respective piers. Depending if there are parallel construction activities by these tenants, this may affect the schedule for the construction of the new towers.

Further Analysis

A cost-benefit analysis would be needed to determine the overall cost of constructing new towers. Similar to Option 2, further analysis is needed to determine the height of the new towers to accommodate a 200-ft (61-m) vertical clearance above the MHWL. This would be done during the preliminary design stage.

Option 3

Figure 5
New Towers

Option 4

Option 4 would remove all lines from over the Cerritos Channel via the towers on Pier S and on Pier A, up to just north of the Pier A Substation. New lines would then be routed overhead along the western Harbor Department boundary and across the Cerritos Channel to Terminal Island adjacent to the proposed Schuyler Heim Bridge. The 66- and 12.5-kV lines would then be connected to the Dock Substation and the 220-kV line would be routed across Pier S to the LBGS. Figure 6 shows the proposed configuration for Option 4.

Pros

Relocating the lines adjacent to the Schuler Heim Bridge would enable taller ships to traverse the Cerritos Channel. Reducing navigational hazards along the Cerritos Channel would prevent service interruption to ships utilizing the Back Channel. The existing towers would be left in place and would not require additional coordination with the SHPO. The SHPO has concurred that by leaving the existing towers in place the project would not have an adverse affect on the eligible NRHP resource and therefore would not affect the project schedule.

Cons

Option 4 will require acquisition of additional right-of-way that may impact the facilities located outside of the Harbor Department boundary south of Anaheim Street. Additionally, relocating the lines via the Schuyler Heim Bridge requires coordination with the Alameda Corridor Transportation Authority (ACTA) and the California Department of Transportation (Caltrans). Since the Schuyler Heim Bridge is proposed to be replaced, integrating the steel pole adjacent to the new project would be necessary to facilitate the construction process.

Further Analysis

A cost-benefit analysis would be needed to determine the overall cost of rerouting the lines and right-of-way requirements.

Conclusions/Recommendations

Based on the above analysis, Option 3 is recommended for further study and coordination with SCE. Option 3 is likely the most economical, feasible and, with the exception of the new towers, utilizes existing SCE power infrastructure and right-of-way while eliminating the navigational hazard for ships traversing the Cerritos Channel.

Option 4

Figure 6
Via Schuyler Heim Bridge

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