UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910

OCT 2 0 2011

To All Interested Government Agencies and Public Groups:

Under the National Environmental Policy Act, an environmental review has been performed on the following action.

TITLE: Adoption of the United States Army Corps of Engineers' (USACOE) Environmental Assessment (EA) for the Colorado Lagoon Estuary Restoration Project

LOCATION: Colorado Lagoon, City of Long Beach, California

SUMMARY: In compliance with the National Environmental Policy Act (NEPA), the National Oceanic and Atmospheric Administration's (NOAA) Restoration Center (RC) has prepared a Finding of No Significant Impact (FONSI), for NOAA's adoption the USACOE's EA for the "Colorado Lagoon Estuary Restoration Project." This proposed project is funded through the NOAA Restoration Center's partnership with the State of California Coastal Conservancy. The proposed project will remove contaminated sediment and will support the City of Long Beach's efforts to restore the coastal wetlands of southern California that provide benefit to living marine resources and their habitats.

RESPONSIBLE OFFICIAL: Patricia A. Montanio
Director, Office of Habitat Conservation
National Oceanic and Atmospheric Administration
1315 East-West Highway
Silver Spring, MD 20910

The environmental review process led us to conclude that this action will not have a significant effect on the human environment. Therefore, an environmental impact statement will not be prepared. A copy of the FONSI including the supporting EA is enclosed for your information.

Although NOAA is not soliciting comments on this completed EA/FONSI we will consider any comments submitted that would assist us in preparing future NEPA documents. Please submit any written comments to the responsible official named above.

Sincerely,

Paul N. Doremus, Ph.D.
NOAA NEPA Coordinator

Enclosure

FINAL

ENVIRONMENTAL ASSESSMENT

COLORADO LAGOON ESTUARY RESTORATION PROJECT

CITY OF LONG BEACH

LOS ANGELES COUNTY, CALIFORNIA

Historic Aerial of the Colorado Lagoon, 1928

August 2011

FINAL

ENVIRONMENTAL ASSESSMENT

COLORADO LAGOON ESTUARY RESTORATION PROJECT

CITY OF LONG BEACH

LOS ANGELES COUNTY, CALIFORNIA

Lead Federal Agency:

The United States Army Corps of Engineers

Cooperating Agency:
National Oceanic and Atmospheric Administration

In Partnership With:
The City of Long Beach

Co-Prepared by:

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LSA Project No. CLB0803

August 2011

U.S. ARMY CORPS OF ENGINEERS
SOUTH PACIFIC DIVISION
LOS ANGELES DISTRICT

FINDING OF NO SIGNIFICANT IMPACT FOR THE COLORADO LAGOON ESTUARY RESTORATION PROJECT (PHASE 1) CITY OF LONG BEACH LOS ANGELES COUNTY, CALIFORNIA

I have reviewed the attached Environmental Assessment that has been prepared for the proposed federal action, which involves funding selected elements of Phase 1 of a two-phase project by the City of Long Beach known as the Colorado Lagoon Estuary Restoration Project (State Clearinghouse No. 2007111034, approved September 2008) located in the City of Long Beach, Los Angeles County, California. The proposed federal action would contribute monies toward the dredging, treatment, transportation and disposal of approximately 28,000 cubic yards of contaminated sediment from the western arm of Colorado Lagoon, and to create a salt marsh at the same location. Under this alternative, sediments would be dredged and disposed at the Port of Long Beach (POLB) Middle Harbor Contained Disposal Facility (CDF). The dredged material will be stabilized prior to transport with a cement stabilization treatment process. Approximately 56 million gallons of water from the dredge slurry will be treated and discharged back into the western arm of the Colorado Lagoon.

The POLB Middle Harbor CDF was subject to, and has received, a Department of the Army permit (SPL-2004-1053-AJS) from the U.S. Army Corps of Engineers (Corps), as well as Waste Discharge Requirements (R4-2010-0020) issued by the California Regional Water Quality Control Board, Los Angeles Region. These permitting actions identify conditions related to the disposal of sediment into the POLB Middle Harbor CDF that would apply to this project. In addition, the project would be carried out in accordance with the conditions imposed in Coastal Development Permit CDP 5-09-071 issued by the California Coastal Commission, that are applicable to the transport and disposal of sediments in the POLB Middle Harbor CDF, including water quality monitoring.

The need for the proposed federal action is the result of the existing degraded water and sediment quality within the Lagoon due to the discharge of storm runoff into the Lagoon, and diminished tidal flushing within the Lagoon. The purpose of dredging the Lagoon is to remove the contaminated sediment, and treat the contaminated sediments to levels below the state of California hazardous waste criteria so as to make the sediment acceptable for discharge at the POLB Middle Harbor CDF.

In compliance with the Magnuson-Stevens Fishery Management and Conservation Act, the National Marine Fisheries Service (NMFS) has been consulted regarding potential impacts to Essential Fish Habitat (EFH). Although adverse impacts will occur associated with dredging operations, NMFS believes the project will result in a net benefit to EFH. Furthermore, no federally-listed species or designated critical habitat will be affected by project implementation. Therefore, consultation pursuant to section 7 of the Endangered Species Act of 1969, as amended, is not required.

Compliance with section 106 of the National Historic Preservation Act (36 CFR Part 800) has been completed. A letter was sent to the State Historic Preservation Office (SHPO) requesting concurrence with the Corps' determination that the project will not involve impacts to properties eligible for or listed on the National Register of Historic Places. SHPO, in a letter dated July 23, 2010, has concurred with the Corps' determination (COE100720A), thus completing Section 106 compliance.

The Corps finds this project to be consistent to the maximum extent practicable with the enforceable policies of the Coastal Zone Management Act (CZMA) of 1972. The California Coastal Commission, in a letter dated October 5, 2010, has concurred with the Corps' Negative Determination (ND-049-10) and agrees with the Corps that the proposed disposal activities are the same as those analyzed in the above-referenced CDP 5-09-071.

Other resources analyzed in this Environmental Assessment, including air and water quality, hydrology, noise, land and recreation uses, aesthetics, and ground transportation are not expected to result in significant adverse impacts.

I have considered the information contained in this Environmental Assessment and determined that the impacts resulting from the implementation of the Colorado Lagoon Estuary Restoration Project will not have a significant adverse impact upon the existing environment or the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

2 SEP 2011
DATE

R. Mark Toy, P.E.
Colonel, US Army
Commander and District Engineer

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LIST OF ABBREVIATED TERMS

ºF	degrees Fahrenheit
µg/kg-dry	microgram per kilogram-dry
AAQS	ambient air quality standards
ac	acre/acres
af	acre-feet
amsl	above mean sea level
AQMP	Air Quality Management Plan
AR	Army Regulations
BACT	Best Available Control Technology
Basin	South Coast Air Basin
bgs	below ground surface
BMP	Best Management Practice
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
Cal-EPA	California Environmental Protection Agency
California Register	California Register of Historical Resources
CARB	California Air Resources Board
CCA	California Coastal Act
CCC	California Coastal Commission
CDFG	California Department of Fish and Game
CDMG	California Division of Mines and Geology
CDP	Coastal Development Permit
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
CFP	California Fully Protected
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	California Geological Survey
CHL	California Historical Landmarks
City	City of Long Beach
CNDDB	California Natural Diversity Data Base

CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_{2e}	CO_2 equivalent
COC	Contaminant of Concern
County	Los Angeles County
Corps	United States Army Corps of Engineers
CSC	California Species of Concern
CSU	California State University
CUP	Conditional Use Permit
CVC	California Vehicle Code
CWA	Clean Water Act
cy	cubic yard/cubic yards
CZMA	Coastal Zone Management Act
dB	decibels
dBA	A-weighted decibels
DDT	dichloro-diphenyl-trichlorethane
DPW	Department of Public Works
DTSC	Department of Toxic Substances Control
EDR	Environmental Data Resources, Inc.
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EPA	(Federal) Environmental Protection Agency
ERL	Effects Range Low
ERM	Effects Range Median
FESA	Federal Endangered Species Act
FMPs	Fishery Management Plans
FOCL	Friends of the Colorado Lagoon
FONSI	Finding of No Significant Impact
FR	Federal Register
ft	Feet/foot
FWCA	Fish and Wildlife Coordination Act
g	gravity
GCC	Global Climate Change

GHG	Greenhouse gas
GIS	Geographic Information Systems
HAPC	Habitat Area of Particular Concern
I-405	Interstate 405
I-605	Interstate 605
I-710	Interstate 710
km	kilometer
LACSD	Los Angeles County Sanitation Districts
LAFCO	Local Agency Formation Commission
Lagoon	Colorado Lagoon
LARWQCB	Los Angeles Regional Water Quality Control Board
LBUSD	Long Beach Unified School District
L_{eq}	Equivalent Noise Level
LOS	Level of Service
LUST	leaking underground storage tank
MADEP	Massachusetts Department of Environmental Protection
Magnuson Act	Magnuson-Stevens Fishery Conservation Act
MBTA	Migratory Bird Treaty Act
mg/kg-dry	milligrams per kilogram dry
mg/L	milligrams per liter
MHHW	mean higher high water
mi	mile/miles
ml	milliliter
MLD	Most Likely Descendant
MLLW	mean lower low water
mph	mile per hour
MPN	most probable number
MSL	mean sea level
Mw	magnitude
NAHC	Native American Heritage Commission
NAAQS	National Ambient Air Quality Standards
ng/g-dry	nanograms per gram dry
NHPA	National Historic Preservation Act
nm	nautical mile
NMFS	National Marne Fisheries Service
NO_2	nitrogen dioxide

NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
O_3	ozone
OEHHA	Office of Environmental Health Hazard Assessment
OVA	organic vapor analyzer
PAH	polycyclic aromatic hydrocarbons
PBT	persistent bioaccumulative toxic
PCB	polychlorinated biphenyls
PCE	Passenger Car Equivalent
PCH	Pacific Coast Highway
PE	Pacific Electric
PEA	Preliminary Endangerment Assessment
PGA	Peak Ground Acceleration
PHI	California Points of Historical Interests
PHMRF	Puente Hills Materials Recovery Facility
PM_{10}	particulate matter of 10 micrometers or less
$PM_{2.5}$	particulate matter of 2.5 micrometers or less
POLB	Port of Long Beach
ppt	parts per thousand
RAG	Risk Assessment Guidance
ROC	Reactive Organic Compounds
ROW	right-of-way
ROWD	Report of Waste Discharge
RV	Recreational vehicle
RWQCB	Regional Water Quality Control Board
SA	Special Animal
SCAQMD	South Coast Air Quality Management District
SCCAT	Southern California Caulerpa Action Team
SCE	Southern California Edison
SCEMP	Southern California Eelgrass Mitigation Policy
SEERF	Southeast Resource Recovery Facility
sf	square feet
SIP	State Implementation Plan
SMMS	Synthetic Metals Mineralization System

SO_2	sulfur dioxide
SP	Special Plant
STLC	Soluble Threshold Limit Concentration
SUSMP	Standard Urban Stormwater Mitigation Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
T&E	Threatened and Endangered
TAD	Termino Avenue Drain
TADP	Termino Avenue Drain Project
TDS	Total Dissolved Solids
TMDL	total maximum daily loads
TTLC	total threshold limit concentrations
UBC	Uniform Building Code
USC	United States Code
USDoN	United States Department of the Navy
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	underground storage tank
VOC	volatile organic compounds
WDID	Waste Discharge Identification
WDR	Waste Discharge Requirement
WET	waste extraction test
WMA	Water Management Area
WQC	Water Quality Certification

1.0 INTRODUCTION

1.1 COLORADO LAGOON ESTUARY RESTORATION PROJECT

The Colorado Lagoon (Lagoon) is an approximately 11.7-acre (ac) tidal water body that is connected to Alamitos Bay and the Pacific Ocean through an underground tidal culvert to Marine Stadium. The Lagoon serves three main functions: hosting estuarine habitat, providing public recreation (including swimming), and retaining and conveying storm water drainage. The deteriorated ecological health of the Lagoon has been established for the past several decades. The city of Long Beach (City) proposes the Colorado Lagoon Estuary Restoration Project (Project) in order to restore the site's ecosystem, improve the estuarine habitat, provide enhanced recreation facilities, improve water and sediment quality, and manage storm water.

Once restored, the Lagoon will have improved water and sediment quality, which would enhance recreational opportunities at the Lagoon, potentially lead to a more diverse invertebrate and fish community, and increase the potential for the Lagoon to support a variety of plant and animal species. Additionally, the Project would provide a walking trail that extends through areas that currently provide no public access.

The Project would be implemented in two phases. Phase 1 includes improvements to the Lagoon through cleaning of the culvert and removal of structural impedances at the culvert; dredging areas of the Lagoon; implementing storm drain upgrades; removal of the north parking lot, access road, and the restroom on the north shore of the Lagoon; recontouring side slopes; revegetating land areas; planting eelgrass in the Lagoon water body; and developing the walking trail at the Lagoon. Phase 2 includes improvements to Marina Vista Park, including: the long term project component of building an open channel between the Lagoon and Marine Stadium; constructing two roadway bridges spanning the open channel at East Colorado Street and East Eliot Street; demolishing and replacing two public restrooms in Marina Vista Park; reconfiguring the baseball and youth overlay soccer fields; and developing a walking trail on the eastern side of the open channel and vegetation buffers on both sides of the channel.

The proposed federal action is part of Phase 1 of the Project and is to dredge, treat, and dispose approximately 28,000 yd^3 of sediment from the western arm of the Lagoon, and to create a salt marsh at the same location.

1.2 ENVIRONMENTAL COMPLIANCE DOCUMENTATION

The City finalized and certified an Environmental Impact Report (EIR) (State Clearinghouse No. T007111034) in May 2008, which evaluated environmental impact associated with Phases 1 and 2 of the Colorado Lagoon Restoration Project. The City finalized an addendum to the EIR in October 2010 to address changes to the Project that have occurred since completing the EIR.

The U.S. Army Corps of Engineers (Corps) circulated a draft Environmental Assessment (EA) for selected elements of Phase 1 of the Colorado Lagoon Restoration Project in October 2010. This final EA encompasses additional changes to the proposed federal action that have occurred since circulation of the draft EA.

1.3 ESTUARY HABITAT RESTORATION PROGRAM

The Estuary Restoration Act of 2000 (Public Law 106-457) was enacted to encourage the restoration of estuary habitat through more efficient project financing and enhanced coordination of Federal and non-Federal restoration programs. The Act also established the Estuary Habitat Restoration Program (Program) authorizing the Secretary of the Army (i.e., U.S. Army Corps of Engineers) in coordination with the Estuary Habitat Restoration Council to carry out estuary habitat restoration projects with non-Federal entities, and provide technical assistance through the award of contracts and cooperative agreements.

The Estuary Habitat Restoration Council consists of representatives of five federal agencies: the National Oceanic and Atmospheric Administration, Environmental Protection Agency, U.S. Fish and Wildlife Service, Department of Agriculture, and the Corps. The duties of the Council include soliciting, reviewing, and evaluating project proposals, and submitting to the Secretary of the Army a prioritized list of projects recommended for construction.

In February 2006, the Estuary Habitat Restoration Council approved funding for the Project. Specifically, the City has been awarded funds through the Program to fund a portion of Phase 1 of the Project.

1.4 PHASE 1 OF THE COLORDO LAGOON ESTUARY RESTORATION PROJECT

The City has been awarded funds through the Program to fund a portion of Phase 1 of the Project. Phase 1 encompasses 24 total elements. The Corps' federal action entails providing $1 million in grant funding from the Program to the City to fund Elements 5 and 7-11.

Table 1.4.1: Phase 1 Project Elements Subject to Corps Federal Action

Project Elements	Corps Funded Elements	Approximate Dimensions & Quantities
Culvert Improvements		
1. Clear sediment and bio-fouling debris.		Approximately 1250 yd.³ of sediment/debris and bio-fouling material were removed.
2. Remove rock sill at Marine Stadium end of culvert and place rock wthin Marine Stadium revetment.		Approximately 130 tons of rock removed and placed below high tide line. Rock sizes up to ¼ ton.
3. Remove tide gates at Colorado Lagoon end of culvert		Two 7'X 7' side-by-side gates removed.
4. Remove structural sill within culvert		No sill found.
Contaminated Sediments		
5. Dredge Western Arm	X	Approximately 25,000 cubic yards of sediment.
6. Dredge Northern and Central Arms		Approximately 33,000 cubic yards of sediment. An additional 5,000 cubic yards of dredge sediment may also be dredged.
7. Discharge Return Water	X	Approximately 140 million gallons under the Regulatory action. Approximately 56 million gallons under the Corps funded action.
8. Treat Dredge Material	X	Approximately 70,000 yd.³ of sediment to be treated.
9. Transport Dredge Material	X	Approximately 70,000 yd.³ of sediment to be transported..
10. Dispose Dredge Material	X	Approximately 70,000 yd.³ of sediment to be disposed at POLB Middle Harbor fill site or another approved landfill.
Marsh Habitat		
11. Western Arm	X	Approximately 3,000 cubic yards of side slope sediment to be removed and disposed at POLB Middle Harbor fill site or another approved landfill.
12. Central and Northern Arm		Approximately 4,000 cubic yards of side slope sediment to be removed and disposed, of which approximately 400 cubic yards would be disposed at POLB Middle Harbor fill site or another approved landfill and the remaining (to be excavated over separate timeframe) would be re-used on site above the high tide line or disposed at an upland landfill.
Storm Drain Upgrades		
13. Install storm drain diversion structures and lines		Approximately 100,000 gallons per day of storm drain flows diverted away from the lagoon.
14. Install trash separation units within storm drains		Three trash separation devices installed, one on each of 63", 54", and 48" diameter storm drains.
15. Install tide/flap gates at end of storm drains		Three flap gates installed, one on each of 63", 54", and 48" diameter storm drains. Fourth storm drain outlet capped.

Table 1.4.1: Phase 1 Project Elements Subject to Corps Federal Action

16. Install wet well and pump stations		One wet well with capacity of approximately 100,000 gallons. Two lift/pump stations installed.
17. Demolish Termino Avenue Drain Project (abandoned storm drain outlets)		Discharges from four storm drains (48", 42" and two 24"diameter) re-routed away from the lagoon. Four headwalls (approximately 4 tons of concrete) to be demolished and disposed offsite.
Bioswales		
18. Grading (above high tide line)		Approximately 2,100 linear feet of bioswale, approximately 10 to 20 feet wide. Approximately 3,500 cubic yards of material to be excavated and re-used on site above high tide line or hauled to upland landfill.
19. Placement of rip rap at end of bioswale		Approximately 60 cubic yards of rock rip-rap placed below the high tide line.
Upland Improvements		
20. Removal of Parking Lot and Access Road		Approximately 60,000 square feet (3,000 tons) of hard surface to be demolished and hauled offsite, (above the high tide line).
21. Demolition and removal of north shore restroom		Approximately 1,500 square feet restroom to be demolished and hauled offsite.
22. Non-native vegetation removal and native vegetation installation along west arm, north shore, north arm, and east shore		Approximately 5 acres to be re-planted.
23. Demolition and landscaping of Appian Way median		Approximately 5,000 square feet converted from hard surface to permeable landscaping, (above the high tide line). Demolition/removal of hard surface completed as part of Termino Avenue Drain Project.
24. Walking Trail Around the Lagoon		Approximately 6,000 linear feet, 6' to 14' wide, above the high tide line. Wider trail is for emergency vehicles access.

1.5 FEDERAL LEAD AND COORPORATING AGENCIES

Aspects of Phase 1 of the Project entail federal actions by the Corps and the National Oceanic and Atmospheric Administration Restoration Center, National Marine Fisheries Service (NOAA). Like the Corps, NOAA is providing financial assistance to the Project. Pursuant to 40 C.F.R. 1501.5(c), when more than one federal agency is involved, the lead agency is determined by considering:

- Magnitude of the federal agency's involvement
- Approval authority over the proposed federal action
- Expertise with regard to environmental effects
- Duration of the federal agency's involvement
- Sequence of the federal agency's involvement

The Corps has *direct* permitting authority under section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act. In addition, the Corps is providing funding for several elements of Phase 1 through the Program. The Corps is also responsible for ensuring that issuance of permits and allocation of funding is in compliance with NEPA. Lastly, Corps is a participating member of the Southern California Dredged Material Management Team, an intergovernmental working group responsible for evaluating suitability of dredged material for disposal; in this role, the Corps has participated in SCDMMT's evaluation of dredged material suitability for the Project.

NOAA has special expertise in coastal and marine resources; federal jurisdiction by law under the Magnuson-Stevens Fishery Conservation Act and the Endangered Species Act. NOAA has provided conservation recommendations to the Corps under the Magnuson-Stevens Fishery Conservation Act.

In light of the above, it was determined the Corps would be the lead federal agency and NOAA a cooperating agency since the Corps has multiple approval authority over the Project.

1.6 PROPOSED FEDERAL ACTION

In general, the proposed federal action would fund dredging of contaminated sediment and construction of marsh habitat in the western arm of the Lagoon. In particular, the proposed federal action would fund the following Phase 1 elements:

- Dredge approximately 25,000 yd³ of contaminated sediment from the western arm of the Lagoon (Element 5).
- Dredge approximately 3,000 yd³ of side slope from the western arm of the Lagoon in order to create marsh habitat (Element 11).
- Treat approximately 28,000 yd³ of dredged sediment in accordance with standards and methods approved by Los Angeles Contaminated Sediment Task Force/Southern California Dredged Material Management Team (Element 8).[1,2]
- Discharge approximately 56 million gallons of water from the dredge slurry treated to standards deemed appropriate by the Los Angeles Regional Water Quality Control Board into the Lagoon (Element 7).[3]
- Transport approximately 28,000 yd³ of dredged sediment for disposal (Element 9).

[1] The approximate volume of 28,000 yd³ is the summation of contaminated sediment volume to be dredged from the western arm (25,000 yd³) and the volume to be dredged from the side slopes (3000 yd³).

[2] Dredged material previously determined to be contaminated with lead would be stabilized prior to transport with a cement stabilization treatment process.

[3] In order to evaluate the maximum amount of water, the use of a hydraulic dredge is assumed. In general, sediments make up approximately 10% by volume of the slurry from hydraulic dredges; the remaining 90% is water. Thus, 28,000 yd³ of dredged material will entail the return of approximately 56 million gallons of water.

- Dispose approximately 28,000 yd³ of dredged sediment at the POLB Middle Harbor CDF (Element 10).[1]

1.7 PROJECT LOCATION

The Lagoon is located at approximately latitude 33.7710°N, longitude 118.1334°W, primarily in Section 4 of Township 5 South and Range 12 West on the USGS *Long Beach, California* 7.5-minute series topographical quadrangle. With respect to surface streets, it is located south east of the intersection between 6th Street and Park Avenue. With respect to adjacent water bodies, it lies northwest of the mouth of the San Gabriel River and is north of Marine Stadium and Alamitos Bay.

1.8 PURPOSE AND NEED

The Lagoon was once a part of the historic Los Cerritos Wetlands. In 1923, the low-lying tidelands of Alamitos Bay were dredged to form the Lagoon and Marine Stadium, which were used for recreational rowing. The City then purchased the Lagoon area and Recreation Park in the 1920s through general revenue bond funding. The 1932 Los Angeles Olympic Committee chose the Lagoon for diving trials and Marine Stadium for rowing events. High diving was performed from a three-story structure that was floating in the Lagoon. To prepare for the diving trials, the Lagoon was separated from Marine Stadium by a tide gate, which was installed to maintain adequate diving depth. In 1968, the City remodeled Marine Stadium for the Olympic rowing and canoeing team trials. Also, in the late 1960s, the area between what is now the north end of Marine Stadium and the south end of the Lagoon was filled and the existing underground box culvert was constructed, thereby further separating the Lagoon from Marine Stadium. This was undertaken as part of the construction for the then-proposed Pacific Coast Freeway. This "filled" area is now Marina Vista Park.

The deteriorated ecological health of the Lagoon is attributed to diminished tidal influence, and point source pollution, a process that has evolved over the past several decades. The Lagoon receives inflow from 11 storm water drains. Since the Lagoon is a natural low point in the watershed, it accumulates pollutants deposited over the entire watershed that enter the storm drains by storm flows and dry weather runoff. Additionally, accumulation of sediment and biomass has reduced the depth and capacity of the culvert, resulting in diminished tidal flushing at low tides and increased degradation of water quality.

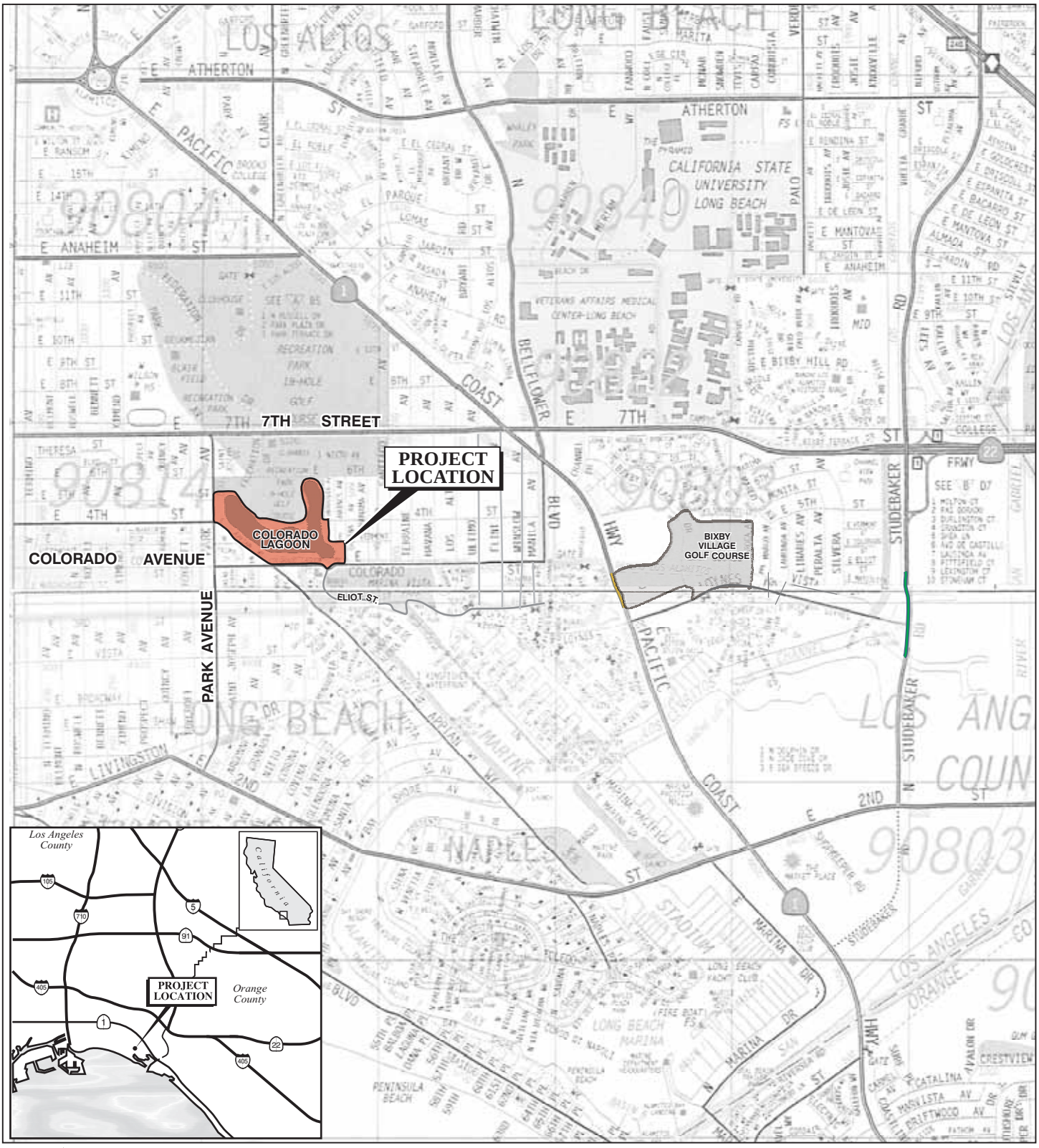
The Lagoon's watershed is 1,172 ac and composed of 773 ac of residential, 125 ac of commercial, 55 ac of institutional (schools), and 219 ac of open-space land uses. Urban

[1] The POLB Middle Harbor Project was subject to, and has received, a Department of the Army permit (SPL-2004-1053-AJS) from the U.S. Army Corps of Engineers (Corps) for discharge of dredged and fill material at the Middle Harbor CDF pursuant to Section 404 of the Clean Water Act. The POLB would ensure that the discharge of dredged material from the Colorado Lagoon Estuary Restoration Project complies with applicable conditions of the Section 404 permit.

runoff contains many pollutants such as heavy metals, pesticides, petroleum, hydrocarbons, nutrients, and bacteria. As a result, the Lagoon is listed in the 2002 and 2006 Federal Clean Water Act (CWA) Section 303(d) lists as an impaired water body for lead, zinc, sediment toxicity, chlordane, dichloro-diphenyl-trichloroethane (DDT), dieldrin, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and bacteria. Beach advisory postings due to elevated bacteria levels are frequent.

The project purpose is to:

- Improve water quality through removal, treatment, and disposal of contaminated sediment from the western arm of the Lagoon.
- Restore historic wetland habitat through creation of tidal marsh habitat along the shores of the western arm of the Lagoon.



LSA

FIGURE 1.2-1

Project Area

N

0 1000 2000
FEET

Colorado Lagoon Restoration Project

Project Location

SOURCE: Thomas Guide, 2007

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LSA

FIGURE 1.2-2

SOURCE: Air Photo USA (2008), Moffat & Nichol (2007), Thomas Bros. (2007).

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Colorado Lagoon Restoration Project
Existing Conditions

2.0 ALTERNATIVES

2.1 Alternatives Formulation

This section presents the process used to formulate and evaluate alternative dredging and disposal of sediment plans leading to selection of an alternative for implementation. Alternatives are evaluated, first, as to whether they meet the purpose and need and if they are feasible. Alternatives proposed to complete the proposed federal action that meet these criteria are carried forward for further analysis in the EA.

2.2 ALTERNATIVES

2.2.1 No Federal Action Alternative

The No Federal Action Alternative would result in insufficient funding to undertake dredging the western arm of the Lagoon including dredging to create salt marsh habitat. Approximately 28,000 yd^3 of sediment would not be dredged, treated, transported, or disposed at the POLB Middle Harbor CDF. Approximately 56 million gallons of water would not be treated and discharged into the Lagoon. Salt marsh on the western arm of the Lagoon would not be created.

Moreover, because funding from other sources were provided with the assumption that the City would have sufficient funds to undertake the entire project, it is unlikely that the City would dredge any part of the Lagoon if is unfunded by the Corps. As a result, approximately 70,000 yd^3 of sediment would not be dredged, treated, transported, or disposed at the POLB Middle Harbor CDF. Approximately 140 million gallons of water would not be treated and discharged into the Lagoon. Salt marsh within the Lagoon would not be created.

Contaminated sediment would continue to be present and untreated, and would be expected to result in continued adverse impacts to water quality. The Lagoon would continue to be on the 303(d) Impaired Water Bodies List and would remain non-compliant with RWQCB TMDL's. The opportunity to cost effectively dispose sediment in the POLB Middle Harbor CDF would be lost. POLB Middle Harbor CDF is located approximately near Colorado Lagoon, and has been permitted to accept dredged material. Therefore, the short distance required for transportation of dredged material to a facility already in compliance with applicable environmental laws and regulations would reduce costs associated with disposal of dredged material. Otherwise, transport of dredged material to Class I landfill would vastly increase costs in a future project or in a future cleanup conducted under a Cleanup and Abatement Order issued by the RWQCB.

2.2.2 Alternative 1 (Mechanical Dredge and Truck Option Alternative)

Under Alternative 1, an approximate total of 28,000 yd^3 of sediment from the western arm of the Lagoon would be dredged, treated, transported, and disposed at the POLB Middle Harbor CDF. The side slopes of the western arm would be dredged and recontoured to create a salt marsh habitat.

Alternative 1 would utilize a mechanical dredge/excavation equipment (barge-based clamshell/excavator or land-based excavator) and transport the treated dredged material to the POLB Middle Harbor CDF. The dredge area would be isolated by a silt curtain, and closed "environmental" buckets would be used to minimize turbidity in the water column. Barge-based clamshell/bucket-type dredging equipment would be utilized. Barges would be moved around the Lagoon as needed.

The dredged material would be treated on site at the Lagoon. The dredged material would be temporarily stockpiled, and dewatered in the parking lot along the northern shore of the western arm of the Lagoon until it is treated and loaded onto trucks. Plastic tarps and containment structures would be placed under and around the stockpile areas to minimize runoff back into the Lagoon and surrounding areas. Excess water from dredged materials would be collected and treated according to requirements of the section 401 CWA Water Quality Certification (WQC) prior to discharge back into the lagoon.

The sediment treatment process would most likely occur with a pug mill that would mix the dredged material with cement lime and/or other chemical reagents to stabilize contaminants within sediments at a 20 percent mixture requiring approximately 8,960 tons of cement. The cement that would be used for this process is anticipated to come from one of the several cement companies located at the POLB.

Once the treatment is complete, the treated dredged material would be loaded onto trucks and transported to the POLB Middle Harbor CDF (an approximately 24-mile [mi] roundtrip truck trip from the Lagoon). The trucked material would be placed in the Middle Harbor CDF site from dockside. It is anticipated that this alternative would require a total of 1,960 truck trips; this includes trucks coming from the POLB to the Lagoon for cement import activities and truck trips from the Lagoon to the POLB to transport treated dredged material.

2.2.3 Alternative 2 (Mechanical Dredge Equipment and Barge Alternative)

Under Alternative 2, an approximate total of 28,000 yd^3 of sediment from the western arm of the Lagoon would be dredged, treated, transported, and disposed at the POLB Middle Harbor CDF. The side slopes of the western arm would be dredged and recontoured to create a salt marsh habitat.

Alternative 2 differs from Alternative 1 in the mode of transport to POLB Middle Harbor CDF. For Alternative 2, once the treatment process is complete, the treated dredged material would be loaded onto trucks and transported to Marine Stadium (an approximately 2 mi roundtrip truck trip from the Lagoon). The treated dredged material would be transferred from the trucks onto a barge/scow located at Marine Stadium. From there, the barge would transport treated dredged material to POLB Middle Harbor CDF (an approximately 20 mi roundtrip barge trip from Marine Stadium).

The dredged material would be treated on site at the Lagoon. The dredged material would be temporarily stockpiled, and dewatered in the parking lot along the northern shore of the western arm of the Lagoon until it is treated and loaded onto trucks. Plastic tarps and containment structures would be placed under and around the stockpile areas to minimize runoff back into the Lagoon and surrounding areas. Excess water from dredged materials would be collected and treated according to requirements of the section 401 CWA Water Quality Certification prior to discharge back into the lagoon.

It is anticipated that this alternative would require 280 truck trips from the POLB to the Lagoon for cement/reagent import activities and 1,680 truck trips from the Lagoon to Marine Stadium for treated dredged material transport activities. In addition to these truck trips, approximately 30 barge trips from the Marine Stadium loading dock to Middle Harbor CDF would also occur (based on an average barge capacity of 1,200 yd^3 and based on the assumption that the barge is propelled by tug boats).

2.2.4 Alternative 3 (Non-Electric Hydraulic Equipment and Barge Alternative)

Under Alternative 3, an approximate total of 28,000 yd^3 of sediment from the western arm of the Lagoon would be dredged, treated, transported, and disposed at the POLB Middle Harbor CDF. The side slopes of the western arm would be dredged and recontoured to create a salt marsh habitat.

This alternative would result in dredging using non-electric hydraulic dredge equipment. Dredged material would be piped through an underground culvert to either the Marine Stadium barge or a land-based treatment facility. It is anticipated that the piping of the dredged material would require the use of a diesel-fueled booster pump and that the pug mill operation would be powered with a diesel-fueled generator. Once the piped dredged material reaches the Marine Stadium barge or land-based treatment facility, the dredged material would be dewatered. Excess water from dredged materials would be collected and treated according to requirements of the section 401 CWA Water Quality Certification prior to discharge back into the lagoon. Sediment resulting from the dewatering process would be treated and loaded onto a barge located at the northwest end of Marine Stadium. From there, the barge would transport treated dredged material to the POLB Middle Harbor CDF (an approximately 20 mi roundtrip barge trip from Marine Stadium to POLB).

It is anticipated that this alternative would require 280 truck trips from the POLB to the Lagoon for cement/reagent import activities. In addition to these truck trips, approximately 30 barge trips from the Marine Stadium loading dock to the POLB would also occur (based on an average barge capacity of 1,200 yd^3 and based on the specification that the barge is propelled by tug boats). It is anticipated that the barge location for this alternative would be adjacent to the treatment site, eliminating the need to truck material between the treatment at Marine Stadium and the Marine Stadium barge.

2.2.5 Alternative 4 (Dry Dredge and Barge Alternative)

Under Alternative 4, an approximate total of 28,000 yd^3 of sediment from the western arm of the Lagoon would be dredged, treated, transported, and disposed at the POLB Middle Harbor CDF. The side slopes of the western arm would be dredged and recontoured to create a salt marsh habitat.

This alternative would utilize the dry dredge method that would install a temporary coffer dam to isolate the western arm of the Lagoon. The dredge area would be drained of water, and the bottom sediment would be dewatered. Excess water from the site dewatering process would be collected and treated according to requirements of a National Pollutant Elimination Discharge System (NPDES) permit prior to discharge back into the central lagoon. An excavator would be used to remove the dry sediment, which would be temporarily stockpiled in the parking lot along the Lagoon's north shore and the southwest shore of the Lagoon. Plastic tarps and containment structures would be placed under and around the stockpile area to minimize runoff back into the Lagoon and surrounding areas. Excess water from dredged materials would be collected and treated according to requirements of the section 401 CWA Water Quality Certification prior to discharge back into the lagoon.

Dredging activities would utilize a non-electric mechanical excavator. Similar to Alternatives 1-3, the dredged material would be treated on site. This alternative specifies the use of a diesel generator at the treatment site. Once the sediment treatment process is complete, the treated dredged material would be loaded onto trucks and trucked to Marine Stadium, where it would be transferred from the trucks onto a barge/scow located at the northwest end of Marine Stadium and transported to the POLB Middle Harbor CDF.

It is anticipated that this alternative would require 280 truck trips from the POLB to the Lagoon for cement/reagent import activities and 1,680 truck trips from the Lagoon to Marine Stadium. In addition to these truck trips, approximately 30 barge trips from the Marine Stadium loading dock to the POLB would also occur (based on an average barge capacity of 1,200 yd^3 and based on the specification that the barge is propelled by tug boats).

3.0 AFFECTED ENVIRONMENT

3.1 PHYSICAL ENVIRONMENT

3.1.1 Project Setting

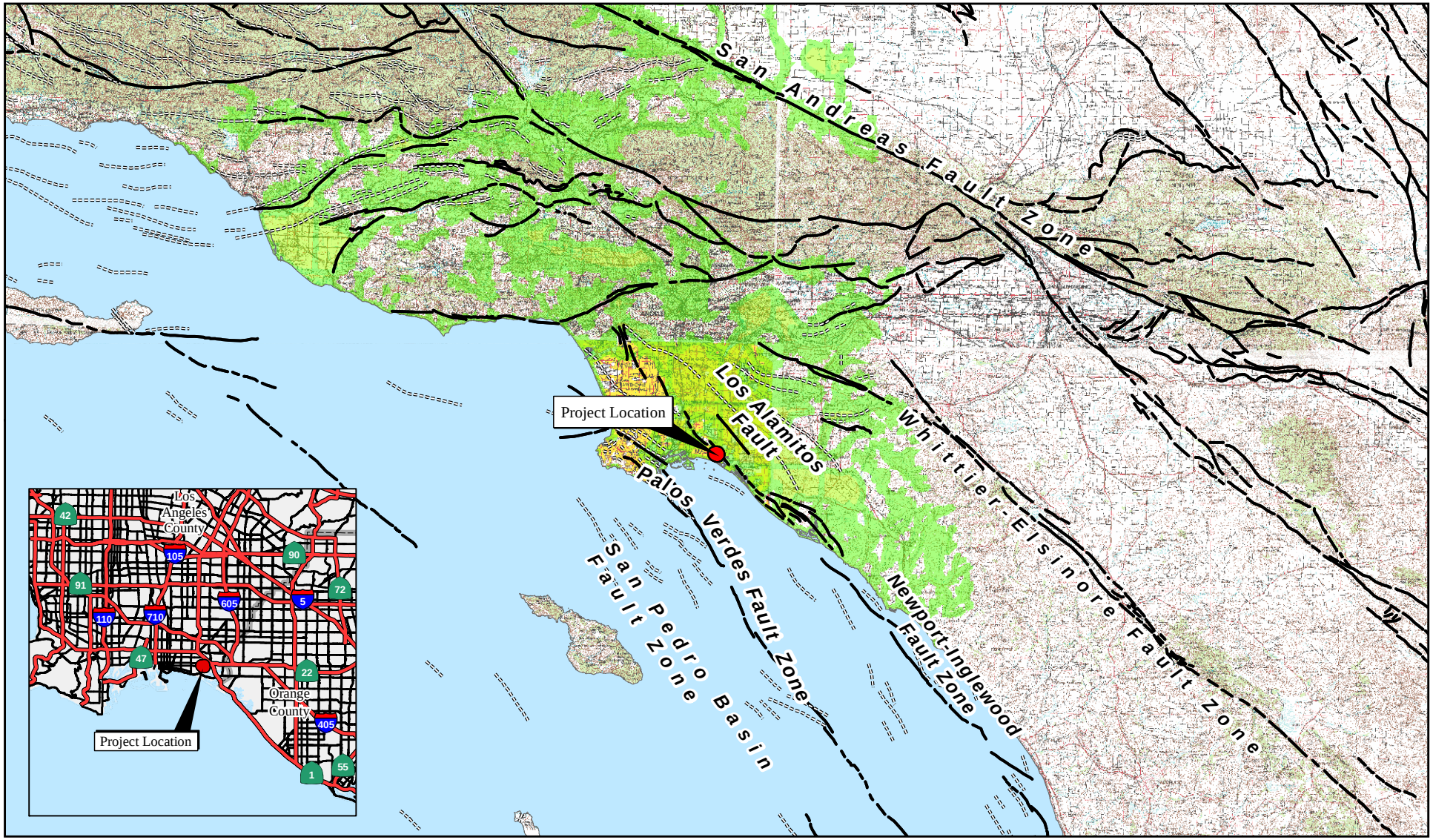
The project location is within the United States Geological Survey (USGS) *Long Beach, California* 7.5-minute quadrangle. The site lies within the southwestern block of the Los Angeles Basin, which comprises a low alluvial floodplain. The floodplain is bound by a line of elongated low hills, folds, and faults, which delineate the northwest-trending Newport-Inglewood Structural Zone.

Prior to extensive dredging of the Colorado Lagoon and Marine Stadium area in the 1920s, the site was a tidal mudflat that received alternating alluvial deposits of marine sands, organic silts and clays, and fluvial deposits. In the 1960s, the previously dredged area between what is now the north end of Marine Stadium and the south end of the Lagoon was filled and the existing underground box culvert constructed. This was done as part of the construction for the then-proposed Pacific Coast Freeway. This "filled" area is now Marina Vista Park.

Consistent with the project area's history, the soil underlying the project site is characterized by predominantly younger alluvial deposits and artificial fill. Younger alluvial deposits consist of Holocene alluvial soft clay, silt, silty sand, and sand.

3.1.2 Structural Geology

The project area is not located within an Alquist-Priolo Earthquake Fault Zone (California Geological Survey [CGS] 1986). However, based on the current understanding of the geologic framework of the area, ground shaking resulting from an earthquake occurring along regional faults is the seismic hazard with the highest probability of affecting the project site. A fault is described as the area where two tectonic or continental plates meet. An "active" fault is defined by the State of California as having had surface displacement within the Holocene time (i.e., within the last 11,000 years). A "potentially active" fault is defined as showing evidence of surface displacement during the Quaternary time (i.e., during the last 1.6 million years). These terms are, however, used by the State primarily for use in evaluating the potential for surface rupture along faults and are not intended to describe possible seismic activity associated with displacement along a fault. These definitions are not applicable to blind thrust faults that have only limited, if any, surface exposures. Figure 3.1-1 shows the faults within the region, and Figure 3.1-2 provides a closer look at the faults within the project area vicinity.



LSA

FIGURE 3.1-1

LEGEND

Project Boundary

Fault Lines

Alquist-Priolo Faults

Liquefaction Areas

N

0 10 20

Miles

Colorado Lagoon Restoration Project

Regional Geologic Constraints

SOURCE: California Seismic Hazard Mapping Program (2002), USGS 250K QUAD (1980).

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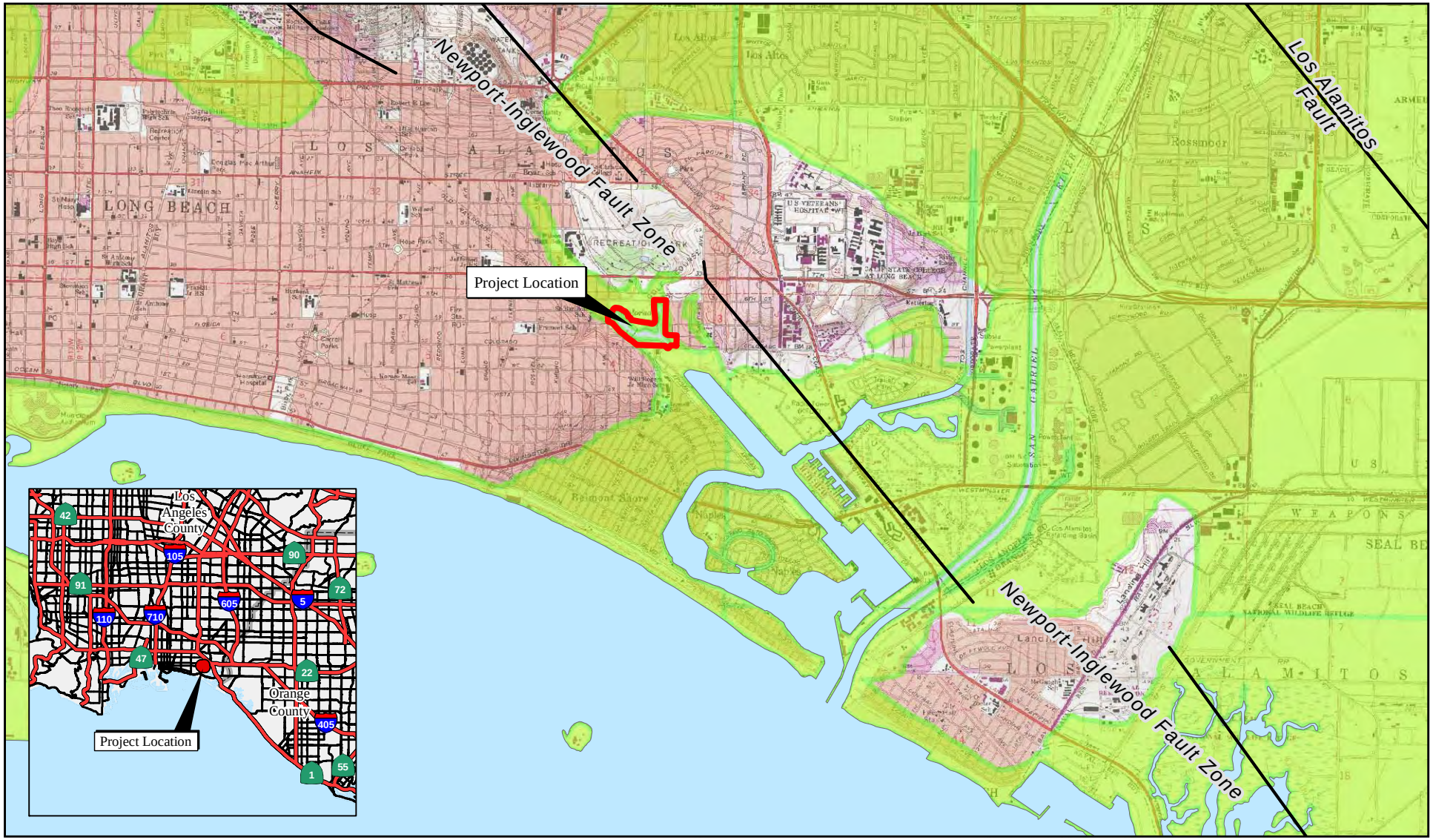

LSA

FIGURE 3.1-2

LEGEND

- Project Boundary
- Fault Lines
- Liquefaction Areas

N

0 2,000 4,000 Feet

Colorado Lagoon Restoration Project

Local Geologic Constraints

SOURCE: California Seismic Hazard Mapping Program (2002), USGS 7.5' QUAD - LONG BEACH ('80).

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The project site is located within Seismic Zone 4 of the Uniform Building Code (UBC). UBC Seismic Zones are based on the probability of expected intensity of ground shaking due to an earthquake. Seismic Zone 4 corresponds to regions where expected peak acceleration (as a fraction of gravity, g) is greater than 0.3g. The probabilistic approach to forecasting future ground motion at the site determines the expected peak ground acceleration level that has a 10 percent probability of exceedance over 50 years.

The project site is located in the USGS *Long Beach, California* 7.5-minute quadrangle, and the Seismic Hazard Zone Evaluation report for this area is Open-File Report 98-19.[1] The peak horizontal ground acceleration (PGA) is a commonly used parameter to represent the level of observed and/or estimated ground shaking at a particular site. The California Division of Mines and Geology's (CDMG) probabilistic seismic hazard analysis[2] estimates that a PGA of 0.49g is applicable to the project site conditions for a 10 percent probability of exceedance in 50 years (475-year return period). The "predominant earthquake" that contributes most to the ground-shaking hazard at 10 percent probability of exceedance in 50 years is a magnitude (Mw) 6.8 event on the nearby portion of the Newport-Inglewood Fault Zone, which is located 4 mi from the project site as shown in previously referenced Figure 3.1-2.

The Newport-Inglewood Fault Zone dominates the geologic structure of the *Long Beach, California* quadrangle. There are three primary traversing faults within the larger Newport-Inglewood Fault system: the Cherry Hill Fault, the Northeast Flank Fault, and the Reservoir Hill Fault. The northwest-trending and generally right lateral Newport-Inglewood Fault Zone is marked by a northwest-trending chain of elongated low hills and mesas that extend from Newport Bay to Beverly Hills. Within the project region, the Dominguez Hills and Signal Hill are uplifts along the Newport-Inglewood Fault Zone. Continuous seismic activity occurs along this fault zone, which is believed to pose the greatest seismic hazard to the Los Angeles area, including the project site. A major event along this zone would produce strong or intense ground motion at the project site. Likewise, the most significant previous earthquake with regard to the project location was the Mw 6.3 Long Beach earthquake on March 11, 1933. This earthquake occurred along the Newport-Inglewood Structural/Fault Zone at a location about 18 mi to the southeast, offshore from Newport Beach.

Other known regional faults that could produce significant ground shaking at the site include the San Andreas Fault, the Palos Verdes Fault Zone, and the Los Alamitos Fault. A brief discussion of each of these fault systems is provided below. Previously referenced Figure 3.1-1 illustrates the approximate positions of the faults within the project region and Figure 3.1-2 shows the surface traces of the Newport-Inglewood Structural Zone with respect to the site.

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1 California Department of Conservation, Division of Mines and Geology. 1998. "Seismic Hazard Evaluation of the *Long Beach* 7.5-Minute Quadrangle, Los Angeles County, California," Open File Report 98-19. http://gmw.consrv.ca.gov/shmp/download/evalrpt/longb_eval.pdf, accessed October 17, 2007.

2 Ibid.

San Andreas Fault Zone. The San Andreas Fault Zone extends from Northern California to near the Mexican border. The fault zone has been divided into several segments. In Southern California, the San Andreas Fault consists of three segments: the Mojave, San Bernardino Mountains, and Coachella Valley segments. The project area is located approximately 56 mi southwest of the San Bernardino Mountains segment and approximately 72 mi east of the Mojave segment.

The last major rupture on the southern San Andreas occurred on January 9, 1857, along the Mojave segment. The magnitude is estimated to have been Mw 8.0. The interval between major ruptures averages about 140 years on the Mojave segment with a recurrence interval varying from under 20 years (in the City of Parkfield only, which is located directly over the most active region of the fault) to over 300 years. The San Andreas Fault Zone is a right-lateral, strike-slip fault that slips about 20 to 35 millimeters per year (mm/yr).

The Palos Verdes Fault Zone. The Palos Verdes Fault Zone is a 50 mi long, right-reverse fault lying near San Pedro, Redondo Beach, and Torrance. The most recent surface rupture of the offshore portion occurred in the Holocene, while the most recent surface rupture of the onshore portion occurred during the Late Quaternary. The slip rate along the fault is between 0.1 and 3.0 mm/yr, and the interval between ruptures is unknown. A probable magnitude of Mw 6.0 to 7.0 has been established for this fault, with the potential for larger earthquakes depending on fault geometry. The Palos Verdes Fault Zone includes two main faults, the Cabrillo Fault and the Redondo Canyon Fault, that are both capable of producing earthquakes of greater than 6.0 in magnitude. The proposed federal action is approximately 7 mi east of the Palos Verdes Fault Zone.

Whittier/Elsinore Fault System. The Whittier/Elsinore Fault System consists of several steep to near-vertical faults along a zone as much as 0.5 mi wide. The inferred sense of movement along these faults is predominantly reverse slip west of the Chino area and right lateral, strike slip to the east. Offset of Holocene sediments and historic seismicity indicates that the fault system is active. The proposed federal action is approximately 32 mi west of the Whittier/Elsinore Fault Zone.

The Los Alamitos Fault. The Los Alamitos fault is an inferred blind thrust fault located within the south-central portion of the Los Angeles Basin. The closest portion of the vertical surface projection of the buried thrust fault is located approximately 8 mi northeast of the proposed federal action. Like other blind thrust faults in the Los Angeles area, the Compton-Los Alamitos thrust is not exposed at the surface and does not present a potential surface rupture hazard; however, the fault is active and capable of generating earthquakes.

3.1.3 Liquefaction

Soil liquefaction is a phenomenon that occurs during strong ground shaking, most commonly in generally low- to medium-density, saturated, low cohesion soils, where the soils experience a temporary loss of strength and behave essentially as a fluid. Areas most susceptible to liquefaction-induced damage are underlain by loose, water-saturated, granular sediment within 40 ft of the ground surface. Saturated conditions reduce the effective normal stress, thereby increasing the likelihood of earthquake-induced liquefaction. One of the major types of liquefaction-induced ground failures is lateral spreading of mildly sloping ground. Lateral spreading involves movement of earth materials due to ground shaking and is evidenced by near-vertical cracks with horizontal movement of the soil. Liquefaction-induced ground failure has historically been a major cause of earthquake damage in Southern California.

According to the Seismic Hazard Zones Maps for the *Long Beach, California* quadrangle, the site is located within an area where liquefiable materials are mapped and/or where liquefaction has occurred in the past. In the *Long Beach, California* quadrangle, the liquefaction zone is widespread due to shallow groundwater and abundant young alluvium. The zone covers the lowland terrain adjacent to the hills along the Newport-Inglewood uplift, the beaches, and the areas of artificial fill. Artificial fills that overlie beach sands and estuarine deposits are specifically more likely to be susceptible to liquefaction. Therefore, extensive low-lying areas of artificial fill have been included in the liquefaction hazard zone within the *Long Beach, California* quadrangle.

Due to the presence of loose, unconsolidated silty sands underlain by young alluvial, estuarine deposits and shallow groundwater (groundwater levels are approximately 5 ft below ground surface [bgs] at Marine Stadium), potential liquefaction and lateral spreading risks at the project site are considered high. The artificial fill areas within the project site also overlie young alluvial or estuarine deposits. Because artificial fills are usually too thin to change the liquefaction hazard, and the underlying estuarine and alluvial deposits have high liquefaction susceptibility, the fill areas are also assumed to have a high susceptibility to liquefaction. Previously referenced Figure 3.1-2 shows the liquefaction hazard zone in the project vicinity.

3.1.4 Landslides

Landslides and other slope failures are common occurrences during or soon after earthquakes. Areas that are most susceptible to earthquake-induced landslides are steep slopes in poorly cemented or highly fractured rocks, areas underlain by loose, weak soils, and areas on or adjacent to existing landslide deposits. Within the *Long Beach, California* quadrangle, the lack of steep terrain, except for a few slopes on Signal Hill and Reservoir Hill, results in only about 0.1 percent of the land (62 ac) lying within the earthquake-induced landslide zone for the quadrangle. The proposed federal action is not included in or adjacent

to the earthquake-induced landslide zone. In addition, the project area is relatively level. Therefore, the possibility of a seismically induced landslide is remote.

3.1.5 Subsidence

Subsidence is the lowering of surface elevation due to changes occurring underground. In the arid southwest, subsidence can be associated with earth fissures (i.e., cracks in the ground surface that form from horizontal movement of sediment and can be more than 100 ft deep). Because of the loose, unconsolidated silty sands and shallow groundwater table, potential subsidence risks are considered to be moderate to high.

3.1.6 Expansive Soils

Expansive soils contain the types of clay minerals that occupy considerably more volume when they are wet or hydrated than when they are dry or dehydrated. Volume changes associated with changes in the moisture content of near-surface expansive soils can cause uplift or heave of the ground when they become wet or, less commonly, cause settlement when they dry out. Repeated cycles of wetting and drying in areas composed of expansive soils can produce incremental lateral and downslope movements known as "slope creep." Potential variability in the soil moisture content typically decreases with increasing depth, and the weight of overlying soil also tends to reduce the amount of volume change that can occur. Therefore, the deeper portion of the foundation soil profile tends to be less problematic with regard to expansive soils. The soils testing on the project site indicate considerable variation with no consistent pattern of stratification among sites. The soil sample core logs indicate that clays and sandy clays are abundant in this area, which indicate a potential for volume changes. However, because groundwater levels are approximately 5 ft bgs at Marine Stadium, the soils are anticipated to remain relatively wet and are not anticipated to experience cycles of wetting and drying or volume changes, which would reduce the potential effects of the expansive soils on site.

3.2 BIOLOGICAL RESOURCES

The Colorado Lagoon tidal water body consists of approximately 11.7 ac in the City of Long Beach. The Lagoon is located in a park setting and is owned and maintained as a City park by the City Department of Parks, Recreation, and Marine. The Lagoon lies northwest of the mouth of the San Gabriel River and is north of Marine Stadium and Alamitos Bay. The Lagoon is primarily accessible from East Appian Way and East Colorado Street via Park Avenue from East 7th Street. The site is located at approximately latitude 33.7710°N, longitude 118.1334°W, primarily in Section 4 of Township 5 South and Range 12 West on the USGS *Long Beach, California* 7.5-minute series topographical quadrangle. Land uses adjacent to the project area are predominantly residential and recreation.

The topography in the project vicinity is relatively flat with a gently sloping transition from the Lagoon waters to upland areas. The project area is dominated by the Lagoon, an 11.7 ac tidal water body[1] that is connected through an underground tidal culvert to Marine Stadium, which in turn is connected to Alamitos Bay and the Pacific Ocean. The project area includes the western arm of the Lagoon. The historic Los Cerritos Wetlands were dredged in the 1920s to deepen the Lagoon, which has subsequently been used for a variety of public and private recreational events.

3.2.1 Habitats

Vegetation Communities and Habitat Types. The Lagoon historically consisted of coastal salt marsh. The original vegetation communities have been eliminated or severely degraded due to the disturbances,the presence of invasive non-native vegetation, and degraded water quality and pollutants in the Lagoon. The lagoon habitat types include mudflats (approximately 0.83 ac), sandy beach (approximately 4.33 ac), and marine open water and subtidal (measured at high tide and including all subtidal and intertidal habitats) (approximately 13.12 ac) (County of Orange 1992). Figure 3.2-1 illustrates the distribution of habitats within the project site.

Table 3.2.1: Summary of Vegetation Communities and Habitat Types

Terrestrial Vegetation Community/Habitat Type	Colorado Lagoon (acres)
Mudflats	0.83
Sandy beach	4.33
Total marine open water and subtidal	13.12
Total	**18.28**

[1] Total may not equal sum due to rounding.
Source: Biological Resources Assessment for Colorado Lagoon, LSA Associates, Inc., February 2008.

Mudflats are not described in the references above but are considered here as a habitat type due to their high resource value as an exceptionally productive biodiversity center for invertebrates, an important feeding habitat for wintering and migrating shorebirds and waterfowl, and their ability to dissipate wave energy to help reduce the risk of eroding salt marshes. The following three habitat communities exist in or adjacent to the dredge area:

- **Southern Coastal Salt Marsh (approximately 0.94 ac):** The salt marsh at the Lagoon has degraded from a natural three-tier coastal salt marsh plant community, to a remnant strip of a middle marsh plant community dominated by common pickleweed, saltwort, and jaumea (*Jaumea carnosa*). These middle marsh plants are ecologically important to the Lagoon since this community is made up of remnant populations that have survived the decades of degradation.

[1] LSA Associates, Inc. used a Geographic Information System (GIS) to estimate Colorado Lagoon water body acreage based on a 2006 aerial photo; however, the water body acreage will vary with the tides.

LSA

LEGEND

Project Boundary

Habitat Type (and Acreage) within Project Boundary

- Sandy Beach - 4.33 ac
- Developed - 2.54 ac
- Mudflats - 0.83 ac
- Marine Open Water and Subtidal- (High Tide) - 13.12 ac
- Parks and Ornamental Landscaping - 7.53 ac
- Southern Coastal Salt Marsh - 0.94 ac

Sensitive Species

- Cooper's hawk nest
- Estuary sea-blite

0 100 200
FEET

SOURCE: Air Photo USA (2008), Moffat & Nichol (2007), Thomas Bros. (2007).

I:\CLB0803\GIS\Existing_Habitats.mxd (5/14/2009)

FIGURE 3.2-1

Colorado Lagoon Restoration Project
Existing Habitat Communities

The lower edge of the marsh that is inundated most often and would normally be characterized by cordgrass is absent, apparently a result of decades of polluted water and muted tidal fluctuations. The upper marsh, which would normally be characterized by glasswort, alkali heath, and sea-blite (*Suaeda* spp.), has been colonized by non-native vegetation from the surrounding residential and park landscape and is not present in a functioning form. Some fragments of the upper marsh plant community still exist on site such as alkali heath (*Frankenia salina*), estuary sea-blite, salt grass, and shoregrass, but only within the elevation of the middle marsh plant community. In addition, even though the Lagoon receives fluctuating amounts of freshwater input, salinity measurements conducted by the Friends of the Colorado Lagoon (FOCL) report an average salinity of 35 to 40 parts per thousand (ppt), which does not allow the Lagoon to support characteristic brackish marsh species such as sedges, cat-tails, or rushes (*Carex* sp., *Scirpus* sp., *Typhus* sp., or *Juncus* sp.) even around the freshwater source.

The coastal salt marsh surrounds the Lagoon in a thin band that is interrupted by two zones of machine-groomed sandy beach (previously referenced Figure 3.2-1). The north shore of the west arm consists mainly of turf grass and slopes steeply to the mud bottom. However, the west arm provides mats of shore grass and biologically diverse potholes of sufficient size to support multiple species, including sea lavender (*Limonium* sp.), sea-blight, alkaliweed (*Cressa* sp.), and saltgrass.

- **Mudflats (approximately 0.83 ac):** Mudflats, in general, support very little vegetation other than green algae. The mudflats of the Lagoon do not support any vegetation, but they do support invertebrate species such as mollusks, crustaceans, worms, California horn snail (*Cerithidea californica*), and tiger beetles (*Cicindelidae*). The mudflats form a contiguous strand around the Lagoon, with the most productive areas located around the north and west arms of the Lagoon, and with degraded mudflats in front of the sandy beaches. Mudflats can provide quality foraging habitat for some fish species. The Lagoon mudflats provide a consistent feeding area for many migrating and resident shorebirds and waterfowl such as marbled godwit (*Limosa fedoa*), American widgeon (*Anas americana*), and ruddy duck (*Oxyura jamaicensis*).
- **Sandy Beach (approximately 4.34 ac):** Within the project area, there are two areas located along the north and south portions of the Lagoon that are sandy beaches. There is no vegetation growing on these beaches since they are frequently machine groomed. The sandy beaches are used by the public for various recreational activities and as a roosting site for gulls and resting waterfowl. The area has a high recreation value, but due to constant use and grooming, there is little habitat value in these areas for native flora or fauna.

Marine Communities. Aquatic vegetation in the Lagoon has been described by Chambers (2004). This past documentation by Chambers shows that the majority of the Lagoon substrate is soft mud with a heavy cover of algae. Temperature and salinity levels stay relatively constant throughout the year, but oxygen and nutrient levels vary. The species

composition is dominated by introduced species tolerant of disturbance and freshwater. Dominant species in the western arm of the Lagoon included red algae (*Gracilaria* sp.) . A few scattered eelgrass plants were observed during the 2004 surveys at a depth of about 9 ft below MSL (which is slightly deeper than ideal eelgrass habitat of 4-7 ft below MSL). A subsequent eelgrass survey was conducted in August 2009 by Dr. Christine Whitcraft of California State University (CSU) Long Beach; Erika Fox of CSU Long Beach; and Eric Zahn of Tidal Influence. No signs of eelgrass leaves, shoots roots, or rhizomes were observed underwater or on shore. The two marine habitat types at the Lagoon are described below.

Marine Open Water and Subtidal Habitat (approximately 13.12 ac at high tide): This habitat type represents the open water in the Lagoon and comprises the most acreage within the project limits. Due to the reduced capacity and perching of the culvert to Marine Stadium, the tidal flushing is greatly reduced, and water levels do not fluctuate substantially. The deeper water is used by a variety of species, including vertebrates, invertebrates, and plants. Phytoplankton and zooplankton populations are an important component of the deep subtidal range because they are the primary food source for many organisms within this habitat. Plankton movements and distribution are totally dependent on currents and tides (USDoN 1999). Many invertebrates, birds, and fish utilize the plankton as a primary food source. This habitat in the Lagoon is currently functionally limited by the muted tidal exchange through the culvert. This effect has contributed to the degradation of the Lagoon and the reduction of the Lagoon's original habitat. However, the Lagoon still provides habitat for adult fish and their young as a shelter and nursery as well as providing foraging opportunities for migratory birds, including the federally listed endangered California least tern (*Sternula antillarum brownii*). Dominant invertebrates included the gelatinous colonial bryzoan (*Zoobytron verticullatum*) and the solitary tunicate (*Styela plicata*). Clam species collected during the July 2004 survey included smooth chione (*Chione fluctifraga*), common littleneck (*Protothaca staminea*), California jackknife clam (*Tagelus californianus*), and Philippine cockle (*Venerupis philipinarum*). The benthic community is relatively diverse in the northern arm and central portion of the Lagoon. However, the biodiversity of benthic organisms in the western arm of the Lagoon is diminished, which may be due to several factors including but not limited to poor water quality, low dissolved oxygen, sediment contamination, or a combination of these factors. The available data are not sufficient to determine if the low diversity is caused by contaminated sediment.

Dominant fish species included topsmelt, arrow goby (*Clevelandia ios*), and California killifish (*Fundulus parvipinnis*). Conditions at the Lagoon and surrounding areas have not changed since this baseline was determined.

Marine mammals and sea turtles have not been reported from the Lagoon and are highly unlikely to be found in the Lagoon.

Threatened and Endangered Species. The Federal Endangered Species Act (FESA) of 1973, as amended, is federal legislation that protects endangered and threatened species and their critical habitats. Endangered species are plant or wildlife species that are in danger of extinction throughout all or a significant portion of its range. Threatened species are those that are likely to become endangered in the foreseeable future. Once a species is listed, all protective measures authorized by the FESA apply to the species and its habitat. Proposed species are those that are proposed in the Federal Register (FR) to be listed under the FESA. Proposed species do not receive statutory protection under the FESA; however, conservation measures are encouraged by the USFWS. The only threatened and endangered species which may occur at the western arm of the Colorado Lagoon during dredging activities is the California least tern (*Sterna antillarum browni*).

"Take" of a T&E species or its habitat is prohibited by federal law without a special permit. The term "take," under FESA, means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct. Harm is defined by the USFWS to encompass "an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering" (50 CFR § 17.3).

The California least tern is listed as State and federally endangered species. This species has been documented at the Lagoon in previous consulting firm reports and by FOCL members. In the summer of 2004, Keane conducted a total of 20 surveys at the Lagoon and Marine Stadium for California least terns. Based on the results of the Keane study, the Lagoon was considered to rarely support foraging least terns (Keane 2004).

3.2.2 Fish and Essential Fish Habitat

Essential Fish Habitat (EFH) is managed under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson Act). This act protects waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (Magnuson-Stevens Act, 16 U.S.C. 1801 et seq.). Substrates include sediment, hard bottom, structures underlying waters, and associated biological communities (National Marine Fisheries Service [NMFS] 2002). This EFH assessment for the proposed federal action is being provided in conformance with the Magnuson Act. NMFS (2002) defines specific EFH terms as follows (50 Code of Federal Regulations [CFR] §§ 600.05–600.930):

- "Waters" include all aquatic areas and their associated biological, chemical, and physical properties that are used by fish and may include aquatic areas historically used by fish where appropriate.
- "Substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities.

- "Necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "Spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle.

Fishery Management Plans. Under the Magnuson Act, the federal government has jurisdiction to manage fisheries in the U. S. Exclusive Economic Zone (EEZ), which extends from the outer boundary of State waters (3 nautical miles [nm] or 5.6 kilometers [km] from shore) to a distance of 200 nm (370 km) from shore. Fishery Management Plans (FMPs) are extensive documents that are constantly revised and updated. The goals of the management plans include, but are not limited to, the promotion of an efficient and profitable fishery, achievement of optimal yield, provision of adequate forage for dependent species, prevention of overfishing, and development of long-term research plans (PFMC 1998, 2008a). There are two FMPs that encompass the project site: the Coastal Pelagics FMP (6 species), and the Pacific Groundfish FMP (89 species).

- **Coastal Pelagics.** EFH for Coastal Pelagics is defined as all marine and estuarine waters from the shoreline of the coasts of California, Oregon, and Washington offshore to the limits of the EEZ and above the thermocline. (The thermocline is the portion of the water column where water temperature changes rapidly, usually warmer surface waters transitioning to cooler subsurface waters.) The habitat for the Coastal Pelagics is primarily above the thermocline.
- **Pacific Groundfish.** There are 89 fish species covered under the Pacific Groundfish FMP, including ratfish (*Hydrolagus colliei*), finescale codling (*Antimora microlepis*), Pacific rattail (*Coryphaenoides acrolepis*); three species of sharks, three skates; six species of roundfish; 62 species of rockfishes, scorpionfishes and thornyheads; and 12 species of flatfishes. The Pacific Groundfish, EFH includes all waters off southern California between Mean Higher High Water (MHHW) and depths less than or equal to 3,500 m. It also considers EFH to include areas of the upriver extent of saltwater intrusion. Lastly, specific Habitat Areas of Particular Concern (HAPCs) have been identified as: estuaries, canopy kelp, seagrass, rocky reefs, and other specific areas (such as seamounts).

Relevant Species. Although there are nearly 100 fish/invertebrate species covered under the Coastal Pelagics and Pacific Groundfish FMPs, not all occur near the proposed federal action site. Table 3.2.2 lists species that have been collected or observed during studies near the project site, including Alamitos Bay, San Pedro Bay, and the Colorado Lagoon. While only a small subset of Federally managed fish species would be expected to directly utilize the Lagoon, the primary and secondary productivity of the Lagoon that is anticipated as a result of the improvement would indirectly benefit Federally managed fish species in the nearshore environment away from the Lagoon.

- **Coastal Pelagics.** Two coastal pelagics—northern anchovy and Pacific sardine—are likely to occur in the vicinity of the proposed federal action. Northern anchovy is among the most common and abundant fish species in the area. In 2006, larvae were present in the throughout the San Pedro Bay-Alamitos Bay area during two seasonal periods, a greater peak in March–July and a lesser peak in October–December (MBC and Tenera 2007). Juvenile and adult northern anchovies have consistently been collected during fish sampling near the proposed federal action site (MBC 1994, 2009; MEC 2002). Northern anchovy are found from the surface to depths of 310 m (1,017 ft), though juveniles are generally more common inshore and in estuaries (Davies and Bradley 1972).

  Pacific sardine were not abundant during 2006 ichthyoplankton sampling throughout the area (MBC and Tenera 2007), but was taken in the San Pedro Bay area by Watson et al. (2007). This species is also less common/abundant than northern anchovy near the project site (MBC 1994, 2009; MEC 2002). Pacific sardine is epipelagic, occurring in loosely aggregated schools (Wolf et al. 2001) with larvae taken from the near-shore waters out to at least 100 km offshore (Moser et al. 2001).

  Jack mackerel, Pacific mackerel, and market squid have all been collected near the proposed federal action site, but in much lower frequency and numbers than northern anchovy and Pacific sardine. All coastal pelagics are associated with the water column (as opposed to the seafloor like many of the groundfish); however, female squid also lay egg masses on sandy bottoms during spawning (at depths of about 5–55 m, with most occurring between 20–35 m) (PFMC 1998).

  Pacific Groundfish. As Table 3.2.2 shows, none of the species covered under the Pacific Groundfish FMP are considered common or abundant in the proposed federal action area. The leopard shark (*Triakis semifasciata*) uses estuaries, bays, and nearshore habitat for foraging and breeding. They prey on benthic invertebrates and to a lesser degree small fishes and rays. Leopard sharks are found in the eastern Pacific, between Oregon and Cabo San Lucas, Mexico as well as within the Gulf of California, Mexico. The tidal culvert between Marine Stadium and the Lagoon may serve as a barrier that prevents the occurrence of leopard sharks within the Lagoon, which would otherwise provide foraging and breeding habitat for the leopard shark, which have not been observed in the Lagoon.

Table 3.2.2: Managed Fish/Invertebrate Species Potentially Occurring in the Colorado Lagoon, Alamitos Bay, and Greater Near-shore San Pedro Bay Area

Common Name	Potential Habitat Use	Occurrence	
		Larval[1,2,3]	Juvenile/ Adult[2,4,5,6]
Coastal Pelagics			
northern anchovy	Open water.	Common	Abundant
Pacific sardine	Open water.	Common	Common
Pacific (chub) mackerel	Open water, juveniles off sandy beaches and around kelp beds.	—	Uncommon
jack mackerel	Open water, young fish over shallow banks and juveniles around kelp beds.	Rare	Uncommon

Table 3.2.2: Managed Fish/Invertebrate Species Potentially Occurring in the Colorado Lagoon, Alamitos Bay, and Greater Near-shore San Pedro Bay Area

Common Name	Potential Habitat Use	Occurrence	
		Larval[1,2,3]	Juvenile/ Adult[2,4,5,6]
market squid	Open water. Rare near bays, estuaries, and river mouths.	Uncommon	Rare
Pacific Groundfish			
English sole	Soft bottom habitats.	Uncommon	Common
Pacific sanddab	Soft bottom habitats.	Rare	Uncommon
Curlfin sole	Soft bottom habitats.	Rare	Rare
black rockfish	Along breakwater, near deep piers and pilings. Associated with kelp, eelgrass, and high-relief reefs.	—	Rare
calico rockfish	Multiple habitat associations but prefer hard substrata and rocky interfaces.	—	Rare
kelp rockfish	Common on hard substrate, kelp; reported along breakwater.	—	Rare
black and yellow rockfish	Common on hard substrate; reported along breakwater	—	Rare
California scorpionfish	Benthic, on soft and hard bottoms, as well as around structures.	—	Uncommon
treefish	Common on hard substrate, kelp; reported along breakwater.	—	Rare
grass rockfish	Common on hard substrate, kelp, and eelgrass habitats.	—	Rare
vermilion rockfish	Juveniles over soft-bottom and kelp, adults associated with hard substrate.	—	Uncommon
lingcod	Multiple habitat associations but prefer hard substrata and rocky interfaces.	—	Rare
cabezon	Multiple habitat associations but prefer hard substrata and rocky interfaces.	Rare	Rare
Pacific hake	Common offshore, juveniles in open water.	Rare	—
leopard shark	Multiple habitat associations, including soft bottoms, and near structure, kelp, and eelgrass.	n/a	Rare in Lagoon, uncommon to common in Alamitos Bay, and common in near-shore San Pedro Bay area
spiny dogfish	Pelagic and on muddy bottoms.	n/a	Rare
big skate	Soft bottom habitat.	n/a	Uncommon
California skate	Soft bottom habitat.	n/a	Uncommon

Occurrence: Abundant>Common>Uncommon>Rare. n/a = Not applicable, internal fertilization. (Note: Most rockfish larvae not identifiable to species.) "—" indicates none recorded.
Sources: 1. MBC and Tenera (2007); 2. MEC (2002); 3. Watson et al. (2007); 4. Allen (1976); 5. MBC (1994); 6. Froeschke et al. (2005).

3.3 TRAFFIC

The project site is located in the southeastern portion of the City. The Lagoon and Marina Vista Park lie northwest of the mouth of the San Gabriel River and are north of Marine Stadium and Alamitos Bay. The closest major roadway to the project site is East 7th Street,

which is a six-lane, east-west regional corridor located north of the project area. The proposed federal action area is bounded by several local streets, including East 6th Street, Park Avenue, East Appian Way, East Colorado Street, East Eliot Street, Monrovia Avenue, Haines Avenue, and Orlena Avenue.

The City Traffic and Transportation Bureau of the Department of Public Works has estimated the following existing traffic volumes on the streets near the project site:

- East 7th Street currently carries approximately 45,000 vehicles a day between Pacific Coast Highway (PCH) and Park Avenue.
- The intersection of East 7th Street and PCH has an existing level of service (LOS) F in the a.m. and p.m. peak hours, which is below the City's established threshold of LOS D as the minimum operating level for roadway segments and intersections.[1]
- The portion of East Colorado Street adjacent to the Lagoon carries approximately 11,000 vehicles a day.
- Park Avenue carries approximately 15,000 vehicles a day north of East 4th Street and East Appian Way.
- Park Avenue carries approximately 10,500 vehicles a day south of East 4th Street and East Appian Way.
- East Appian Way carries approximately 9,000 vehicles a day.

The City does not have existing LOS information for the local streets serving the project site. However, the City Traffic Engineer has stated that existing traffic volumes on the local roads adjacent to the Lagoon area are higher than many residential/park areas due to the existing roadway network and other physical constraints such as the waters of Marine Stadium and Alamitos Bay and the bridges that cross Alamitos Bay. These physical constraints result in a somewhat discontinuous street network in the southeastern portion of Long Beach, and much of the traffic destined to or from Belmont Park, Belmont Shore, and portions of Belmont Heights utilize Park Avenue to access East 7th Street. East Appian Way also provides a secondary route to and from Belmont Park and Naples via a bridge over Alamitos Bay that connects to PCH.

3.4 AIR QUALITY

3.4.1 Meteorology

Climate in the South Coast Air Basin (Basin) is determined by its terrain and geographical location. The Basin is a coastal plain with connecting broad valleys and low hills. The Pacific Ocean forms the southwestern border, and high mountains surround the rest of the Basin. The Basin lies in the semi-permanent high-pressure zone of the eastern Pacific; the resulting climate is mild and

[1] Long Beach Home Depot Traffic Impact Analysis, April 2005.

tempered by cool ocean breezes. This climatological pattern is rarely interrupted; however, periods of extremely hot weather, winter storms, or Santa Ana wind conditions do occur.

The annual average temperature varies little throughout the Basin, ranging from the low to middle 60s, measured in degrees Fahrenheit (°F). With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas. The climatological station closest to the site is the Long Beach Station.[1] The monthly average maximum temperature recorded at this station from April 1958 to August 2009 ranged from 66.9°F in January to 83.9°F in August, with an annual average maximum of 74.2°F. The monthly average minimum temperature recorded at this station ranged from 45.3°F in December to 64.9°F in August, with an annual average minimum of 54.8°F. January is typically the coldest month and August is typically the warmest month in this area of the Basin.

Most rainfall in the Basin occurs between November and April. Summer rainfall is minimal and is generally limited to scattered thundershowers in coastal regions and slightly heavier showers in the eastern portion of the Basin and along the coastal side of the mountains. The Long Beach Station monitored precipitation from April 1958 to August 2009. Average monthly rainfall during that period varied from 2.94 inches in February to 0.39 inch or less between May and October, with an annual total of 11.89 inches. Patterns in monthly and yearly rainfall totals are unpredictable due to fluctuations in the weather.

Although the Basin has a semiarid climate, air near the surface is generally moist because of the presence of a shallow marine layer. With very low average wind speeds, there is a limited capacity to disperse air contaminants horizontally. The dominant daily wind pattern is an onshore 8–12-mile per hour (mph) daytime breeze and an offshore 3–5 mph nighttime breeze. The typical wind flow pattern fluctuates only with occasional winter storms or strong northeasterly (Santa Ana) winds from the mountains and deserts northeast of the Basin. Summer wind flow patterns represent worst-case conditions because this is the period of higher temperatures and more sunlight, which results in ozone formation.

3.4.2 Air Quality

Many factors have a potential impact on air quality, including local climate, topography, and land use. The proposed federal action is located within the City, which is within the non-desert portion of the County. Los Angeles County is part of the Basin and is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). Air quality is determined primarily by meteorological conditions, the type and amount of pollutants emitted, and their subsequent dispersion into the atmosphere. The combination of topography, low mixing height, abundant sunshine, and emissions from the second largest urban area in the United States gives the Basin the worst air pollution problem in the nation.

[1] Western Regional Climate Center, http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca5085, website accessed March 18, 2010.

During spring and early summer, pollution produced during any one day is typically blown out of the Basin through mountain passes or lifted by warm, vertical currents adjacent to mountain slopes. Air contaminants can be transported 60 mi or more from the Basin by ocean air during the afternoons. From early fall to winter, the transport is less pronounced because of slower average wind speed and the appearance of drainage winds earlier in the day. During stagnant wind conditions, offshore drainage winds may begin by late afternoon. Pollutants remaining in the Basin are trapped and begin to accumulate during the night and the following morning. A low morning wind speed in pollutant source areas is an important indicator of air stagnation and the potential for buildup of primary air contaminants.

Inversions are generally lower in the nighttime when the ground is cool than during daylight hours when the sun warms the ground and, in turn, the surface air layer. As this heating process continues, the temperature of the surface air layer approaches the temperature of the inversion base, causing heating along its lower edge. If enough warming takes place, the inversion layer becomes weak and opens up to allow the surface air layers to mix upward. This can be seen in the middle to late afternoon on a hot summer day when the smog appears to clear up suddenly. Winter inversions typically break earlier in the day, preventing excessive contaminant buildup.

The combination of stagnant wind conditions and low inversions produces the greatest pollutant concentrations. On days of no inversion or high wind speeds, ambient air pollutant concentrations are lowest. During periods of low inversions and low wind speeds, air pollutants generated in urbanized areas are transported predominantly onshore into Riverside and San Bernardino Counties. In the winter, the greatest pollution problem is accumulation of carbon monoxide (CO) and oxides of nitrogen (NO_X) due to extremely low inversions and air stagnation during the night and early morning hours. In the summer, the longer daylight hours and the brighter sunshine combine to cause a reaction between hydrocarbons and NO_X to form photochemical smog.

Pollutants of potential concerns include ozone (O_3), CO, nitrogen dioxide (NO_2), particulate matter (PM_{10}, $PM_{2.5}$), sulfur dioxide (SO_2), and lead. These chemicals, called criteria pollutants, are harmful to individual health, materials, and agriculture. The quality of surface air (air quality) is evaluated by measuring ambient concentrations of pollutants that are known to have harmful effects on public health. The degree of air quality degradation is then compared to ambient air quality standards (AAQS) such as the California and National Ambient Air Quality Standards (CAAQS and NAAQS, respectively). The Federal Clean Air Act (CAA) (42 United States Code [USC] Sections 7401–7671q) requires the adoption of NAAQS to protect the public health and welfare from the effects of air pollution. The NAAQS have been updated on many occasions to adjust the criteria pollutants. Current standards are set for SO_2, CO, NO_2, O_3, PM_{10} and $PM_{2.5}$, and lead. The California Air Resources Board (ARB) has established additional standards that are generally more restrictive than the NAAQS. Table 3.4.1 summarizes the CAAQS and NAAQS for pollutants.

The portion of the South Coast Air Basin (SCAB) encompassing the project area is in an area that is designated as being in nonattainment of the NAAQS for O_3 (eight-hour average), PM_{10}, and $PM_{2.5}$. In addition, the severity of the nonattainment status for this area has been classified as "extreme" for O_3 and "serious" for PM_{10}, but it is not classified for $PM_{2.5}$. On July 24, 1998, this area was re-designated from nonattainment to attainment/maintenance status for NO_2 by EPA (63 FR 39747). More recently, the area was re-designated by EPA from nonattainment to attainment/maintenance for CO (72 FR 26718), effective June 11, 2007. The area is in attainment of the NAAQS for SO_2 and Pb. On May 5, 2010, EPA promulgated a rule to reclassify the SCAB as "extreme" for O_3; this rule was effective on June 4, 2010 (75 FR 24409).

Section 176 of the 1990 Federal CAA amendments requires the United States Environmental Protection Agency (EPA) to put into effect rules to ensure that federal actions conform to the appropriate State Implementation Plan (SIP). The General Conformity Rule (40 Code of Federal Regulations [CFR] Sections 93.150-.160)[1] applies to a Federal action in a nonattainment or maintenance area if the total of direct and indirect emissions of the relevant criteria pollutants and precursor pollutants caused by the Federal action equal or exceed certain de minimis rates, thus requiring the Federal agency to make a determination of general conformity. The general conformity regulations incorporate a stepwise process, beginning with an applicability analysis. According to EPA guidance (EPA 1994), before any approval is given for a Federal action to go forward, the Federal agency must apply the applicability requirements found at 40 C.F.R. § 93.153(b) to the Federal action to evaluate whether, on a pollutant-by-pollutant basis, a determination of general conformity is required. If the Federal agency determines that the general conformity regulations do not apply to the Federal action, no further analysis or documentation is required. If the general conformity regulations do apply to the Federal action, the regulating Federal agency must next conduct a conformity evaluation in accord with the criteria and procedures in the implementing regulations, publish a draft determination of general conformity for public review, and then publish the final determination of general conformity.

Unless exempted by the regulations or otherwise presumed to conform, a Federal action requires a general conformity determination for each pollutant where the total of direct and indirect emissions caused by the Federal action would equal or exceed an annual de minimis emission rate. These emission rates are expressed in units of tons per year (tpy) and are compared to the total of direct and indirect emissions caused by Federal action for the calendar year during which the net emissions are expected to be the greatest. It should be

[1] On April 5, 2010, EPA promulgated revised general conformity requirements at 40 C.F.R. Part 93 Subpart B (75 FR 17254). In the same action, EPA eliminated most of the general conformity requirements under 40 C.F.R. Part 51 Subpart W, because they were mostly duplicative of the requirements at 40 C.F.R. Part 93 Subpart B, and revised 40 C.F.R. § 51.851 to remove the obligation for states to include general conformity requirements in their implementation plans. The revised regulations took effect on July 6, 2010.

noted that, because O_3 is a secondary pollutant (i.e., it is not emitted directly into the atmosphere but is formed in the atmosphere from the photochemical reactions of volatile organic compounds, VOC, and oxides of nitrogen, NO_x, in the presence of sunlight), its de minimis emission rate is based on primary emissions of its precursor pollutants - VOC and NO_x. If the net emissions of either VOC or NO_x exceed the de minimis emission rate for O_3 (EPA 1994), then the Federal action is subject to a general conformity evaluation for O_3.

The SCAQMD is the agency responsible for attaining state and federal clean air standards in the Basin that includes the project area. The SCAQMD is the regional agency charged with being primarily responsible for managing local air quality by regulating emissions from stationary sources of air pollution. Standards for motor vehicle emissions are set by the ARB and apply uniformly statewide. The SCAQMD Rules and Regulations are adopted by the SCAQMD and apply to the area and activities within the Basin. The SCAQMD also is involved with the overall development and implementation of the SIP, as well as adopting and enforcing emissions from motor vehicles, fuels, and consumer products at the state level. The SCAQMD is also charged with updating the air quality management plan (AQMP) for the Basin. The AQMP outlines the District's strategies to reduce ozone precursor emissions from a wide variety of stationary and mobile sources.

Air quality in the project area is generally good. As noted above, however, standards for ozone are exceeded, most often in summer months. Although standards are exceeded only a few times annually in the coastal zone, they are exceeded more frequently inland due to pollutants carried by prevailing winds. The major source of air pollution in the project area is automobiles, followed by recreational facilities.

Table 3.4.1: Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone (O_3)	1-Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8-Hour	0.07 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM_{10})	24-Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15.0 µg/m^3		
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1-Hour	20 ppm (23 mg/m^3)		35 ppm(40 mg/m^3)		

Table 3.4.1: Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	—
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminescence
	1-Hour	0.18 ppm (339 µg/m^3)		0.100 ppm (see footnote 8)	None	
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	—	Ultraviolet Fluorescence	0.030 ppm (80 µg/m^3)	—	Spectrophotometry (Pararosaniline Method)
	24-Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (365 µg/m^3)	—	
	3-Hour	—		—	0.5 ppm (1300 µg/m^3)	
	1-Hour	0.25 ppm (655 µg/m^3)		—	—	
Lead[10]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High-Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3	Same as Primary Standard	
	Rolling 3-Month Average[9]	—		0.15 µg/m^3		
Visibility-Reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer - visibility of ten miles or more (0.07-30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		**No Federal Standards**		
Sulfates	24-Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[9]	24-Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Notes for Table 3.4.1

Source: California Air Resources Board, February 16, 2010.

[1] California standards for ozone; carbon monoxide (except Lake Tahoe); sulfur dioxide (1- and 24-hour); nitrogen dioxide; 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 California Code of Regulations.

[2] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth-highest eight-hour concentration in a year, averaged over three 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 above 150 $\mu g/m^3$ 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 three years, are equal to or less than the standard. Contact the EPA for further clarification and current federal policies.

[3] 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 a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[4] Any equivalent procedure which can be shown to the satisfaction of ARB to give equivalent results at or near the level of the air quality standard may be used.

[5] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[6] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[7] Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the EPA.

[8] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).

[9] The ARB has identified lead and vinyl chloride as "toxic air contaminants" with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[10] National lead standard, rolling 3-month average: final rule signed October 15, 2008.

°C = degrees Celsius
$\mu g/m^3$ = micrograms per cubic meter
ppm = parts per million
EPA = United States Environmental Protection Agency
mg/m^3 = milligrams per cubic meter

3.5 NOISE

Noise is generally defined as unwanted or objectionable sound. Noise levels are measured on a logarithmic scale because of physical characteristics of sound transmission and reception. Noise energy is typically reported in units of decibels (dB) in which a change of 10 units on the decibel scale reflects an increase of 10 times the noise energy and roughly translates to a doubling of perceived loudness. The human ear does not respond uniformly to sounds at all frequencies, being less sensitive to low and high frequencies than to medium frequencies, which correspond with human speech. In response to this, the A-weighted noise level (or scale) was developed. The A-weighted scale corresponds better with people's subjective judgment of sound levels than does the traditional decibel scale. The A-weighted sound level is called the "noise level" referenced in dBA. Noise is measured on a logarithmic scale; a doubling of sound energy results in a 3 dBA increase in noise levels. However, changes in noise levels of less than 3 dBA are not typically noticeable by the human ear. Changes from 3–5 dBA may be noticed by some individuals who are extremely sensitive to changes in noise. A 5.0 dBA increase is readily noticeable, while the human ear perceives a 10 dBA increase in sound level to be a doubling of sound.

Noise levels diminish (or attenuate) as distance from the source increases according to the inverse square rule, but the rate constant varies with type of sound source. Sound attenuation from point sources, such as industrial facilities, is approximately 6 dB per doubling of distance. Heavily traveled roads with few gaps in traffic behave as continuous line sources and attenuate at 3 dB per doubling of distance. Noise from more lightly traveled roads is attenuated at 4.5 dB per doubling of distance.

Community decibel levels are reported in different ways. The two most common reporting mechanisms used in environmental analysis of community noise levels are the Community Noise Equivalent Level (dBA, CNEL) and the Equivalent Noise Level (dBA, L_{eq}). The CNEL is a 24-hour weighted noise average, which assigns a 5 dB penalty to the noise levels (adds 5 dB to the measured noise level before computing the noise average) between the hours of 7:00 p.m. and 10:00 p.m. and a 10 dB penalty from 10:00 p.m. to 7:00 a.m. These penalties are intended to account for a greater sensitivity to noise, which occurs during quiet evening hours and overnight hours when people sleep.

The CNEL is therefore most appropriate for analysis of projects that are anticipated to generate substantial noise during nighttime and overnight hours, such as supermarkets, which experience predawn deliveries of goods (such as associated heavy truck noise and loading/unloading noise), other 24-hour retail uses, and certain industrial uses. Similar to the CNEL, the L_{eq} is also a type of noise average, but the L_{eq} does not assign a penalty or weighting to record noise levels as the CNEL does. Rather, the L_{eq} represents the average of the fluctuating noise levels recorded in any given time period, usually 1 hour, or $L_{eq\ (h)}$. The L_{dn} index, the average A-weighted noise level during a 24-hour day, obtained after addition of 10 dB to levels measured in the night between 10:00 p.m. and 7:00 a.m., penalizes nighttime noise the same as the CNEL index, but does not penalize evening noise.

People are subject to a multitude of sounds in the environment. Excessive noise cannot only be undesirable but may also cause physical and/or psychological damage. The amount of annoyance or damage caused by noise is dependent primarily upon three factors: the amount and nature of the noise, the amount of ambient noise present before the intruding noise, and the activity of the person working or living in the noise source area. The difficulty in relating noise exposure to public health and welfare is one of the major obstacles in determining appropriate maximum noise levels. Although there is some dispute in the scientific community regarding the detrimental effects of noise, a number of general conclusions have been reached:

- Noise of sufficient intensity can cause irreversible hearing damage;
- Noise can produce physiological changes in humans and animals;
- Noise can interfere with speech and other communication; and
- Noise can be a major source of annoyance by disturbing sleep, rest, and relaxation.

The Noise Element of the City of Long Beach General Plan contains noise standards for mobile noise sources. These standards address the impacts of noise from adjacent roadways and airports. The City specifies outdoor and indoor noise limits for residential uses, places of worship, educational facilities, hospitals, hotels/motels, and commercial and other land uses. The noise standard for exterior living areas is 65 dBA CNEL. The indoor noise standard is 45 dBA CNEL, which is consistent with the standard in the California Noise Insulation Standard.

In addition to the Noise Element of the General Plan, the City has adopted a quantitative Noise Control Ordinance, No. C-5371, Long Beach 1977 (Municipal Code, Chapter 8.80). The ordinance establishes maximum permissible hourly noise levels (L_{50}) for different districts throughout the City. Tables 3.5.1 and 3.5.2 list exterior noise and interior noise limits for various land uses. For the purposes of the proposed federal action, the exterior noise standard of 70 dBA L_{max} has been applied to all of the sensitive land uses, the residences, the preschool, and the open space located within the vicinity of the project area.

Table 3.5.1: Exterior Noise Limits, LN (dBA)

Receiving Land Use	Time Period	L_{50}	L_{25}	L_8	L_2	L_{max}
Residential (District One)	Night: 10:00 p.m.–7:00 a.m.	45	50	55	60	65
	Day: 7:00 a.m.–10:00 p.m.	50	55	60	65	70
Commercial (District Two)	Night: 10:00 p.m.–7:00 a.m.	55	60	65	70	75
	Day: 7:00 a.m.–10:00 p.m.	60	65	70	75	80
Industrial (District Three)	Anytime[1]	65	70	75	80	85
Industrial (District Four)	Anytime[1]	70	75	80	85	90

[1] For use at boundaries rather than for noise control within industrial districts.
dBA = A-weighted decibels
L_2 = A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 2% of a stated time period.
L_8 = A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 8% of a stated time period.
L_{25} = A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 25% of a stated time period.
L_{50} = A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 50% of a stated time period.
L_{max} = maximum sound level
L_N = percentile noise exceedance level

Table 3.5.2: Maximum Interior Sound Levels, LN (dBA)

Receiving Land Use	Time Interval	L_8	L_2	L_{max}
Residential	10:00 p.m.–7:00 a.m.	35	40	45
	7:00 a.m.–10:00 p.m.	45	50	55
School	7:00 a.m.–10:00 p.m. (while school is in session)	45	50	55
Hospital and other noise-sensitive zones	Anytime	40	45	50

dBA = A-weighted decibels
L_2 = A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 2% of a stated time period.
L_8 = A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 8% of a stated time period.
L_{max} = maximum sound level
L_N = percentile noise exceedance level

The City's Noise Control Ordinance (Section 8.80.202) governs the time of day that construction work can be performed. The Noise Ordinance prohibits construction, drilling, repair, remodeling, alteration, or demolition work between the hours of 7:00 p.m. and 7:00 a.m. on weekdays or federal holidays (considered a weekday) if the noise would create a disturbance across a residential or commercial property line or violate the quantitative provisions of the ordinance, except for emergency work authorized by the building official.

The Noise Ordinance prohibits construction, drilling, repair, remodeling, alteration, or demolition work between the hours of 7:00 p.m. on Friday and 9:00 a.m. on Saturday and after 6:00 p.m. on Saturday, except for emergency work authorized by the building official. No construction, drilling, repair, remodeling, alteration, or demolition work shall occur at anytime on Sundays, except for emergency work authorized by the building official.

The Colorado Lagoon is located in an area characterized primarily by residences, parks, and schools. Although noise measurements have not been taken, ambient noise levels are generally quiet. The primary existing noise sources in the project area are transportation facilities. Traffic on streets adjacent to the project site is the dominant source contributing to ambient noise levels in the project vicinity. Noise from motor vehicles is generated by engine vibrations, the interaction between the tires and the road, and the exhaust system. In addition, recreational facilities and activities contribute to the human-made ambient noise environment in the Lagoon. Noise levels tend to increase during summer months from heavy recreational activities.

3.6 LAND USE AND RECREATION

3.6.1 Land Use

The area surrounding the proposed federal action is composed primarily of park and recreational land, residential development, and small areas of commercial and industrial land uses, as detailed below. Figure 3.6-1 shows the project site and adjacent land uses.

- **North:** Recreation Park, which is a City park, is adjacent to the Lagoon on the north and includes 9-hole and 18-hole golf courses, a baseball stadium, a softball stadium, a casting pond, picnic areas, a dog park, tennis courts, a community center, lawn bowling, a band shell, and a playground.
- **South:** Developed neighborhoods, which are largely composed of residential land uses, are located to the south. Small areas of commercial and institutional development are located to the south of the Lagoon and to the west of Marina Vista Park. In addition, Marine Stadium, which is a recreational water body, is located to the south of the project site.
- **East:** Developed residential land uses are located to the east of the project site.
- **West:** Developed residential land uses are located to the west of the project site.

FIGURE 3.6-1

Colorado Lagoon Estuary Restoration Project

Land Uses in the Project Vicinity

SOURCE: City of Long Beach Dept. of Planning & Building and Dept. of Technology Services

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3.6.2 Recreation

On-Site Recreation Opportunities. There are several existing on-site recreation facilities and opportunities at the Colorado Lagoon, including swimming areas, a sandy shoreline, grassy open space, play equipment, picnic areas, a pedestrian bridge over the Lagoon, the Colorado Lagoon Marine Science Center, restrooms, and parking. Additionally, the Colorado Lagoon Playgroup Preschool, which is a private program for 3–5-year-old children that is permitted through the City to use the building, and a model boat shop are located on the south side of the Lagoon. The City utilizes the Lagoon area for several City programs, which in 2010 include:

- **Summer Fun Days:** Lectures and guided explorations of Lagoon wildlife began June 21, 2010.
- **Estuary Explorers:** FOCL volunteers lead explorations at the Lagoon on the second Saturday of every month.
- **Super Science at Colorado Lagoon:** Six-week free program for children that runs from June through August.
- **Model Boat Program:** Model boat building program for children held during the summer.

Off-Site Recreation Opportunities. The City Department of Parks, Recreation, and Marine operates and maintains all municipal parks and recreation facilities in Long Beach. The parks and recreation system includes 94[1] parks encompassing 1,672 acres (ac) (Strategic Plan, Long Beach Department of Parks, Recreation, and Marine, 2003). In addition to parks, Long Beach has a number of specialty facilities that provide recreation and leisure opportunities other than those within the project area, including: a riverfront recreation vehicle (RV) compound; two historic ranchos; the Long Beach Museum of Art; two marine biological reserves; two special events parks (Queen Mary and Rainbow Lagoon); Shoreline, Santa Cruz and Victory Parks; and the El Dorado Nature Center Park and trail. Long Beach is also home to public and private golf courses and a number of water recreation areas other than those within the project area, including boat launches and Alamitos Bay. Public golf courses include Heartwell, El Dorado, Recreation, Recreation South (adjacent to the north of the project site), and Skylinks. Three of these are 18-hole courses, one is an 18-hole executive par 3 golf course, and one is a 9-hole executive par 3 course. Each is maintained and operated by a private contractor. As provided in the City's Open Space and Recreation Element and Strategic Plan, Figure 3.6-2 shows the location of the Long Beach parks. The City has added the following six parks that total 11.7 ac since adoption of its Open Space and Recreation Element and Strategic Plan:

[1] Total is by park type classification wherein portions of El Dorado, Heartwell, and DeForest Parks fall into multiple park type classes. When parks are simply counted by name, there are 89 parks in the City of Long Beach.

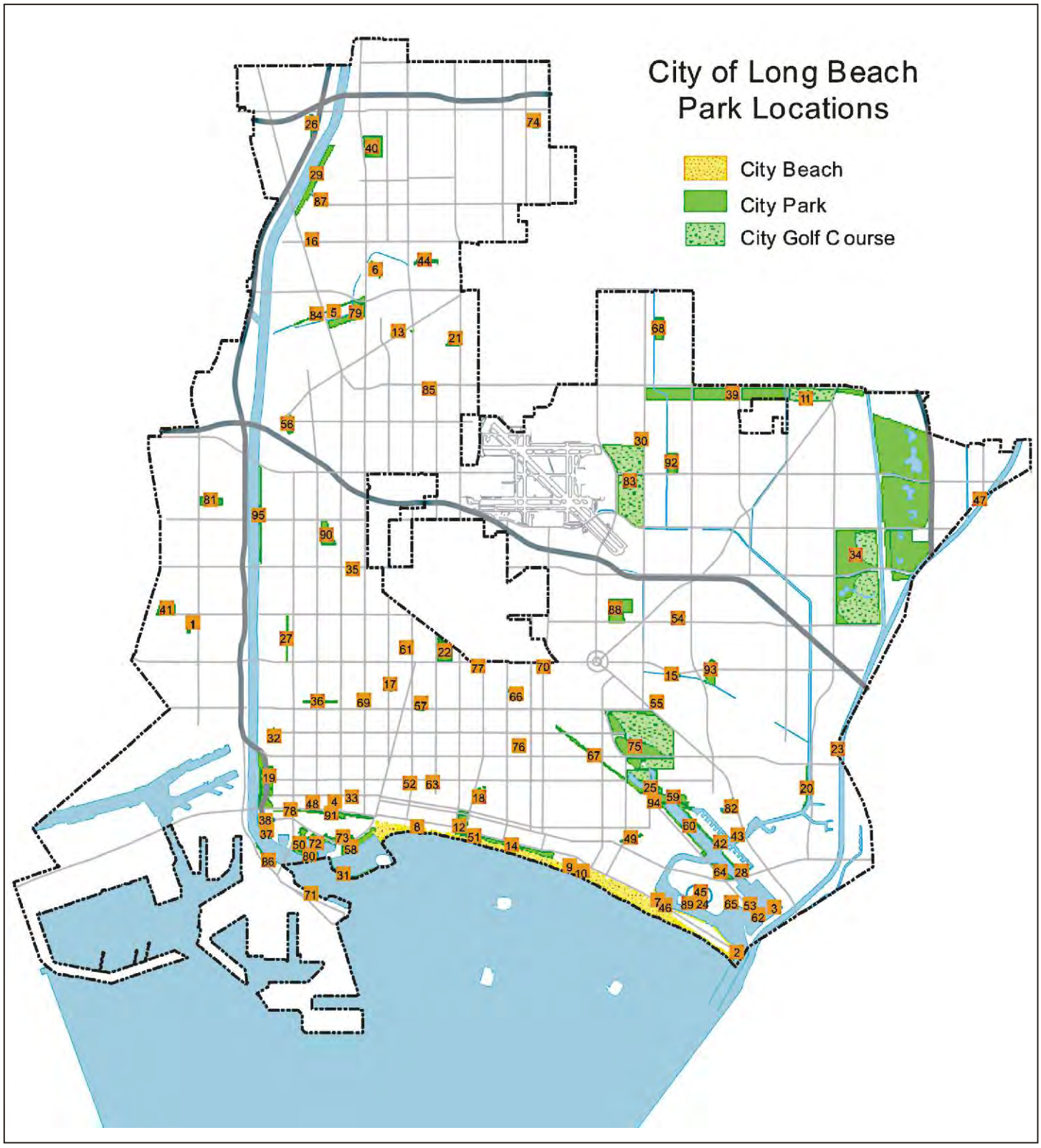

FIGURE 3.6-2

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Colorado Lagoon Estuary Restoration Project

Long Beach Park Locations

SOURCE: Open Space and Recreation Element

I:\CLB0803\G\ParkLocation.cdr (6/21/10)

- Burton W. Chace Mini-Park: 0.29 ac, located at Market Street and Dairy Avenue. Amenities include open space.
- Ed "Pops" Davenport Park: 5.84 ac, located at 2910 E. 55th Way. Amenities include open space.
- Grace Park: 1.2 ac, located at Elm Avenue and Plymouth Street. Amenities include open space.
- 21st Street and Hill Street Park: 0.9 ac, located adjacent to the Los Angeles River. Amenities include a trail, open space, park benches, and a drinking fountain.
- Trolley: 0.1 ac. Amenities include open space.
- Jack Nichol Park: 3.5 ac, located at 6200 Costa Del Sol. Amenities include a basketball court, baseball field, playground, soccer field, softball field, restrooms, picnic area, and a youth recreation program.

Public schools within Long Beach also provide parklands and recreational amenities. As shown in Figure 3.6-3, there are 70 public school facilities located in Long Beach, most of which have areas of green open space and other recreation amenities, such as sports fields and courts. The Open Space and Recreation Element of the City's General Plan states that school site recreation programs managed by the City Department of Parks, Recreation, and Marine are held currently at 16 elementary and 5 middle school locations. Table 3.6.1 lists schools in the project vicinity.

Table 3.6.1: Long Beach Unified School District Schools near the Project Area

School Name and Location	Distance from Project*	Grades	Number of Classes (2006–2007)	Average Class Size (2008–2009)	Total Number of Students (2006–2007)
Bryant Elementary 4101 East Fountain Street	1.41 miles	K–5	16	21.9	352
Fremont Elementary 4000 East 4th Street	0.46 mile	K–5	19	23.2	420
Lowell Elementary 5201 East Broadway	0.32 mile	K–5	33	21.2	663
Mann Elementary 257 Coronado Avenue	1.49 miles	K–5	16	21.8	352
Jefferson Middle School 750 Euclid Avenue	0.97 mile	6–8	195	25.0	892
Rogers Middle School 365 Monrovia Avenue	0.15 mile	6–8	148	30.7	883
Wilson High School 4400 East 10th Street	0.66 mile	9–12	952	29.1	4,343

*Distances were measured using a Geographic Information System (GIS). Measurements were taken from the project boundary closest to each school's location.
Source: www.ed-data.k12.ca.us. Downloaded 6/10.

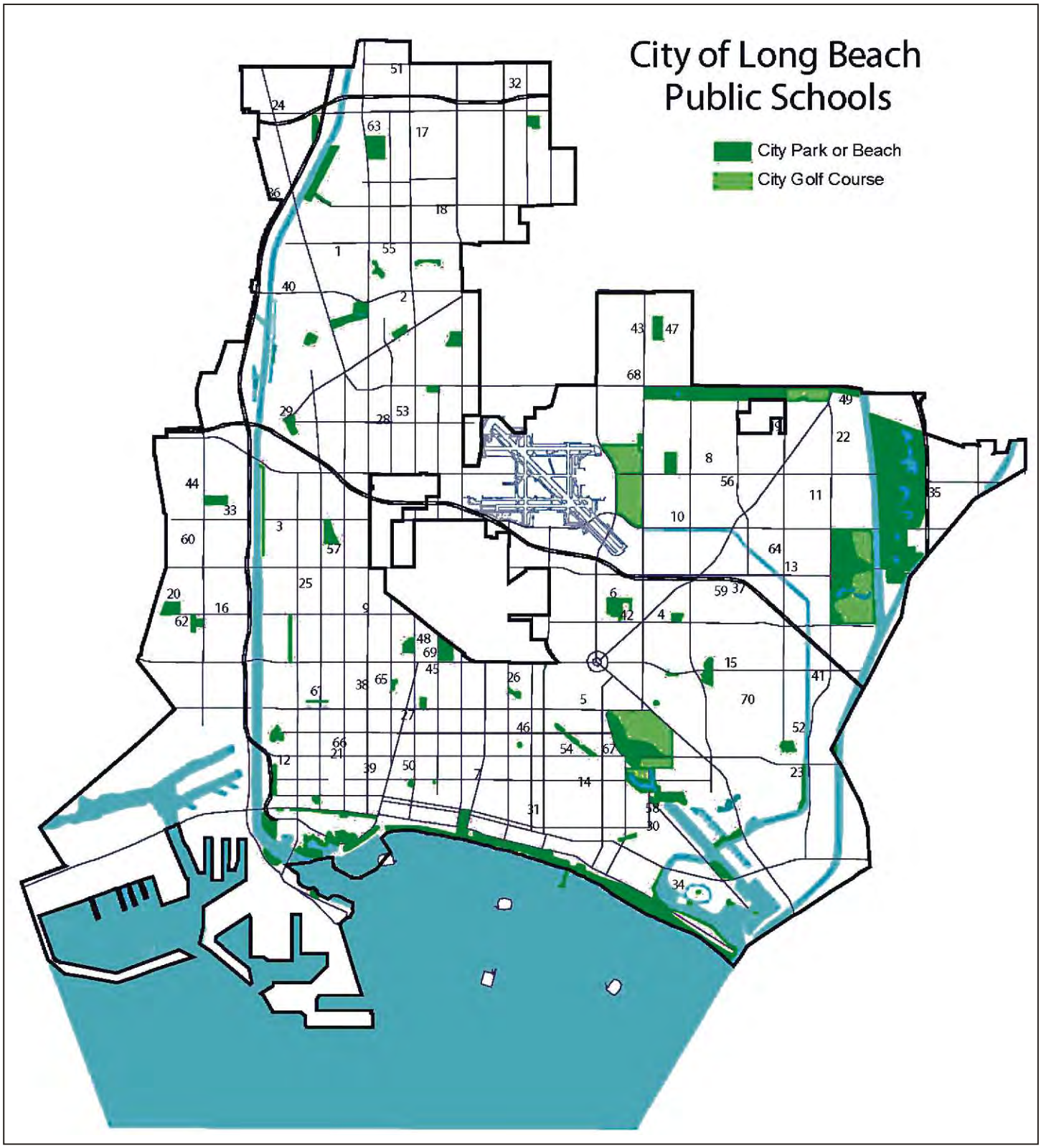

FIGURE 3.6-3

N

Colorado Lagoon Estuary Restoration Project

Long Beach School Locations

SOURCE: Open Space and Recreation Element

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The City of Long Beach has few open recreation areas within its boundaries that are owned and maintained by other governmental jurisdictions. The most significant of these are the Los Angeles County (County) bicycle, pedestrian, and equestrian trails along the San Gabriel and Los Angeles Rivers and Coyote Creek. The County also leases a 4.82 ac park in the Carmelitos Housing Development, and the City of Los Alamitos has a 0.5 ac park within the boundaries of Long Beach (Strategic Plan, Long Beach Department of Parks, Recreation, and Marine, 2003).

It should be noted that several of the off-site park and recreation facilities are in close proximity to the project site. These existing facilities are listed below.

- Recreation Park is 229 ac and is adjacent to the Lagoon on the north. The park includes 9-hole and 18-hole golf courses, a baseball stadium, a casting pond, picnic areas, a dog park, tennis courts, a community center, lawn bowling, green open space, and a playground.
- Marine Stadium is a water body and park area adjacent to Marina Vista Park on the south. The park amenities include an activity center, boating facilities, coastal viewing, a rowing center, green open space, benches, and picnic tables. Additionally, Marine Stadium is the site of municipal band concerts in the summer.
- Will Rogers Mini-Park is 1.9 ac and is located adjacent to the project area at the intersection of East Appian Way and Nieto Avenue. The park provides open space.
- Pacific Electric Railway Greenbelt is a narrow strip of land that runs diagonally from East 4th Street and Park Avenue (adjacent to the project area) to East 11th Street and Loma Avenue. The area includes walking and riding trails, and native plants.
- Jack Nichol Park is located approximately 1 mi from the project site at 6200 Costa Del Sol. The park facilities provide a basketball court, baseball field, playground, soccer field, softball field, restrooms, picnic area, and a youth recreation program.
- Mother's Beach (Marine Park) is a beach area that is adjacent to the waters of Marine Stadium. The recreation amenities include boating facilities, coastal viewing, a playground, swimming, volleyball, green open space, benches, and picnic tables.
- Chittick Field is located approximately 3.25 mi from the project site at 1900 Walnut Avenue. The park facilities provide open green space, picnic tables, a soccer field, and a softball field.
- Martin Luther King, Jr. Park is located approximately 3.66 mi from the project site at 1950 Lemon Avenue. The park facilities provide a community center, open green space, playground, a handball/racquetball court, picnic areas, two baseball/softball fields, a soccer field that overlays a baseball field, swimming pool, softball fields, and restrooms.
- Stearns Champions Park is located approximately 2.30 mi from the project site at 4520 East 23rd Street. The park facilities provide basketball and volleyball courts, two baseball diamonds, roller hockey, a soccer field, a community center, and open green space.

- Bryant Elementary School is located at 4101 East Fountain Street, which is approximately 1.41 mi from the project site. The school facilities provide 1.82 ac of green open space, basketball courts, volleyball courts, and playgrounds.
- Fremont Elementary School is located at 4000 East 4th Street, which is approximately 0.46 mi from the project site. The school facilities provide 1.82 ac of green open space, basketball courts, volleyball courts, and playgrounds.
- Lowell Elementary School is located at 5201 East Broadway, which is approximately 0.32 mi from the project site. The school facilities provide 1.98 ac of green open space, basketball courts, volleyball courts, and playgrounds.
- Mann Elementary School is located at 257 Coronado Avenue, which is approximately 1.49 mi from the project site. The school facilities provide 1.98 ac of green open space, basketball courts, volleyball courts, and playgrounds.
- Kettering Elementary School is located at 550 Silvera Avenue, which is approximately 1.57 mi from the project site. The school facilities provide 5.67 ac of green open space, a playground, basketball and volleyball courts, and a soccer field.
- Tincher Elementary School is located at 1701 Petaluma Avenue, which is approximately 2.90 mi from the project site. The school facilities provide 6.45 ac of green open space, a playground, basketball courts, and a soccer field.
- Jefferson Middle School is located at 750 Euclid Avenue, which is approximately 0.97 mi from the project site. The school facilities provide 3.45 ac of green open space, a baseball field, a gymnasium, basketball courts, and volleyball courts.
- Rogers Middle School is located at 365 Monrovia Avenue, which is approximately 0.15 mi from the project site. The school facilities provide 2.47 ac of green open space, a baseball field, a gymnasium, basketball courts, and volleyball courts.
- Wilson High School is located at 4400 East 10th Street, which is approximately 0.66 mi from the project site. The school facilities provide 11.50 ac of green open space, baseball field, a gymnasium, basketball courts, a football field, volleyball courts, a swimming pool, and tennis courts.

3.7 AESTHETICS

3.7.1 Existing Visual Character in the Vicinity of the Project Site

The area surrounding the proposed federal action is composed primarily of park and recreational land, residential development, and small areas of commercial and institutional land uses.

Recreation Park, which is a City park, is adjacent to the Lagoon on the north and includes 9-hole and 18-hole golf courses, a baseball stadium, a softball stadium, a casting pond, picnic areas, a dog park, tennis courts, a community center, lawn bowling, and a playground. A chain

link fence separates the Lagoon project site from the Recreation Park 9-hole golf course along the west side of the north arm of the Lagoon and along the existing north parking lot to the existing restroom. The chain link fence does not separate the Recreation Park golf course and the project site around the west arm of the Lagoon, which is west of the restroom.

Developed neighborhoods, which are largely composed of residential land uses, are located to the south, east, and west. Small areas of commercial and institutional development are located to the south of the Lagoon and to the west of Marina Vista Park. In addition, Marine Stadium, which is a recreational water body, is located adjacent to the south of Marina Vista Park.

3.7.2 Existing Visual Character of the Project Site

Colorado Lagoon. The Lagoon was once a part of the historic Los Cerritos Wetlands and historically consisted of coastal salt marsh. In 1923, the low-lying tidelands of Alamitos Bay were dredged to form the Lagoon and Marine Stadium, which were used for recreational rowing. The original vegetation communities have been eliminated or severely degraded due to disturbances related to human activity, steepness of the banks along the northern arm of the Lagoon, the presence of invasive non-native vegetation, and degraded water quality and pollutants in the Lagoon. A few isolated stands of coastal salt marsh occur within highly degraded habitat areas and other non-native species. The project area supports two plant communities and four habitat types. The plant communities within the project area include parks and ornamental plantings (approximately 7.53 ac) and southern coastal salt marsh (approximately 0.94 ac). The four habitat types within the project area include mudflats (approximately 0.83 ac), sandy beach (approximately 4.33 ac), developed land (approximately 2.54 ac), and marine open water and subtidal (approximately 13.12 ac). Previously referenced Figure 3.2-1 illustrates the distribution of these areas within the project site.

The Lagoon is largely characterized as a water body and park comprising ornamental landscaping. The dominant herbaceous plant is turf grass, which is a mixture of multiple non-native grasses such as Bermuda grass (*Cynodon dactylon*) and annual bluegrass (*Poa annua*). Scattered throughout the project area are mature trees typically used in Southern California park landscaping. The dominant ornamental plant species are gum tree (*Eucalyptus* sp.), Canary Island pine (*Pinus canariensis*), carrotwood (*Cupaniopsis anacardioides*), myoporum (*Myoporum laetum*), southern magnolia (*Magnolia grandifolia*), Peruvian pepper (*Schinus molle*), and European olive (*Olea europaea*).

Within the project area, there are two sandy beach areas located along the north and south portions of the Lagoon. There is no vegetation growing on these beaches since they are frequently machine groomed. The sandy beaches are used by the public for various recreational activities and as a roosting site for gulls and resting waterfowl. The area has a high recreation value.

The northern portion of the Lagoon area is developed with a parking lot on the north shore and a driveway entrance from East 6th Street to the parking lot. As stated above, a chain link fence separates the Lagoon project site from Recreation Park along the north arm and north beach/north parking lot boundary. The driveway entrance from East 6th Street to the parking lot is lined with approximately 32 Mexican fan palms (*Washingtonia robusta*) along the shore and approximately 16 palms along the chain link fence. Also along the chain link fence are various species of non-native shrubs and trees. Vegetation within the developed area consists of some individuals of non-native turf grass, mainly Bermuda grass, growing along the sides of the access road and in the cracks of the asphalt. The access road and parking lot area currently do not support any native vegetation and have little to no habitat value.

The Lagoon water body comprises 11.7 ac within the Lagoon project area. The Lagoon water quality is currently degraded due to urban runoff impairments and the culvert restrictions that limit tidal flushing. Due to the limited capacity and perching of the culvert that connects the Lagoon to Marine Stadium, tidal flushing is restricted, and water levels do not fluctuate at the same level as the tides. This effect has contributed to the degradation of the water quality at the Lagoon. As a result, the Lagoon waters have limited aesthetic appeal due to high turbidity (less clarity) and the potential for periodic blooms of algae. In addition, the major storm drains and several of the minor storm drains visibly outlet into the Lagoon.

There are several physical structures at the Lagoon. The existing restroom structures on the north and south shores are old but maintained in good condition. The existing pedestrian bridge at the Lagoon is in need of minor repairs to deteriorated portions of the wood structure. The preschool and model boat structures have recently been renovated and are therefore in excellent condition. The Marine Science Center building was painted with a mural several years ago. The Marine Science Center and lifeguard structures to the south side of the Lagoon are maintained in good condition. The picnic tables, playground, and other recreation features are maintained in operational condition by the City. Generally, the physical structures at the Lagoon are in a moderate to excellent state of repair. These structures are small in scale compared to the overall site and do not dominate the visual features at the Lagoon.

In summary, the existing aesthetic quality of the Lagoon area is characterized by passive and active recreation open space represented primarily by grassy areas with ornamental trees, beach, and a water body. The visual quality of the water is somewhat degraded by turbidity and visible outlet structures. Physical improvements are maintained in moderate to excellent condition. Overall, the Lagoon is a visual asset to the community by providing open space in an urban environment.

Light and Glare. Currently, low-level security lighting is provided on the streets surrounding the project area, at Marine Stadium, and at the adjacent golf course to provide illumination for roadway traffic, adjacent residential areas, and the golf course users. The Lagoon currently has two restroom structures with two mercury vapor lights on the outside of

the buildings. One restroom building is located on the north side of the Lagoon, and the second restroom building is located on the south side of the Lagoon. Marina Vista Park currently has one restroom structure located to the north of East Eliot Street, which is illuminated by two light poles. A fourth restroom structure is located south of East Eliot Street at Marine Stadium and is illuminated with two lights on the outside of the building.

3.8 CULTURAL RESOURCES

The project site is generally flat and surrounded by a developed urban area of the City. The project site includes the Lagoon and adjacent parkland areas, including Marina Vista Park. The Lagoon is an approximately 11.7 ac tidal water body that is connected to Alamitos Bay and the Pacific Ocean through an underground tidal culvert to Marine Stadium.

3.8.1 Project Area History

The Colorado Lagoon was once a part of the historic Los Cerritos Wetlands. In 1923, the low-lying tidelands of Alamitos Bay were dredged of more than 7 million cy of sand, silt, and mud to create the Lagoon and Marine Stadium. Since their development, the Lagoon and Marine Stadium have been utilized for recreational and competitive diving and rowing, including various Olympic events. Marine Stadium is unique in its design, accommodating four competing rowing teams in one heat.

The City purchased the Lagoon area and Recreation Park in the 1920s through general revenue bond funding. The 1932 Los Angeles Olympic Committee chose the Lagoon for diving trials. High diving was performed from a three-story structure floating in the Lagoon. To prepare for the diving trials, the Lagoon was separated from Marine Stadium by a tide gate, which was installed to maintain adequate diving depth in the Lagoon.

The 1932 Olympics also utilized Marine Stadium for rowing events. During these games, the United States rowing team won the gold medal in Marine Stadium. In 1968, the City remodeled Marine Stadium and constructed the current boathouse for the Olympic rowing and canoeing team trials. The boathouse that was used during the 1932 Olympics still remains (located on the southeast corner of E. Colorado Street and Neito Avenue). This building is noteworthy due to the Olympic history; however, it has been extensively remodeled and is not listed as a historical landmark.

In the late 1960s, the area between what is now the north end of Marine Stadium and the south end of the Lagoon (which was also the end of the original Olympic course) was filled and the existing underground box culvert constructed, thereby further separating the Lagoon from Marine Stadium. This was done as part of the construction for the then-proposed Pacific Coast Freeway. The freeway was never built and the “filled” area is now Marina Vista Park.

Despite the fill, which relocated the Olympic course's finish line, Marine Stadium still provides 2,000 m straight of water, which is the standard sprint distance for national and international rowing. Marine Stadium is the only rowing venue specifically built for the sport in the United States and it continues to be a center for training United States Olympic Rowing Teams. In 1984, the Women's Olympic Sculling trials were held in the Marine Stadium. Marine Stadium is also the location from which aviators Clyde Schlieper and Wes Carroll set off when they set a world record for longest sustained flight (30 days) in 1939. In addition, Marine Stadium is notable because it and the Los Angeles Coliseum are the only two surviving 1932 Olympic structures. For these reasons, Marine Stadium was designated a California Registered Historical Landmark (#1014) on April 29, 1995.

In January 1990 the Corps evaluated the Marine Stadium and determined that the Marine Stadium was not eligible for the National Register of Historic Places due to lack of sufficient integrity. In February 1990, the State Office of Historic Preservation provided concurrence that the Marine Stadium does not meet eligibility requirements of the National Register of Historic Places. Both letters are appended to this EA (Appendix D).

3.8.2 Historical, Paleontological, and Archaeological Resources

Records searches and an archaeological survey have been conducted. No cultural resources that could be considered eligible for the National Register of Historic Places (NRHP) were identified in the area of potential effects (APE), defined as the western arm of the Lagoon. The survey found that soil in the project area is loamy sand and that marine shell was observed over the majority of the project area and is consistent with previous dredging and fill of tidal areas, as shown in the historic aerials (Figures 3.8-1 through 3.8-3).

The records search found that seven resources have been previously identified within 0.25 mi of the project area, including six archaeological sites and one historic resource. None of the archaeological sites is located within the APE; however, the historic resource, as identified previously, is located in the immediate vicinity of the project area. This resource is the Long Beach Marine Stadium (CA-LAN-056) and is determined to be a Point of Historical Interest. The stadium is listed in the California Register of Historical Resources (California Register), the California Historical Landmarks (CHL; No. 1014), and the California Points of Historical Interests (PHI; No. 19-186115). The Marine Stadium, however, is not eligible for the NRHP.

FIGURE 3.8-1

Colorado Lagoon Estuary Restoration Project

Historic Aerial of the Colorado Lagoon, 1928

FIGURE 3.8-2

Colorado Lagoon Estuary Restoration Project

Historic Aerial of the Colorado Lagoon, 1947

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FIGURE 3.8-3

Colorado Lagoon Estuary Restoration Project

Historic Aerial of the Colorado Lagoon, 1968

3.9 HAZARDS AND HAZARDOUS MATERIALS

The ecological health of the Lagoon is degraded. The Los Angeles Regional Water Quality Control Board (LARWQCB) listed the Lagoon on California's Section 303(d) list of impaired water bodies due to elevated levels of lead, zinc, chlordane, and PAHs in the sediment, and chlordane, DDT, dieldrin, and PCBs in fish and mussel tissue. In addition, testing confirmed the presence of PCBs, cadmium, copper, mercury, and silver as secondary contaminants of concern. Bacterial contamination of the Lagoon water is also a major concern and indicator bacteria was added in 2006 to California's Section 303(d) list.

The LARWQCB has approved TMDLs for the Lagoon that require removal of contaminated sediments. It is estimated that the layer of contaminated sediments reaches 4–7 ft in portions of the western arm of the Lagoon. Sediment will be removed beyond these depths to provide a safeguard that only clean sediment remains.

The TMDL study conducted by the LARWQCB is considered a separate yet complementary project in relationship to the proposed federal action and is expected to characterize the condition of the Lagoon and provide limitations on the discharge quantities for pollutants of concern into the Lagoon for future development projects.

Concentrations of existing pollutants have been evaluated in the western arm by collecting three vibracore samples. Results indicated that with the exception of elevated concentrations of lead in soil present in the western arm, no organochlorine pesticide, PCBs, or PAHs were detected above the State levels for hazardous waste.

3.9.1 Off-site Releases

According to the Environmental Data Resources, Inc. (EDR) Radius Map with GeoCheck® prepared by EDR on December 21, 2007, two leaking underground storage tank (LUST) sites were identified within 0.3 mi of the project limits. The first LUST, identified as Mobil #18-M1A, is located approximately 0.2 mi north-northwest of the western arm of the Lagoon. Based on records from a file review obtained at the LARWQCB, the Mobil #18-M1A site was issued underground storage tank (UST) case closure on September 4, 1996,[1] and requires no further action related to the UST release. In addition, based on information provided in the First Semi-Annual Groundwater Monitoring Report[2] and Well Abandonment Report Request Letter,[3] concentrations of benzene have been limited to the Mobil #18-M1A site and its immediate surrounding area. Therefore, it is unlikely that this site will pose a concern to groundwater within the project limits. The second LUST is identified as Southland Corp #25800 and is located approximately 0.28 mi northwest of the western arm of the Lagoon. A

1 Los Angeles Regional Water Quality Control Board, *Underground Storage Tank Case Closure – Mobil SS# 18-M1A*, September 4, 1996.
2 Kleinfelder, Inc., *First Semi-Annual Groundwater Monitoring Report Mobil Station 18-M1A*, August 1995.
3 Kleinfelder, Inc., *UST Case Closure Mobil Service Station #18-M1A Well Abandonment Report – Delivery Date Extension*, September 30, 1996.

gasoline release that was reported on April 21, 1986, reportedly affected both soil and groundwater at the Southland Corp #25800 site. The LARWQCB issued a site closure letter on August 2, 1996. Therefore, it is unlikely that this site will pose a concern to groundwater within the project limits.

3.10 HYDROLOGY AND WATER QUALITY

3.10.1 Regional Watershed

The project site is located in the San Gabriel River watershed. The watershed drains 689 square miles from Los Angeles, Orange, and San Bernardino Counties and is bounded by the San Gabriel Mountains to the north, a large portion of San Bernardino and Orange Counties to the east, the Los Angeles River watershed to the west, and the Pacific Ocean to the south. The San Gabriel River's headwaters originate in the San Gabriel Mountains, while the lower part of the river flows through a concrete-lined channel before becoming a soft-bottom channel near its termination at the Pacific Ocean. The project site is located within the Los Cerritos Channel and Alamitos Bay Water Management Area (WMA) of the San Gabriel River watershed. The WMA is located between the Los Angeles and San Gabriel Rivers and drains to the same general area as the San Gabriel River. The Los Cerritos Channel and Alamitos Bay comprise the main water bodies of the WMA.[1]

Alamitos Bay, located in the southeastern portion of the City near the Los Angeles County/ Orange County border, consists of Marine Stadium, a recreation facility used for boating, water skiing, and jet skiing; Long Beach Marina, which contains seven smaller basins for recreational craft and a boatyard; a variety of public and private berths; and the Bay proper, which includes several small canals, a bathing beach, and several popular clamming areas. Colorado Lagoon has a tidal connection with Alamitos Bay through an existing culvert that connects to Marine Stadium[2] (Figure 3.10-1).

[1] County of Los Angeles, Department of Public Works, San Gabriel River Watershed, http://dpw.lacounty.gov/wmd//sg/ accessed 01/30/07.

[2] Los Cerritos Channel and Alamitos Bay Watershed Management Area, December 2007.

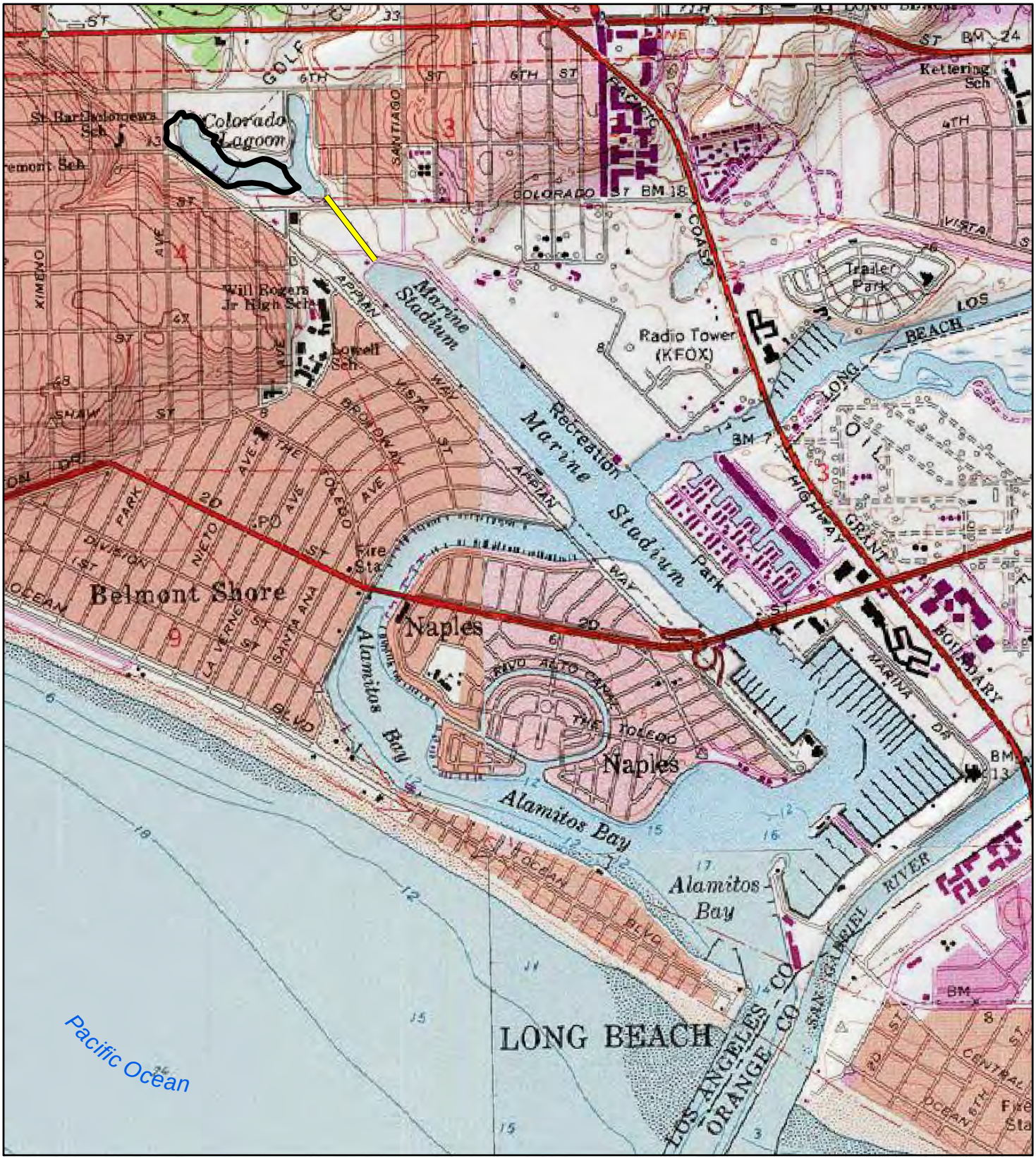

FIGURE 3.10-1

LEGEND

Project Boundary

Culvert

N

0 750 1500

FEET

Colorado Lagoon Estuary Restoration Project

Existing Lagoon-Bay Tidal Connection

SOURCE: USGS 7.5' QUAD - Long Beach ('81); CALIF.

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3.10.2 Local Watershed

The Lagoon is a relatively small tidal lagoon connected to Alamitos Bay and the Pacific Ocean through a tidal culvert to Marine Stadium. It serves three main functions: hosting sensitive habitat, providing public recreation, and retaining and conveying storm floods.[1]

The Lagoon watershed lies entirely within the boundaries of the City (Figure 3.10-2) and is identified as Basin 21 in the City of Long Beach Storm Water Management Plan. Basin 21 is 1,172 ac and consists of 773 ac of residential, 125 ac of commercial, 55 ac of institutional, and 219 ac of open space.[2] The watershed ranges in elevation from 125 feet above mean sea level (amsl) at the northwestern portion to sea level within the Lagoon.[3] The watershed is almost entirely built out; remaining open space includes the City Recreation Park Area, consisting of two golf courses and adjacent park areas, the Pacific Electric (PE) right-of-way (ROW) greenbelt, and to a lesser degree the picnic and park areas surrounding the Lagoon.[4]

3.10.3 Surface Water

Surface water runoff within the watershed occurs as overland runoff into curb inlets and catch basins, and as sheet flow near the shores of the Lagoon. There are four major storm drain systems in the project area that outfall into the Lagoon. There is one additional major system that outfalls into Marine Stadium. Currently, the County of Los Angeles Termino Avenue Drain Project (TADP) is under construction. This project will realign the Termino Avenue Drain (TAD) to discharge into Marine Stadium instead of into the Lagoon, as it does currently; the TADP would also include a low-flow diversion system to divert non-storm flows from the storm drain to an existing County sanitary sewer line. Therefore, with implementation of the TADP, three of the major storm drain systems would outfall into the Lagoon, and two major storm drain systems would outfall into Marine Stadium. Construction of the TADP began in October 2009 at Marine Stadium and is anticipated to be complete in approximately 26 months (November 2011).

Seven minor/local storm drains also discharge into the Lagoon. With implementation of the TADP, three minor/local storm drains would be redirected to discharge into Marine Stadium, leaving four minor/local storm drains discharging into the Lagoon.

The Lagoon watershed can be broken down into five subbasins (Figure 3.10-2). Each subbasin discharges to the Lagoon through the individual storm drainage systems. The subbasins are as follows:[5]

- **Subbasin A** discharges to the Lagoon via a 63-inch reinforced concrete pipe (Project 452 drain). This drain discharges into the northern tip of the west arm. This major storm drain

[1] Colorado Lagoon Restoration Feasibility Study Final Report, Moffatt & Nichol, February 4, 2005.
[2] Long Beach Stormwater Management Plan, August 2001.
[3] Colorado Lagoon Watershed Impacts Report/Restoration Feasibility Study, HDR and CGvL, July 30, 2004.
[4] Ibid.
[5] Colorado Lagoon Watershed Impacts Report/Restoration Feasibility Study, HDR and CGvL, July 30, 2004.

has the second highest flow discharging into the Lagoon. The drainage pattern is generally to the south and east. Subbasin A represents the highest concentration of commercial uses within the Lagoon watershed (Basin 21). There are currently three retail gasoline stations, seven automotive repair facilities, one car wash, and various restaurants concentrated mainly along Anaheim Street, Redondo Avenue, and to a lesser degree, 10th Street.

- **Subbasin B** discharges to the Lagoon via a 54-inch reinforced concrete pipe at the north part of the north arm (Line I). The drainage pattern is generally to the southwest. Subbasin B predominantly contains park/golf course open space uses with some residential uses in the northeast corner. However, oil well production, the most notable industrial use located in the Lagoon watershed, is located in this subbasin.
- **Subbasin C** discharges to the Lagoon via a 48-inch reinforced concrete pipe at the midpoint of the north arm (Line K). The drainage pattern is generally to the southwest. Subbasin C contains almost entirely residential uses, with a few commercial uses at the eastern boundary.
- **Subbasin D** discharges to the Lagoon via a 24-inch reinforced concrete pipe at the south part of the west arm. The drainage pattern is generally to the northeast. Subbasin C contains almost entirely residential uses, with some schools and other public facilities.
- **Subbasin E** discharges to the Lagoon via a 48-inch reinforced concrete pipe (TAD) at the west arm. The drainage pattern is generally to the southeast. Subbasin E contains a high concentration of commercial uses. There are currently four retail gasoline stations, three automotive repair facilities, one car wash, and various restaurants concentrated mainly along East 7th Street, Redondo Avenue, and to a lesser degree, 4th Street. Several other smaller storm drains serve the areas adjacent to the Lagoon. As stated above, this drain is currently proposed by the County of Los Angeles to be modified to no longer discharge into the Lagoon. The proposed alignment is assumed to be in place at the time of construction for the proposed federal action.

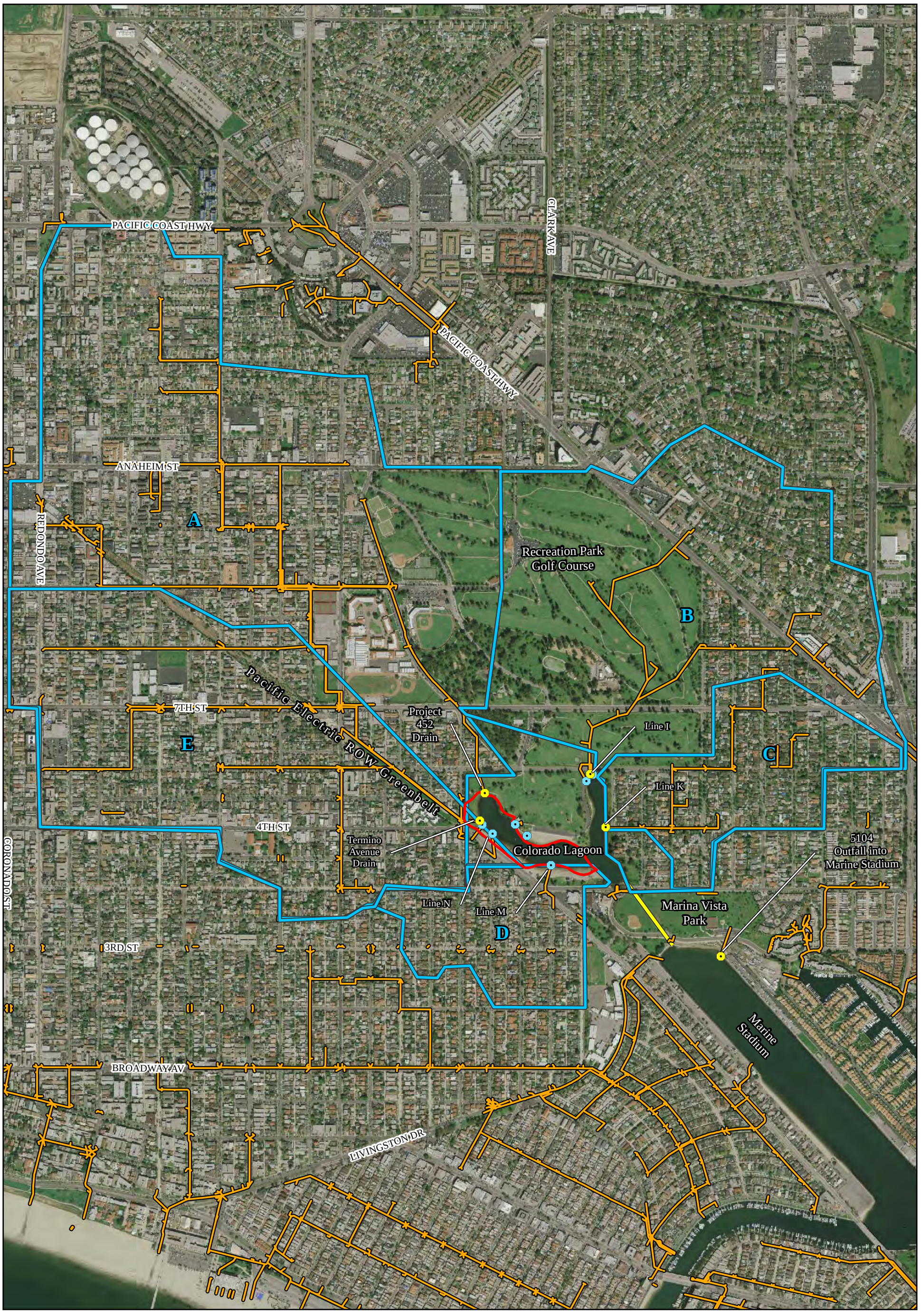

FIGURE 3.10-2

LEGEND

- Project Boundary
- Sub-basins
- Existing Storm Drain Pipelines
- Major System Outfall
- Local Drain
- Culvert

N

0 500 1,000

FEET

SOURCE: AirPhoto USA (2008); TBM (2007)

Colorado Lagoon Estuary Restoration Project

Colorado Lagoon Watershed and Sub-basins

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3.10.4 Tidal Culvert

The Lagoon is hydraulically connected to Marine Stadium through a culvert that allows tidal exchange between the two water bodies. The tidal culvert itself is a reinforced concrete box, which was designed with two distinctive cross-sections. From the Lagoon side, the tidal culvert has a design cross-section of 14 × 7 ft for a length of approximately 160 ft, then transitions to a design cross-section of 12 × 8 ft for approximately 700 ft.

3.10.5 Tides

Since there are no tide stations at Alamitos Bay, the nearest Los Angeles Outer Harbor gauge was used as the ocean boundary tidal condition, as shown in Table 3.10.1. The diurnal tide range is approximately 5.49 ft from mean lower low water (MLLW) to mean higher high water (MHHW), and mean sea level (MSL) is at +2.82 ft relative to MLLW.[1]

Seasonal variations in MSL can result in changes in tide levels of 0.5 ft in some areas, such as Los Angeles Outer Harbor. Superimposed on this cycle is a 4.4-year variation in the MSL that may increase the change in tidal levels by as much as 0.25 ft in Los Angeles Outer Harbor. Water level measurement data are typically analyzed over a tidal epoch[2] to account for these variations and obtain statistical water level information (e.g., MLLW and MHHW).[3]

Table 3.10.1: Recorded Water Levels at Los Angeles Outer Harbor (1983–2001 Tidal Epoch)

Description	Elevation (ft, MLLW)	Elevation (ft, NGVD29)
Extreme high water (1/27/83)	+7.82	+5.18
Mean higher high water (MHHW)	+5.49	+2.85
Mean high water (MHW)	+4.75	+2.11
Mean tidal level (MTL)	+2.85	0.21
Mean sea level (MSL)	+2.82	0.18
National Geodetic Vertical Datum 1929 (NGVD29)	+2.64	0.00
Mean low water (MLW)	+0.94	-1.70
Mean lower low water (MLLW)	0.00	-2.64
Extreme low water (12/17/33)	-2.73	-5.37

ft = feet
NGVD29 = National Geodetic Vertical Datum of 1929
Source: Tidal and Flood Hydraulics Study, Moffatt & Nichol, July 30, 2004.

1 Tidal and Flood Hydraulics Study, Moffatt & Nichol, July 30, 2004.
2 A tidal epoch is a periodic variation in the rise of water above sea level over a period of 19 years.
3 Tidal and Flood Hydraulics Study, Moffatt & Nichol, July 30, 2004.

3.10.6 Tidal Influence and Flushing

Numerical modeling of tidal and flood hydraulics was performed for the existing conditions of the Lagoon. The purpose of this modeling was to characterize the existing Lagoon hydraulics under both wet and dry weather conditions. The groundwater flow input into the Lagoon was not considered in the modeling since the groundwater level in the vicinity is lower than that in the Lagoon; therefore, the groundwater movement direction is from the Lagoon. Also, the groundwater movement compared to tidal exchange is negligible. Under the dry weather condition, the local storm drain inputs are not included in modeling, as the dry weather flow quantity is negligible compared to tidal exchange through the culvert. Under the dry weather condition, typically from May to October, the local storm drain inflow is negligible for the hydraulic regime. Tidal flows are the main driving force for the Lagoon circulation and water exchange. A 50-year storm event and an MHHW level at the ocean boundary were used in assessing flood flow impacts within the Lagoon because these conditions represent the worst-case scenario in terms of flood potential.[1]

The measured data indicate that the high tidal elevations in the Lagoon are close to the ocean tides; however, the time difference from the Lagoon reaching high tide levels is approximately 1 hour behind. The low tides are significantly muted by 1 ft during the neap[2] tidal cycle and 2–3 ft during the spring tidal cycle. The time difference from the Lagoon reaching high tide levels during spring tides is approximately 3 hours behind. Therefore, the water exchange between the Lagoon and Marine Stadium is reduced by 1–3 ft per tidal cycle compared to the full high tide range. Tidal muting and lag time in the Lagoon is an indication of circulation restriction.[3] The data also show that the tidal ranges were further reduced or muted because the tide gates are not currently able to open fully to their design capability due to degradation of the gates over the years.[4] As a result, tidal circulation and flushing is significantly reduced by the design and condition of the existing culvert.

The tidal prism (tidal volume exchanged in the Lagoon between spring high and low tides) is approximately 2.8 million cubic feet. This tidal prism essentially serves as the conveyor of relatively poorer-quality dry weather urban runoff and storm water from the Lagoon to Marine Stadium and the ocean. The residence time of the Lagoon water is approximately 8.5 days, while that for Marine Stadium is approximately 6.9 days under similar hydraulic conditions.[5] The tide range and phase in Marine Stadium are very similar to the ocean, indicating that Marine Stadium has much better tidal circulation. That is also evidenced by a visual comparison of the clarity of water in these two different water bodies. The water in

1 Ibid.
2 Neap tide is a period of lower than average tides. Spring tide is a period of higher than average tides. Both periods are based on the phases of the moon.
3 Tidal and Flood Hydraulics Study, Moffatt & Nichol, July 30, 2004.
4 Opportunities and Constraints Report – Colorado Lagoon Restoration Feasibility Study, Moffatt & Nichol, September 15, 2004.
5 Development and Evaluation of Restoration Alternatives – Colorado Lagoon Restoration Feasibility Report, Moffatt & Nichol, November 11, 2004.

Marine Stadium is clear and very similar to the ocean in appearance, while the Lagoon water is more turbid and less clear.[1]

Flooding. The Lagoon watershed has a history of flooding problems because the existing drainage facilities of this watershed are not sufficient to convey the flow for a 50-year flood event.[2] The peak-flow rate during a 50-year storm event from the watershed entering the Lagoon is 802 cubic feet per second (cfs) with a runoff volume of 252.6 acre-feet (af).[3] Under a combined condition of a severe storm flood and an ocean high tide with the culvert open, the peak water level in the Lagoon reaches 5.7 to 5.9 ft (relative to NGVD29 datum), the same elevation as the boundary of the Lagoon along a reach of approximately 200 ft near the intersection of East Colorado Street and East Eliot Street. The remaining Lagoon boundary varies from elevation 6.38 ft to approximately 8.0 ft (NGVD29). It takes a few days for the Lagoon water level to drop to within the normal tidal fluctuations.[4]

The County's TADP diverts a portion of the watershed area storm waters away from the Lagoon and directly into Marine Stadium. Based on information provided as part of the County's TADP, peak flow entering the Lagoon during a 50-year storm event would be decreased by approximately 391 cfs with a runoff volume decreased by 139.4 af as a result of implementation of the TADP. The TADP results in a significant reduction of water quantity entering the Lagoon during a 50-year storm event.[5] Therefore, implementation of the TADP provides enough freeboard to protect against flooding in the Lagoon during a 50-year storm event.

Pollutants of Concern. Several pollutants are commonly associated with urban storm water runoff, including sediment, nutrients, bacteria, oxygen-demanding substances, petroleum products, heavy metals, toxic chemicals, and floatables. Urban runoff pollutants and their impacts on water quality and aquatic habitat are described in more detail below.

- **Sediments.** Natural sediment loads are important to downstream environments by providing habitat, substrate, and nutrition; however, increased sediment loads can result in several negative effects to downstream environments. Excessive sediment can be detrimental to aquatic life by interfering with photosynthesis, respiration, growth, and reproduction. In addition, pollutants that adhere to sediment, such as nutrients, trace metals, and hydrocarbons, can have other harmful effects on the aquatic environment when they occur in elevated levels.

1 Tidal and Flood Hydraulics Study, Moffatt & Nichol, July 30, 2004.
2 Termino Avenue Drain Hydrologic and Water Quality Analyses Report, Everest International Consultants, Inc., February 2007.
3 Ibid.
4 Tidal and Flood Hydraulics Study, Moffatt & Nichol, July 30, 2004.
5 Termino Avenue Drain, Draft Environmental Impact Report, Hydrology and Water Quality Section, Edaw, Inc., February 2007.

- **Nutrients.** Nutrients are typically composed of phosphorus and/or nitrogen. Fertilizers are a main source of nitrogen and phosphorus in urban runoff. Other sources of phosphorus in runoff are lawn clippings and tree leaves that accumulate on streets and in gutters. Elevated levels in surface waters cause algal blooms and excessive vegetative growth. As nutrients are absorbed, the vegetative growth decomposes, utilizing oxygen in the process and reducing dissolved oxygen levels. Dissolved oxygen is critical for support of aquatic life.

  The ammonium form of nitrogen (found in wastewater discharges) converts to nitrite and nitrate in the presence of oxygen, which further reduces the dissolved oxygen levels in water.

  Kjeldahl-N is defined as the sum of organic nitrogen and ammonia nitrogen, and excludes nitrite and nitrate. Total inorganic nitrogen is comprised of ammonia and nitrate.

- **Heavy Metals.** Bioavailable forms of trace metals are toxic to aquatic life. The most common metals found in urban runoff are lead, zinc, and copper. Other trace metals, such as cadmium, chromium, and mercury are typically not detected or detected at very low levels in urban runoff. Sources of heavy metals in surface waters include emissions and deposits from automobiles, industrial wastewater, and common household chemicals. Heavy metals that impair the Lagoon include lead, cadmium, copper, mercury, zinc, and silver.

- **Organic Compounds.** Organic compounds are carbon-based and are found in pesticides, solvents, and hydrocarbons. Elevated levels can indirectly or directly constitute a hazard to life or health. During cleaning activities, these compounds can be washed off into storm drains. Dirt, grease, and grime may adsorb concentrations that are harmful or hazardous to aquatic life. Organic compounds that impair the Lagoon include PCBs.

- **Trash and Debris.** Trash and debris can have a significant effect on the recreational value of a water body and aquatic habitat. It also can interfere with aquatic life respiration and can be harmful or hazardous to aquatic animals that mistakenly ingest floating debris.

- **Oxygen-Demanding Substances.** Oxygen-demanding substances include plant debris (such as leaves and lawn clippings), animal wastes, and other organic matter. Microorganisms utilize dissolved oxygen during consumption of these substances, which reduces a water body's capacity to support aquatic life.

- **Petroleum Hydrocarbons.** Petroleum hydrocarbons include oil and grease, benzene, toluene, ethyl benzene, xylene (constituents in gasoline), and polyaromatic hydrocarbons. Sources of petroleum hydrocarbons include parking lots and roadways, leaking storage tanks, auto emissions, and improper disposal of waste oil. Some of these materials can be toxic to aquatic life at low concentrations.

- **Bacteria and Viruses.** Bacteria sampling and analysis are used to indicate relative levels of other pathogens such as viruses. Bacterial levels in urban runoff can exceed public health standards for water contact recreation. Bacteria levels in streams within natural

watersheds also can exceed standards for water contact recreation. A common source of bacteria is animal excrement, and other sources include soils and plant materials.

- **Pesticides.** A pesticide is a chemical agent designed to control pest organisms. Pesticides can persist in the environment and can bioaccumulate (concentrate within the body) over several years, resulting in health problems for the affected organism. Organochlorine pesticides that impair the Lagoon include DDT, chlordane, and dieldrin.
- **Selenium.** Selenium is a naturally occurring element that persists in soils and aquatic sediments and can bioaccumulate through the food chain at levels that can cause adverse effects on higher-level aquatic life and wildlife, including fish and birds that prey on fish and invertebrates. Selenium can become mobilized and concentrated by weathering and evaporation in the process of soil formation and alluvial fan deposition in arid and semiarid climates. Moreover, selenium may be leached from sediments as a result of irrigation practices, elevation of the groundwater table, or other modifications in the natural hydrologic regime.

3.10.7 Sediment Quality

The 2004 Sediment Testing and Disposal Report provided the first comprehensive examination of sediment accumulation and contamination in the Lagoon since it was originally developed. The primary objective of the study was to document the extent of sediment contamination in the Lagoon. Testing was conducted in the western arm. Three core samples were taken and composited to form a single sample.[1]

Additional sediment testing was conducted in 2009. The purpose of this study was to provide more detailed information on the horizontal and vertical extent of contamination in the central arm of the lagoon.[2] Lead and zinc were specifically tested but previous work has demonstrated that lead is a good indicator of other contaminants present in the project area.

California Code of Regulations Title 22 (Title 22) criteria were used to determine if any of the sediments sampled from the western arm of the Lagoon contained contaminants at concentrations that were high enough to be considered hazardous waste. Results indicate that none of the contaminants exceeded the total threshold limit concentrations (TTLC; hazardous waste identification). Lead, however, was present in the sample at concentrations that were high enough to require waste extraction tests (WET) to determine whether elutriate[3] levels exceed the soluble threshold limit concentration (STLC; California toxicity thresholds for lead). WET results indicated that elutriate concentrations from the western arm composite (11 milligrams per liter [mg/L]) exceeded the STLC of 5 mg/L. Results of this test indicate

[1] Colorado Lagoon: Sediment Testing and Material Disposal Report, Kinnetic Laboratories, Inc. and Moffat & Nichol, July 30, 2004.
[2] Sediment Survey of the Central Basin of Colorado Lagoon, Kinnetic Laboratories, Inc., April 2010..
[3] Material prepared from the sediment dilution water and used for chemical analyses and toxicity testing.

that sediments in the west arm of the Lagoon should be considered to be a Title 22 hazardous waste material if they were to be taken to a landfill.

The western arm contains high levels of lead as well as several organochlorine pesticides. Concentrations of total lead in the western arm sediment (409 milligrams per kilogram dry [mg/kg-dry]) exceed EPA Region IX Preliminary Remediation Goals for residential soils (400 mg/kg-dry). Based upon this criterion alone, reuse of the west arm sediment on site (for slope recontouring, for example) is not a feasible option. The use of remediation goals for residential soils is appropriate for this site because they are the most conservative factors (i.e., highest level of safety) for material reuse. DDT compounds, chlordane, and dieldrin show similar trends with effects range medium (ERM) exceedances for each of these compounds in the western arm. Concentrations of DDT compounds are 81 micrograms per kilogram dry (µg/kg-dry) in the western arm Chlordane concentrations were 105 µg/kg-dry in the west arm. Dieldrin, one of the compounds cited as causing impairment in tissues, was , where it was present in excess of three times the ERM. PCBs were detected, with concentrations just above the ERL.

In summary, the primary contaminants of concern (COCs) identified in the western arm of the Lagoon are lead and the three groups of organochlorine pesticides (DDT compounds, chlordane, and dieldrin). Secondary COCs include PCBs and a number of metals, including cadmium, copper, mercury, silver, and zinc.

Storm Drain Contaminants. As part of the City's storm water monitoring program, the Lagoon was selected as an appropriate area to conduct an initial pilot investigation designed to identify possible sources of COCs within the storm drain system. The investigation collected storm drain sediments from the three main storm drains near the western arm of the Lagoon. During the field investigation, it was discovered that all three of the major storm drain systems contributing runoff to the western arm of the Lagoon are interconnected at a number of locations in the upper portion of the watershed. The commingling of runoff in these three storm drain systems introduces some difficulty in assessing sources of sediment-associated contaminants.[1]

The major candidate sources of contaminants to the Lagoon were considered to be the three storm drain systems that discharge to the western arm of the Lagoon. Two of these storm drains follow a parallel pathway down the former PE ROW greenbelt before discharging through a common headwall into the Lagoon. Therefore, eroding soils from the former railroad ROW were also considered potential sources of contaminants and were included in the initial sampling effort. All initial sampling sites were located as close as possible to the

[1] Stormwater Monitoring Report 2006/2007 NPDES Permit No. CA00403 (CI 8052) City of Long Beach, Kinnetic Laboratories, Inc., July 2007.

Lagoon while at the same time avoiding areas too heavily influenced by the tide.[1] Areas heavily influenced by the tide have the potential to wash away soils in the storm drain.

The initial 2005 survey concluded that most COCs occurred in highest concentrations at a site sampled in the TAD line. The study also concluded that soils from the former PE ROW contained relatively low concentrations of persistent, bioaccumulative, and toxic (persistent bioaccumulative toxic [PBT]) compounds of concern. The only Section 303(d) list COC at this site was zinc. Silver was also present in similar concentrations, but this metal is not listed by the Regional Board as causing impairment.[2]

Sediments from TAD were found to have substantial levels of metals, primarily lead, copper, and zinc. Concentrations of lead in sediments from TAD were of major interest due to the fact that lead is a primary COC in sediments within the Lagoon and was found again at high levels in the 2005 storm drain investigation. DDT compounds were detected at all sites, with concentrations ranging from 9.9 to 160.7 nanograms per gram dry (ng/g-dry). Chlordane compounds were also detected at all sites. No other organochlorine pesticides were detected at any of the sites.[3]

Relatively low concentrations of persistent PBT compounds were present in sediments from the samples located in the upper portion of the watershed (areas north of 10th Street) that contributes flow to both TAD and Project 452 Drain. This suggests that upper portions of the watershed do not serve as significant sources of the primary COCs in the Lagoon. Sediment sampled from the TAD in 2005 and 2007 exhibited elevated levels of lead. Lead concentrations at the TAD were nearly five times those found in the contaminated sediments of the Lagoon. Concentrations of lead were over nine times those found in the Lagoon when all results were normalized to the fine-grained sediment. In addition, concentrations of copper, silver, zinc, DDT, and chlordane in storm drain sediments from throughout most of the watershed are typically one to three times the concentrations measured in sediments from the Lagoon. Concentrations of these contaminants in storm drain sediments indicate that sources of these contaminants are likely sufficient to maintain their current elevated levels in the Lagoon if measures are not taken to decrease sediment loads.[4]

3.10.8 Surface Water Quality

Since the Lagoon is a natural low point in the watershed, it accumulates pollutants deposited over the entire watershed that enter the storm drains by storm flows and dry weather runoff. Nonpoint sources found to be the major contributors to water pollution in the Lagoon are runoff from paved streets and parking lots, construction sites, soil erosion, pesticide/herbicide

1 Ibid.
2 Stormwater Monitoring Report 2006/2007 NPDES Permit No. CA00403 (CI 8052) City of Long Beach, Kinnetic Laboratories, Inc., July 2007.
3 Ibid.
4 Ibid.

application from the adjacent golf course, wash down at commercial sites, minor industrial operations such as oil well production, and atmospheric deposition of acidic and/or toxic air pollutants.[1]

Bacteria. The City of Long Beach Health Department conducts weekly sampling at three locations in the Lagoon as part of Assembly Bill 411 (AB 411) sampling requirements. (AB 411 established guidelines for ocean water quality in California. The law requires county health officials to test water at public beaches for harmful bacteria and notify the public when levels are too high. These and other bacterial surveys at California beaches only focus on bacteria that are believed to be "indicators" of pathogenic bacteria and viruses. Depending upon the source of the bacteria, these indicators may or may not provide an indication of a significant risk to people involved in water contact recreation.) All sites are located on the pedestrian bridge that crosses the western arm of the Lagoon. With the possible exception of AB 411 sampling requirements, there have not been any consistent sampling programs in the Lagoon to document the concentrations of contaminants in water, sediment, and biota. The City Health Department has been conducting weekly surveys of indicator bacteria since January 2001. Exceedances of AB 411 or Basin Plan criteria at this location are often attributable to high levels of total coliform (>10,000 most probable number [MPN]/100 milliliters [ml]) or a combination of total coliform (> 1,000 MPN/100 ml) and *E. coli* concentrations that exceed 10 percent of the total coliform.[2]

Total and fecal coliform and enterococcal bacteria are used to indicate the likelihood of pathogenic organisms, such as viruses, in surface waters. The levels of these bacteria have been correlated to the incidence of illness in swimmers. The presence of coliform bacteria indicates potential health risks to users of recreational waters, and specifically, enterococcus bacteria have been shown to cause health risks, including stomach flu and other infections. The amount of these indicator bacteria in Southern California waters may be dependent on season and has been linked with rainfall amounts. All three monitoring locations in the Lagoon have had several advisory warnings over the past two years, whereby bacteria levels have exceeded State Standards.[3]

3.10.9 Groundwater Hydrology

The County of Los Angeles overlies 15 groundwater basins, as established by the LARWQCB Water Quality Control Plan for the Los Angeles Region (1994). The project site is situated within the Los Angeles-San Gabriel Hydrologic Unit, which covers most areas of the County as well as some small areas of southeastern Ventura County. Within this hydrologic unit, the project site is located in the Coastal Plain of Los Angeles Groundwater

1 Colorado Lagoon Watershed Impacts Report/Restoration Feasibility Study, HDR and CGvL, July 30, 2004.
2 Colorado Lagoon: Water Quality Assessment Report, Kinnetic Laboratories, Inc. and Moffat & Nichol, August 2004.
3 City of Long Beach Health Department, Water Quality Program, Recreational Water Monitoring, http://www.longbeach.gov/health/bureau/eh/water/water_samples.asp, accessed 03/26/08.

Basin and overlies the West Coast Subbasin (Basin No. 4-11.03).[1] The West Coast Subbasin covers an area of 142 square miles and is bound by the Ballona Escarpment to the north, the Newport-Inglewood Fault Zone to the east, and the Pacific Ocean and Palos Verdes Hills to the south and west. Prior to discharge into San Pedro Bay, the Los Angeles and San Gabriel Rivers cross the subbasin through the Dominguez Gap and the Alamitos Gap, respectively. Groundwater recharge occurs primarily as a result of underflow from the Central Subbasin. Water spread in the Central Subbasin percolates into aquifers and eventually crosses through and over the Newport-Inglewood Fault Zone, supplementing the groundwater supply in the West Coast Subbasin. Additional recharge occurs from infiltration of surface inflow from the Los Angeles and San Gabriel Rivers and irrigation from fields, lawns, and industrial waters. The general regional groundwater flow pattern is southward and westward from the Central Coastal Plain, toward the ocean.[2]

Groundwater Quality. The character of water in the subbasin is variable. Seawater intrusion has produced deterioration of water quality over time. Early tests indicated that the water was sodium bicarbonate in character. It is questionable whether this is representative of the entire zone, because the higher quality water residing outside the subbasin is calcium bicarbonate in nature.[3] In the coastal region of this subbasin, the water is calcium chloride in character and then transitions into sodium bicarbonate further inland. Data from 45 public supply wells show an average total dissolved solids (TDS) content of 720 mg/L and a range of 170 to 5,510 mg/L.

1 California Department of Water Resources, Groundwater Bulletin 118, Coastal Plain of Los Angeles County Groundwater Basin, West Coast Subbasin, February 27, 2004.
2 Ibid.
3 California Department of Water Resources, Groundwater Bulletin 118, Coastal Plain of Los Angeles County Groundwater Basin, West Coast Subbasin, February 27, 2004.

4.0 ENVIRONMENTAL EFFECTS

4.1 PHYSICAL ENVIRONMENT

4.1.1 No Federal Action Alternative

The No Federal Action Alternative would avoid all short-term effects to geology and soils related to dredging activities. The No Federal Action Alternative would not remove contaminated sediment from the western arm of the Lagoon. Water and sediment quality would remain unchanged. Marsh habitat would not be created.

4.1.2 Alternative 1 (Mechanical Dredge and Truck Option Alternative)

Alternative 1 would result in the dredging of the western arm of the Lagoon using mechanical dredge/excavation equipment (barge-based clamshell/excavator or land-based excavator) and the trucking of the dredged material to the POLB Middle Harbor CDF.

The Western arm exhibits a smooth, shallow gradient contour. Substrate within the Western arm of the Lagoon is composed of a mixture of clay, silt, and sand. Though the ratio of clay and silt to sand varies throughout the dredge footprint, the substrate is primarily composed of clay and silt. It is estimated that the layer of contaminated sediment reaches 4 to 5 ft deep. Removal of sediment to a maximum depth of 6 feet plus one foot overdepth would ensure that only clean sediment remains. The dredge depth would be the deepest at the uppermost portion of the western arm and would gradually decrease toward the Central lagoon. Slopes on the perimeter of the Western arm would be recontoured to create a smooth transition from the Lagoon floor to the side slopes in order to create salt marsh habitat. Dredging and recontouring would not substantially change the sediment composition since the sediment would continue to be primarily composed of clay and silt. Immediately after construction the contour would change from a smooth, shallow gradient profile to a stepped profile. However, due to tidal action, the stepped profile is expected to smooth over time. In the long term, storm flows into the Lagoon would result in the buildup of fine sediment which would cause the Lagoon to become shallow.

The project site is not located within a currently designated Alquist-Priolo Earthquake Fault Zone, nor is it currently identified by the regulatory community as being located within zones of either primary or secondary co-seismic surface deformation (e.g., pressure ridges, escarpments, or fissures). Thus, the site is not expected to experience primary surface fault rupture or related ground deformation. According to the California Department of Conservation's Seismic Hazard Zones Map for the Long Beach quadrangle, the site is located within an area where liquefiable materials are mapped and/or where liquefaction has

occurred in the past. A potential result of soil liquefaction on site is lateral spreading, which is the differential movement of the ground surface due to open face excavations.

The project area is surrounded by developed areas, and site topography is relatively level; therefore, the possibility of a seismically induced landslide is remote. Additionally, the site is located near any known historical landslides. According to the California Department of Conservation's Seismic Hazard Zones Map for the Long Beach quadrangle, the project area does not fall within any earthquake-induced landslide zones. The soils testing on the project site indicate variation in pattern of stratification in the area. The soil sample core logs, however, do indicate that clays and sandy clays are abundant in this area, which indicate a potential for volume changes. However, because groundwater levels are approximately 5 ft bgs in the area, the soils are anticipated to remain relatively wet and are not anticipated to experience cycles of wetting and drying or volume changes, which would reduce the potential effects of the expansive soils on site.

Although the project site is located in a seismically-active area with several active earthquake faults in the region, Alternative 1 is not expected to result in an increased exposure of people or structures to potential adverse effects, including the risk of loss, injury, or death from the rupture of a known earthquake fault, strong seismic ground shaking, or seismic-related ground failure, including liquefaction. This alternative would not cause a landslide because placement of dredged material would be trucked to the POLB and distributed over a wide area.

4.1.3 Alternative 2 (Mechanical Dredge Equipment and Barge Alternative)

This alternative involves dredging activity using non-electric mechanical dredge/excavation equipment (barge-based clamshell or land-based excavator). Alternative 2 would result in similar impacts to Geology and Soils as Alternative 1. The difference in the type of dredging equipment that is utilized would not result in a difference in the nature or extent of impacts to this issue. Refer to Section 4.1.2 for a discussion of Alternative 1 effects associated with Geology and Soils.

4.1.4 Alternative 3 (Non-Electric Hydraulic Equipment and Barge Alternative)

This alternative would result in the dredging of the Lagoon using non-electric hydraulic dredge equipment. Dredged material would be piped through an underground culvert to either the Marine Stadium barge or a land-based treatment facility. Alternative 3 would result in similar impacts to Geology and Soils as Alternative 1. The difference in the type of dredging equipment that is utilized would not result in a difference in the nature or extent of impacts associated with this issue. Refer to Section 4.1.2 for a discussion of Alternative 1 effects associated with seismic hazards, underlying soil characteristics, slope stability, and erosion.

4.1.5 Alternative 4 (Dry Dredge and Barge Alternative)

Alternative 4 differs from the other alternatives, as it implements a dry dredge method rather than a wet dredge method. The dry dredge method would install a temporary cofferdam just west of the footbridge to isolate the west arm of the Lagoon for dredging. The dredge area would be drained of water, and the bottom sediment would be dewatered. An excavator would be used to remove the dry sediment, which would be temporarily stockpiled in the parking lot along the Lagoon's north shore and the southwest shore of the Lagoon.

Alternative 4 would result in similar impacts to Geology and Soils as Alternative 1. The difference between dredge methods (wet versus dry) would not result in a difference in the nature or extent of impacts to this issue. Refer to Section 4.1.2 for a discussion of Alternative 1 effects associated with Geology and Soils.

4.2 BIOLOGICAL RESOURCES

4.2.1 No Federal Action Alternative

This alternative would avoid all short-term adverse effects to biological resources related to dredging activities; however, it would not meet the purpose and need of the project. The No Federal Action Alternative would have a negative impact of not removing contaminated sediment from the Lagoon, and the environmental benefits to the project area would not be achieved. The water and sediment quality of the Lagoon would not be improved. The Lagoon would still be impaired and would not meet TMDLs established by the RWQCB. Marsh habitat would not be created.

4.2.2 Alternative 1 (Mechanical Dredge and Truck Option Alternative)

Alternative 1 would dredge the western arm of the Lagoon using mechanical dredge/excavation equipment (barge-based clamshell/excavator or land-based excavator) and truck the dredged material to the POLB. The dredged area would be isolated by a silt curtain, and closed "environmental" buckets would be used to maintain water quality. Clamshell/bucket-type dredging equipment would be used or temporary shore-perpendicular berms or piers would be built into the Lagoon to allow a land-based dredger to access depths not within reach from the Lagoon's shores. The dredged material would be temporarily stockpiled in the parking lot along the northern shore of the Lagoon until it is treated with cement and loaded onto trucks. Plastic tarps and containment structures would be placed under and around the stockpile areas to minimize runoff back into the Lagoon and surrounding areas.

The dredged material would be treated on site (at the Lagoon) through cement stabilization and solidification. The treatment process would most likely occur with a pug mill that would mix the dredged material with cement lime and/or other chemical reagents to stabilize the

sediments. Once the treatment is complete, the treated dredged material would be loaded onto trucks and transported to the POLB Middle Harbor CDF (an approximately 24-mile [mi] roundtrip truck trip from the Lagoon). The trucked material would be put into the CDF from dockside. The amount of dredged material is anticipated to be 28,000 yd^3.

Dredging would result in a temporary loss of subtidal benthic habitat. The benthic community, those species that are associated with the bottom including invertebrates such as worms, clams, and small arthropods as well as some fish, such as gobies, will be disturbed and many lost during construction and dredging. However, these species reproduce quickly, occur in large numbers and are well adapted to repopulate an area following disturbance. Recruits from other areas of the Lagoon will rapidly recolonize the benthic habitat after completion of sediment modifications. The community is expected to be colonized by a similar suite of species that is currently found in the area and construction will not result in a permanent loss. Creation of new marsh habitat would provide enhanced habitat for marine invertebrates and fish.

Historically eelgrass has existed in the Colorado Lagoon, but has not been found in recent surveys. Improvements to sediment and water quality resulting from this project may make conditions in the Lagoon favorable for eelgrass. Eelgrass beds do exist in the Marine Stadium, which may supply seeds and or individual grass shoots that could enter the Lagoon and restore past eelgrass beds.

Threatened and Endangered Species. The California least tern is known to use the project area. The California least tern is listed as State and federally endangered. This species is not expected to be affected under Alternative 1 since the Lagoon is a poor quality foraging site, are only rarely seen at the site, and higher quality foraging sites are available short distances up or down the coast.

Fish and Essential Fish Habitat (EFH). Alternative 1 would improve water quality by removing contaminated sediments. This would benefit all the marine biota, including any and all federally managed species, in the project area. The project area has not been identified as principle spawning habitat for any of the applicable species (previously referenced Table 3.2.2), but larval forms of several species do occur in the project area in varying densities. Juveniles and adults may be affected during the construction activities. Additional potential temporary impacts will derive from loss of infaunal/epifaunal prey items when sediments are removed. It is assumed these prey items will recolonize the area. The general increase in water quality and sediment quality resulting from most activities will potentially result in long-term benefits to all FMP species in the area.

There is a potential for temporary adverse impacts on FMP species due to turbidity limited to the project area with the deployment of a silt curtain. There is additional potential for temporary impacts due to loss of infaunal prey items with sediment removal. It is anticipated that prey would recolonize area. Long-term benefits would potentially be realized from

reduced sediment contaminant levels. Creation of new marsh habitat would provide enhanced habitat for marine invertebrates and fish.

As part of the Section 404 Clean Water Act permitting process, the Regulatory Division of the Corps initiated EFH consultation pursuant to the Magnuson-Stevens Fishery Conservation and Management Act with the NOAA on September 22, 2009. The consultation included evaluation of dredging from the central and western arms of the Lagoon. In a letter dated November 25, 2009, the NOAA concluded that mitigation measures MM BIO-1 through BIO-5 on pages 15–16 of the Marine Resources Report prepared for the project should adequately address many of the adverse impacts to EFH.

Water quality impacts to EFH of the western arm of the Lagoon as a result of construction activities would be temporary. Implementation of this Alternative would result in an enhancement of water quality and an increase in area of open water available to managed fisheries species. Environmental Commitments are provided in Section 8.1.

Based on the biological resource analysis discussed above, the Corps has concluded that Alternative 1 would not have a significant impact on biological resources.

4.2.3 Alternative 2 (Mechanical Dredge Equipment and Barge Alternative)

This alternative involves dredging activity using non-electric mechanical dredge/excavation equipment (barge-based clamshell or land-based excavator). The dredged area would be isolated by a silt curtain, and closed "environmental" buckets would be used to maintain water quality. The dredged material would be treated on site through cement stabilization and solidification or similar process. Similar to Alternative 1, the treatment process would occur using a pug mill to mix the dredged material with cement/reagent at an up to 20 percent mixture ratio.

Alternative 2 differs from Alternative 1 in the mode of transport to the POLB Middle Harbor CDF. For Alternative 2, once the treatment process is complete, the treated dredged material would be loaded onto trucks and transported to Marine Stadium (an approximately 2 mi roundtrip truck trip from the Lagoon). The treated dredged material would be transferred from the trucks onto a barge/scow located at Marine Stadium. From there, the barge would transport treated dredged material to the POLB Middle Harbor CDF (an approximately 20 mi roundtrip barge trip from Marine Stadium).

Alternative 2 would result in similar impacts to biological resources as Alternative 1. The difference in the type of dredging equipment that is utilized would not result in a difference in the nature or extent of impacts to these resources. Refer to Section 4.2.2 for a discussion of Alternative 1 effects to biological resources. Environmental Commitments are provided in Section 8.1.

Based on the biological resource analysis discussed above, the Corps has concluded that Alternative 2 would not have a significant impact on biological resources.

4.2.4 Alternative 3 (Non-Electric Hydraulic Equipment and Barge Alternative)

This alternative would result in the dredging of the western arm of the Lagoon using non-electric hydraulic dredge equipment. Dredged material would be piped through an underground culvert to either the Marine Stadium barge or a land-based treatment facility. It is anticipated that the piping of the dredged material would require the use of a diesel-fueled booster pump and that the pug mill operation would be powered with a diesel-fueled generator. Once the piped dredged material reaches the Marine Stadium barge or land-based treatment facility, the dredged material would be dewatered. This process may include a flocculation process, where a chemical reagent (e.g., coagulants or flocculants) is added to the dredged material and causes the separation of sediment and water to occur. Water resulting from the dewatering process would be treated prior to discharge into the Marine Stadium/Colorado Lagoon. Sediment resulting from the dewatering process would be treated through cement stabilization or similar process and loaded onto a barge located at the northwest end of Marine Stadium. From there, the barge would transport treated dredged material to the POLB Middle Harbor CDF (an approximately 20 mi roundtrip barge trip from Marine Stadium to POLB).

Alternative 3 would result in similar impacts to biological resources as Alternative 1. The difference in the type of dredging equipment that is utilized would not result in a difference in the nature or extent of impacts to these resources. Refer to in Section 4.2.2 for a discussion of Alternative 1 effects to biological resources. Environmental Commitments are provided in Section 8.1.

Based on the biological resource analysis discussed above, the Corps has concluded that Alternative 3 would not have a significant impact on biological resources.

4.2.5 Alternative 4 (Dry Dredge and Barge Alternative)

Alternative 4 differs from the other alternatives, as it implements a dry dredge method rather than a wet dredge method. The dry dredge method would install a temporary cofferdam just west of the footbridge to isolate the west arm of the Lagoon for dredging. The dredged area would be drained of water, and the bottom sediment would be dewatered. An excavator would be used to remove the dry sediment, which would be temporarily stockpiled in the parking lot along the Lagoon's north shore and the southwest shore of the Lagoon. Plastic tarps and containment structures would be placed under and around the stockpile area to minimize runoff back into the Lagoon and surrounding areas. The dredged material would be treated on site through the cement stabilization or similar process. Once the treatment process is complete, the treated dredged material would be loaded onto trucks and trucked to Marine

Stadium where it would be transferred from the trucks onto a barge/scow located at the northwest end of Marine Stadium and transported to the POLB Middle Harbor CDF.

While dry excavation may result in a larger initial loss of benthic biota based on area affected, benthic biota will also recover following inundation by seawater. These species reproduce quickly, occur in large numbers and are well adapted to repopulate an area following disturbance. Recruits from other areas of the Lagoon will rapidly recolonize the benthic habitat after completion of sediment modifications. The community is expected to be colonized by a similar suite of species that is currently found in the area and construction will not result in a permanent loss.

There is a potential temporary impact on FMP species due to loss of water flow and dehydration after arm is pumped dry. Additional temporary impacts may occur due to loss of infaunal prey items with sediment removal. It is anticipated that prey would recolonize area after the area is reflooded. Long-term benefits would potentially be realized from reduced contaminant levels.

Alternative 4 would result in similar impacts to biological resources as Alternative 1. The difference between dredge methods (wet versus dry) would not result in a difference in the nature or extent of impacts to these resources. Refer to Section 4.2.2 for a discussion of Alternative 1 effects to biological resources. Environmental Commitments are provided in Section 8.1.

Based on the biological resource analysis discussed above, the Corps has concluded that Alternative 4 would not have a significant impact on biological resources.

4.3 TRAFFIC

4.3.1 No Federal Action Alternative

This alternative would avoid all short-term adverse effects to traffic related to dredging and disposal activities. However, this alternative would not meet the purpose and need of the project. The No Federal Action Alternative would have a negative impact of not removing contaminated sediment from the Lagoon, and the environmental benefits to the project area would not be achieved. The water and sediment quality of the Lagoon and habitat areas in and around the Lagoon would not be improved. There are no new sources of traffic with implementation of this alternative.

4.3.2 Alternative 1 (Mechanical Dredge and Truck Option Alternative)

Under this alternative, there would be vehicle trips associated with trucking the cement/reagent to the north shore parking lot for the treatment process, trips associated with the transport of treated dredged material from the Lagoon to the POLB Middle Harbor CDF,

and construction worker trips. As identified in the EIR for the Colorado Lagoon Restoration Project, during Phase 1 (which includes the dredging of the western arm of the Lagoon), approximately 10 construction workers will be on site per day. These workers will add 20 daily passenger car trips (10 inbound in the morning and 10 outbound in the evening). Worker commute trips will not add a.m. peak-hour trips to construction traffic because the workers will arrive on site before the 7:00 a.m.–9:00 a.m. peak period. However, worker commute trips will add p.m. peak-hour trips because the workers will depart between 5:30 and 6:00 p.m. Other trips associated with cement importation and the trucking of treated dredged material are anticipated to occur throughout the day. Table 4.3.1 provides a summary of trip generation that is associated with Alternative 1.

Table 4.3.1: Alternative 1 Construction Trips by Component

Dredging Activity Components	Trips
Delivery of cement/reagent for sediment treatment process	325 truck trips
Removal of dredged material from the Lagoon to Port of Long Beach disposal site	1,950 truck trips
Construction worker trips	1,600 car trips

Note: This table represents the total number of trips that would occur during all the dredging activities.

Trucks containing the treated dredged material and headed for the POLB Middle Harbor CDF would travel east on East 7th Street, north on I-405, and then south on I-710. Figure 4.3-1 illustrates the haul routes.

As identified in the overall environmental documentation for the Colorado Lagoon Restoration Project, Phase 1 construction activity (which includes the dredging activities) is anticipated to add approximately 90 daily passenger car equivalent (PCE) trips, 28 a.m. peak-hour PCE trips, and 30 p.m. peak-hour PCE trips. All of the truck trips would travel on East 7th Street.

As described in Section 3.0, East 7th Street is a four-lane roadway with an hourly capacity of 6,400 vehicles and an existing LOS of F in the a.m. and p.m. peak hours at the intersection of East 7th Street and PCH. The addition of up to 28 p.m. peak-hour, construction-related, short-term trips would add less than 0.5 percent of the capacity of the roadway during the peak hour. In addition, most truck trips would occur during the day, when ambient traffic is less. Therefore, dredging activities would not cause an increase in traffic that is substantial in relation to the existing traffic load of the street system. In addition, construction traffic effects are temporary during the period of construction, and the number of construction workers and truck trips would vary depending on the specific construction activities. However, because the intersection of East 7th Street and PCH has an existing LOS of F in the a.m. and p.m. peak hours (which is below the City's established threshold of LOS D as the minimum operating level for roadway segments and intersections) and is located in the project vicinity and along the haul route, additional measures in the Environmental Commitments provided in Section 8.2, which require implementation of a Construction Traffic Management Plan, and

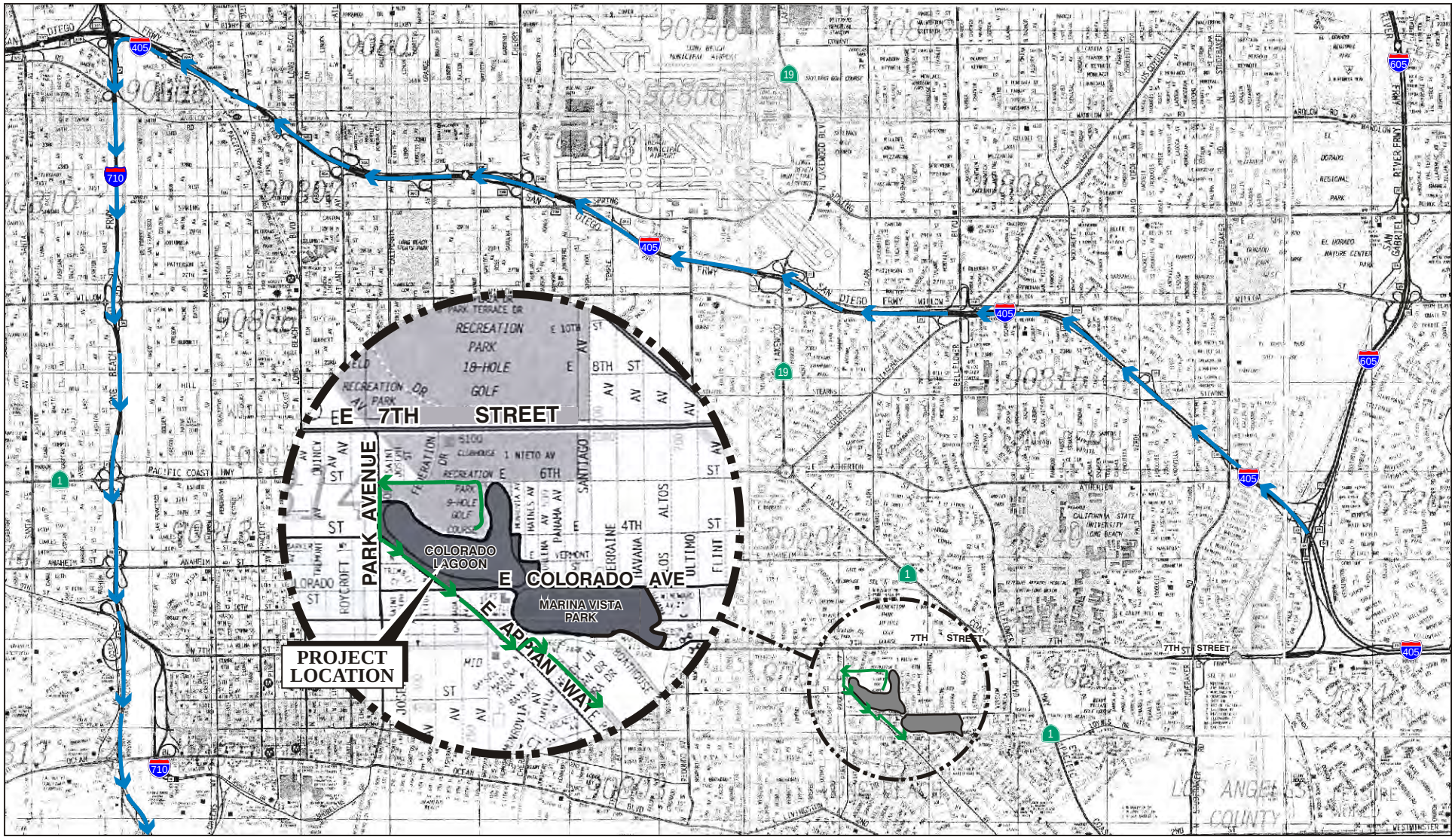

FIGURE 4.3-1

SOURCE: Thomas Guide, 2007

Colorado Lagoon Estuary Restoration Project

Construction Haul Routes

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timing considerations for dredged haul trips have been included to reduce the impact of construction traffic on the local circulation system.

Based on the traffic analysis discussed above, the Corps has concluded that Alternative 1 would not have a significant adverse impact on traffic.

4.3.3 Alternative 2 (Mechanical Dredge Equipment and Barge Alternative)

Trips associated with this alternative would come from trucking cement/reagent onto the site for the treatment process, the trips associated with trucks transporting treated dredged material to Marine Stadium, barge trips of treated dredged material from Marine Stadium to the POLB Middle Harbor CDF, and construction worker trips. Table 4.3.2 provides a trip summary associated with this alternative.

Table 4.3.2: Alternative 2 Construction Trips by Component

Dredging Activity Components	Trips
Delivery of cement/reagent for sediment treatment process	325 truck trips
Removal of dredged material from the Lagoon to Marine Stadium	1,950 truck trips
Barge transport of treated dredged material from Marine Stadium to Port of Long Beach disposal site	35 barge trips
Construction worker trips	1,600 car trips

Note: This table represents the total number of trips that would occur during all the dredging activities.

It is expected that the barge dock would be located on the northwest side of Marine Stadium, with an anticipated route from the Lagoon to the barge dock as follows: from the Colorado Lagoon access road, left on 6th Street, left on Park Avenue, left on Appian Way, left on Nieto, and right onto the Marine Stadium access road.

The dredging activities would not cause an increase in traffic that is substantial in relation to the existing traffic load of the street system. Also, while Alternative 2 would result in the same number of haul trips for treated dredged material, the trips would be substantially shorter in length (2 mi rather than 12 mi) because the destination would be Marine Stadium rather than the POLB. In addition, construction traffic effects are temporary during the period of construction, and the number of construction workers and truck trips would vary depending on specific construction activities. However, because the intersection of East 7th Street and PCH has an existing LOS of F in the a.m. and p.m. peak hours (which is below the City's established threshold of LOS D as the minimum operating level for roadway segments and intersections) and is located in the project vicinity and along the material and equipment delivery route, additional measures in the Environmental Commitments provided in Section 8.2, which require implementation of a Construction Traffic Management Plan, have been included to reduce the impact of construction traffic on the local circulation system.

Based on the traffic analysis discussed above, the Corps has concluded that the Alternative 2 would not have a significant adverse impact on traffic.

4.3.4 Alternative 3 (Non-Electric Hydraulic Equipment and Barge Alternative)

Under this alternative, dredged material would be piped to Marine Stadium to be treated and loaded directly onto the Marine Stadium barge. Therefore, trips associated this alternative would be limited to truck trips to transport cement/reagent to the site for the treatment process, barge trips of treated dredged material from Marine Stadium to the POLB Middle Harbor CDF, and construction worker trips. Table 4.3.3 provides a trip summary associated with this alternative.

Table 4.3.3: Alternative 3 Construction Trips by Component

Dredging Activity Components	Trips
Delivery of cement/reagent for sediment treatment process	325 truck trips
Barge transport of treated dredged material from Marine Stadium to Port of Long Beach disposal site	35 barge trips
Construction worker trips	1,600 car trips

Note: This table represents the total number of trips that would occur during all the dredging activities.

The temporary increase in local traffic due to construction worker commutes, including hauls and construction equipment truck traffic to and from the site, would not add substantially to existing traffic in the project area. However, because the intersection of East 7th Street and PCH has an existing LOS of F in the a.m. and p.m. peak hours (which is below the City's established threshold of LOS D as the minimum operating level for roadway segments and intersections) and is located in the project vicinity and along the haul route, additional measures in the Environmental Commitments provided in Section 8.2, which require implementation of a Construction Traffic Management Plan, and timing considerations for dredged haul trips have been included to reduce the impact of construction traffic on the local circulation system.

Based on the traffic analysis discussed above, the Corps has concluded that Alternative 3 would not have a significant adverse impact on traffic.

4.3.5 Alternative 4 (Dry Dredge and Barge Alternative)

Trips associated this alternative would come from the transport of cement/reagent to the site for the treatment process, the trips associated with the haul of treated dredged material to Marine Stadium, barge trips of treated dredged material from Marine Stadium to the POLB Middle Harbor CDF, and construction worker trips. Table 4.3.4 provides a trip summary associated with this alternative.

Table 4.3.4: Alternative 4 Construction Trips by Component

Dredging Activity Components	Trips
Delivery of cement/reagent for sediment treatment process	325 truck trips
Removal of dredged material from the Lagoon to Marine Stadium	1,950 truck trips
Barge transport of treated dredged material from Marine Stadium to Port of Long Beach disposal site	35 barge trips
Construction worker trips	1,600 car trips

Note: This table represents the total number of trips that would occur during all the dredging activities.

As identified in the overall environmental documentation for the Colorado Lagoon Restoration Project, Phase 1 construction activity (which includes the dredging activities within the western arm) is anticipated to add approximately 90 daily PCE trips, 28 a.m. peak-hour PCE trips, and 30 p.m. peak-hour PCE trips. All of the truck trips would travel on East 7th Street.

The addition of up to 28 a.m. peak-hour, construction-related, short-term trips would add less than 0.5 percent of the capacity of the roadway during the peak hour. In addition, most truck trips would occur during the day, when ambient traffic is less. Therefore, dredging activities would not cause an increase in traffic that is substantial in relation to the existing traffic load of the street system. However, because the intersection of East 7th Street and PCH has an existing LOS of F in the a.m. and p.m. peak hours (which is below the City's established threshold of LOS D as the minimum operating level for roadway segments and intersections) and is located in the project vicinity and along the haul route, additional measures in the Environmental Commitments provided in Section 8.2, which require implementation of a Construction Traffic Management Plan, and timing considerations for haul trips of dredged material have been included to reduce the impact of construction traffic on the local circulation system.

Based on the traffic analysis discussed above, the Corps has concluded that Alternative 4 would not have a significant adverse impact on traffic.

4.4 AIR QUALITY

.Air quality impacts under any of the alternatives would be significant if emissions (including mobile and stationary sources) permanently exceed the following federal emission criteria pollutant thresholds:

Pollutant	SCAB Attainment Status Designations	De Minimis Emission Rate tons per year (tpy)
Nitrogen Dioxide	Attainment/Maintenance	100
Ozone (ROG or NO_x)	Nonattainment/Extreme	10
Carbon Monoxide	Attainment/Maintenance	100
Particulate Matter PM_{10}	Nonattainment/Serious	70
Particulate Matter $PM_{2.5}$ (and each precursor) [b]	Nonattainment	100

The region in which the project is located had until recently been classified as a "severe" nonattainment area for the eight-hour O_3 NAAQS, which carries a 25 tpy de minimis emission rate for NO_x and VOC. However, SCAQMD recently requested re-classification (bump up) to "extreme" nonattainment for the eight-hour O_3 NAAQS in the 2007 AQMP, and EPA approved the bump up which was effective June 4, 2010. The "extreme" nonattainment classification for O_3 carries a 10 tpy de minimis emission rate for NO_x and VOC

Air quality impacts under any of the alternatives would also be significant if emissions (including mobile and stationary sources) permanently exceed any of the following SCAQMD thresholds:

- 70 pounds per day (lbs/day) of ROG;
- 100 lbs/day of NO_x;
- 550 lbs/day of CO;
- 150 lbs/day of SO_x;
- 150 lbs/day of PM_{10}; an d/or
- 55 lbs/day of $PM_{2.5}$.

The draft EA of October 2010 analyzed air quality impacts associated with the dredging, treatment, transportation, and disposal of approximately 32,500 yd³ of sediment. Though this final EA evaluates environmental impacts for approximately 28,000 yd³ of sediment, the air quality analysis below is based on the original estimate of 32,500 yd³. Because the original evaluation did not conclude significant impacts to the air quality, the original conclusion would still remain valid for the reduced volume of 28,000 yd³ since air quality impacts associated with the reduced volume are expected to be less.

4.4.1 No Federal Action Alternative

This alternative would avoid all short-term adverse effects to air quality related to dredging activities; however, it would not meet the purpose and need of the project. The No Federal Action Alternative would have a negative impact of not removing contaminated sediment from the Lagoon, and the environmental benefits to the project area would not be achieved. The water and sediment quality of the Lagoon would not be improved. There would be no new sources of air emissions with implementation of this alternative.

Table 4.4.1 lists the equipment that would be utilized for dredging activities. The other equipment on site (bulldozers, loaders, etc.) would be diesel fueled.

Table 4.4.1: Proposed Dredging Equipment

Type of Equipment	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Barge-based excavator or clamshell dredge[1]	✓	✓		✓
Non-electric hydraulic dredge			✓	
Dredge pipeline booster pump (diesel-fueled)			✓	
Bulldozer	✓	✓	✓	✓
Small Track Loader	✓	✓	✓	✓
Excavator	✓	✓	✓	✓
Front-end Loader	✓	✓	✓	✓
Grader	✓	✓	✓	✓
Small Crane	✓	✓	✓	✓
Dewater Equipment/Pumps				✓
Pug mill	✓	✓	✓	✓
Conveyor				
Generator (diesel-fueled)	✓	✓	✓	✓
Barge		✓	✓	✓
Tugboat		✓	✓	✓
End-Dump Trucks	✓	✓		✓
Cement/Reagent Delivery Trucks	✓	✓	✓	✓

[1] Electric dredge equipment will be utilized if feasible.

4.4.2 Alternative 1 (Mechanical Dredge and Truck Option Alternative)

The proposed dredging activities under Alternative 1 would generate air pollutant emissions from heavy equipment and from vehicles used to transport dredged material from the Lagoon to the POLB. Dredging activities under Alternative 1 would require the use of equipment identified in Table 4.4.1. Dredge equipment could be electrically powered, in which case it would not result in on-site emissions. However, because the City and the Corps have been

unable to confirm the feasible availability of electric dredge equipment, diesel-powered dredge is assumed for purposes of air pollutant emission calculations and conformity determination. Table 4.4.2 provides a summary of emissions generated from the use of equipment, transport of concrete and dredged material, and construction worker commutes.

Table 4.4.2: Alternative 1 Dredging Activity Emissions

Type of Equipment[1]	Pollutants of Concern						
	CO	**ROG**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
2 Loaders	5.0	1.0	5.1	0.0	0.8	0.7	1,068.9
1 Generator	2.5	0.5	5.8	0.0	0.5	0.4	322.0
1 Dozer	4.1	0.7	14.9	0.0	0.6	0.6	956.4
1 Grader	2.0	0.5	8.2	0.0	0.5	0.5	1,061.9
1 Crane	0.8	0.2	4.6	0.0	0.2	0.1	257.3
1 Pug Mill	1.1	0.4	7.4	0.0	0.4	0.3	1,088.0
1 Clamshell Dredge	8.0	1.4	29.2	0.0	1.3	1.2	1,872.0
Haul Trucks[2]	9.4	1.4	17.6	0.0	0.6	0.6	2,490.6
Worker Commute[3]	3.3	0.1	0.4	0.0	0.0	0.0	514.4
Total (lbs/day)	**36.2**	**6.3**	**93.1**	**0.1**	**4.8**	**4.4**	**9,631.6**
SCAQMD Threshold (lbs/day)	550	75	100	150	150	55	N/A
Exceeds SCAQMD thresholds?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Alternative Total (tons)	**1.8**	**0.3**	**4.7**	**0.0**	**0.2**	**0.2**	**481.6**
De Minimus Thresholds (tons/year)	100	10	10	100	70	100	N/A
Exceeds *De Minimus* thresholds?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

[1] All off-road construction equipment is modeled using Tier 1 emission rates.
[2] Assumes that a total of 30 truck trips at 24 miles would be required per day.
[3] Assumes that a total of 20 trips at 40 miles would be required per day.

CO = carbon monoxide
CO_2 = carbon dioxide
lbs/day = pounds per day
NO_x = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
ROC = reactive organic compounds
SO_x = sulfur oxides

An action is presumed to conform and is exempt from a conformity determination if analysis shows that the total net direct and indirect emissions from the proposed federal action would be less than the applicable *De Minimis* thresholds. Dredging to remove contaminated sediment from the Lagoon would result in emissions from the operation of equipment, the delivery of materials and equipment, removal of dredged material from the site, and construction worker commutes. The emissions from these sources represent the total net direct and indirect emissions under this alternative. As shown in Table 4.4.2, the emissions levels for this alternative are less than the applicable *De Minimis* thresholds.

These daily source emission budgets were annualized (daily budget × 365) and compared to the annual emission generated by the project alternatives. The project-related emissions are

substantially less than 10 percent of the area emissions budget (less than 0.01%) and therefore are not considered to be regionally significant.

Table 4.4.3: Area Air Pollutant Emission Budget (tons Per Day)

Source Category	TOG	VOC	CO	NO_X	SO_X	TSP	PM_{10}
Heavy Duty Diesel Trucks	17.62	17.12	180.60	153.08	12.49	7.96	6.68
Commercial Boats	0.51	0.49	2.00	10.22	1.71	0.19	0.18
Mobile Equipment	46.77	45.07	918.49	119.16	3.53	8.85	8.50
Total Applicable Source Categories	64.90	62.68	1,101.09	282.46	17.73	17.00	15.36

CO = carbon monoxide
NO_X = nitrogen oxide
PM_{10} = particulate matter less than 10 microns in diameter
SO_X = sulfur oxide
TOG = total organic gases
TSP = total suspended solids
VOC = volatile organic compound
Source: 1997 AQMP

Emissions from the dredge and other support equipment would result in minimal air quality impacts that are temporary and short-term during dredging activity. Air quality would return to pre-project conditions following completion of dredging. Therefore, the Corps has concluded that the air quality impacts generated under Alternative 1 would be temporary, short-term, and minimal, and would not have a significant adverse effect on air quality.

The Corps has concluded that the air conformity analyses described above, and the Environmental Commitments provided in Section 8.3 of this report adequately address impacts from the diesel operated dredge and supporting equipment during the proposed dredging of the western arm of the Lagoon.

Heavy-duty equipment in the project area during construction would emit odors. These odors would be limited to the time that the equipment is operating during the period for Alternative 1. Environmental Commitments provided in Section 8.3 of this EA reduce impacts associated with objectionable odors from the operation of diesel-powered construction equipment.

The dredged material may be spread out on site to dry before being treated and hauled off site. It is anticipated that the dredged sediment will contain organic materials and that decomposition of the organic matter when exposed to air may generate unpleasant odors. The decaying marine vegetation that was not previously exposed may create unpleasant odors. Therefore, the dredged material may result in odor impacts at the adjacent and nearby sensitive land uses.

Alternative 1 would result in approximately 482 tons (or 437 metric tons) of carbon dioxide (CO_2) emissions during dredging activities. CO_2 is a greenhouse gas (GHG) that is considered to contribute to global climate change (GCC). GCC describes alterations in

weather features (e.g., temperature, wind patterns, precipitation, and storms) that occur across the Earth as a whole. GCC and GHG emissions are an emerging environmental concern being raised on statewide, national, and global levels.

Based on the air quality analysis discussed above, the Corps has concluded that Alternative 1 would not have a significant adverse impact on air quality. The total emissions of each criterion pollutant under Alternative 1 meets or is below the SCAQMD thresholds and *De Minimus* levels identified for federal criteria pollutant thresholds. Therefore, Alternative 1 conforms to the CAA as amended (1990).

4.4.3 Alternative 2 (Mechanical Dredge Equipment and Barge Alternative)

The proposed dredging activities under Alternative 2 would generate air pollutant emissions from dredging, other heavy equipment, barges, ancillary vessels, and vehicles used to transport dredged material from the Lagoon to the POLB. Dredging activities under Alternative 2 would require the use of equipment identified in previously referenced Table 4.4.1. Table 4.4.4 summarizes emissions generated from the use of equipment transport of concrete and dredged material and from construction worker commutes.

Table 4.4.4: Alternative 2 Dredging Activity Emissions

Type of Equipment[1]	Pollutants of Concern						
	CO	**ROG**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
2 Loaders	5.0	0.7	4.2	0.0	0.4	0.4	1,068.9
1 Generator	2.5	0.4	4.9	0.0	0.2	0.2	322.0
1 Dozer	3.4	0.5	10.7	0.0	0.4	0.4	956.4
1 Grader	2.0	0.5	5.9	0.0	0.3	0.3	1,061.9
1 Crane	0.6	0.1	3.3	0.0	0.1	0.1	257.3
1 Pug Mill	1.1	0.4	5.4	0.0	0.2	0.2	1,088.0
1 Clamshell Dredge	6.6	0.9	21.1	0.0	0.8	0.8	1,872.0
1 Tug Boat[2]	7.6	1.7	40.6	0.6	1.3	1.2	1,743.1
1 gas skiff	75.3	33.0	0.0	0.0	0.3	0.3	60.6
Haul Trucks (Cement)[3]	1.3	0.2	2.3	0.0	0.1	0.1	332.1
Haul Trucks (Stadium)[4]	0.7	0.1	1.2	0.0	0.0	0.0	173.0
Worker Commute[5]	3.3	0.1	0.4	0.0	0.0	0.0	514.4
Total (lbs/day)	**109.3**	**38.6**	**100.0**	**0.7**	**4.3**	**3.9**	**9,449.7**
SCAQMD Threshold (lbs/day)	550	75	100	150	150	55	N/A
Exceeds SCAQMD thresholds?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Alternative Total (tons)	**5.5**	**1.9**	**5.0**	**0.0**	**0.2**	**0.2**	**472.5**
De Minimus Thresholds (tons/year)	100	10	10	100	70	100	N/A
Exceeds *De Minimus* thresholds?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

Table 4.4.4: Alternative 2 Dredging Activity Emissions

Type of Equipment[1]	Pollutants of Concern						
	CO	ROG	NO_x	SO_x	PM_{10}	$PM_{2.5}$	CO_2

[1] All off-road construction equipment is modeled using Tier 2 emission rates.
[2] The diesel tug boat is modeled using Tier 2 emission rates.
[3] Assumes that a total of 4 truck trips at 24 miles would be required for cement import activities per day.
[4] Assumes that a total of 25 truck trips at 2 miles would be required for transfer of dredged material from the Lagoon to the Marine Stadium barge per day.
[5] Assumes that a total of 20 trips at 40 miles would be required.

CO = carbon monoxide
CO_2 = carbon dioxide
lbs/day = pounds per day
NO_x = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
ROC = reactive organic compounds
SO_x = sulfur oxides

As described above, a federal action is presumed to conform and is exempt from a conformity determination if analysis shows that the total net direct and indirect emissions from Alternative 2 would be less than the applicable *De Minimis* thresholds. Under Alternative 2, the proposed federal action includes dredging to remove contaminated sediment from the western arm of the Lagoon and would result in emissions from the operation of equipment, the delivery of materials and equipment, removal of dredged material from the site, and construction worker commutes. The emissions from these sources represent the total net direct and indirect emissions from the proposed federal action. As shown in Table 4.4.4, the emissions levels for this alternative are less than the applicable SCAQMD and *De Minimis* thresholds.

Emissions from the dredge and other support equipment would result in minimal air quality impacts that are temporary and short-term during dredging activity. Air quality would return to pre-project conditions following completion of dredging. Therefore, the Corps has concluded that the air quality impacts generated by Alternative 2 would be temporary, short-term, and minimal, and would not have a significant adverse effect on air quality.

The Corps has concluded that the air conformity analysis described above and the Environmental Commitments provided in Section 8.3 of this report adequately address impacts from the diesel-operated dredge and supporting equipment during the proposed dredging of the Lagoon.

Heavy-duty equipment in the project area during construction would emit odors. These odors would be limited to the time that the equipment is operating during the period for Alternative 2. Environmental Commitments provided in Section 8.3 of this EA reduce impacts associated with objectionable odors from the operation of diesel-powered construction equipment.

The dredged material may be spread out on site to dry before being treated and hauled off site. It is anticipated that the dredged sediment will contain organic materials and that decomposition of the organic matter when exposed to air may generate unpleasant odors. The decaying marine vegetation that was not previously exposed may create unpleasant odors.

Therefore, the dredged material may result in odor impacts at the adjacent and nearby sensitive land uses.

Alternative 2 would result in approximately 473 tons (or 429 metric tons) of CO_2 emissions during dredging activities. CO_2 is a GHG that is considered to contribute to GCC. GCC describes alterations in weather features (e.g., temperature, wind patterns, precipitation, and storms) that occur across the Earth as a whole. GCC and GHG emissions are an emerging environmental concern being raised on statewide, national, and global levels.

Based on the air quality analysis discussed above, the Corps has concluded that Alternative 2 would not have a significant impact on air quality. The total emissions of each criterion pollutant under Alternative 2 meets or is below the SCAQMD thresholds and *De Minimus* levels identified for federal criteria pollutant thresholds. Therefore, Alternative 2 conforms to the CAA as amended (1990).

4.4.4 Alternative 3 (Non-Electric Hydraulic Equipment and Barge Alternative)

As described above, a federal action is presumed to conform and is exempt from a conformity determination if analysis shows that the total net direct and indirect emissions from the proposed federal action would be less than the applicable S*De Minimis* thresholds. Under Alternative 3. the proposed federal action includes dredging to remove contaminated sediment from the Lagoon and would result in emissions from the operation of equipment, the delivery of materials and equipment, removal of dredged material from the site, and construction worker commutes. The emissions from these sources represent the total net direct and indirect emissions from the proposed federal action. As shown in Table 4.4.5, the emissions levels for this alternative are less than the applicable SCAQMD and *De Minimis* thresholds.

Emissions from the dredge and other support equipment would result in minimal air quality impacts that are temporary and short-term during dredging activity. Air quality would return to pre-project conditions following completion of dredging. Therefore, the Corps has concluded that the air quality impacts generated by Alternative 3 would be temporary, short-term, and minimal, and will not have a significant adverse effect on air quality.

Table 4.4.5: Alternative 3 Dredging Activity Emissions

Type of Equipment[1]	Pollutants of Concern						
	CO	ROC	NO_x	SO_x	PM_{10}	$PM_{2.5}$	CO_2
2 Loaders	5.0	0.7	4.2	0.0	0.4	0.4	1,068.9
1 Pump[2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 Dozer	3.4	0.5	10.7	0.0	0.4	0.4	956.4
1 Grader	2.0	0.5	5.9	0.0	0.3	0.3	1,061.9
1 Crane	0.6	0.1	3.3	0.0	0.1	0.1	257.3
1 Pug Mill[2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 4.4.5: Alternative 3 Dredging Activity Emissions

Type of Equipment[1]	Pollutants of Concern						
	CO	**ROC**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
1 Hydraulic Dredge	5.5	1.1	28.3	0.0	1.6	1.4	2,760.0
1 Tug Boat[3]	7.6	1.7	40.6	0.6	1.3	1.2	1,743.1
1 Gas Skiff	75.3	33.0	0.0	0.0	0.3	0.3	60.6
Haul Trucks (Cement) [4]	1.3	0.2	2.3	0.0	0.1	0.1	332.1
Worker Commute[5]	3.3	0.1	0.4	0.0	0.0	0.0	514.4
Total (lbs/day)	**104.0**	**37.9**	**95.8**	**0.7**	**4.5**	**4.1**	**8,754.8**
SCAQMD Threshold (lbs/day)	550	75	100	150	150	55	N/A
Exceeds SCAQMD thresholds?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Alternative Total (tons)	**5.2**	**1.9**	**4.8**	**0.0**	**0.2**	**0.2**	**437.7**
De Minimus Thresholds (tons/year)	100	10	10	100	70	100	N/A
Exceeds *De Minimus* thresholds?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

[1] All off-road construction equipment is modeled using Tier 2 emission rates.
[2] The pug mill and pump will be electrically powered.
[3] The diesel tug boat is modeled using Tier 2 emission rates.
[4] Assumes that a total of 4 truck trips at 24 miles would be required for cement import activities per day.
[5] Assumes that a total of 20 trips at 40 miles would be required per day.

CO = carbon monoxide
CO_2 = carbon dioxide
lbs/day = pounds per day
NO_x = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
ROC = reactive organic compounds
SO_x = sulfur oxides

The Corps has concluded that the air conformity analysis described above and the Environmental Commitments cited in Section 8.3 of this EA adequately address impacts from the diesel-operated dredge and supporting equipment during the proposed dredging of the Lagoon.

Heavy-duty equipment in the project area during construction would emit odors. These odors would be limited to the time that the equipment is operating during implementation of Alternative 3. Environmental Commitments identified in Section 8.3 of this EA reduce impacts associated with objectionable odors from the operation of diesel-powered construction equipment.

It is anticipated that the dredged sediment will contain organic materials and that decomposition of the organic matter when exposed to air may generate unpleasant odors. The decaying marine vegetation that was not previously exposed may create unpleasant odors. Therefore, the dredged material may result in odor impacts at the adjacent and nearby sensitive land uses.

Alternative 3 would result in approximately 438 tons (or 397 metric tons) of CO_2 emissions during dredging activities. CO_2 is a GHG that is considered to contribute to GCC. GCC

describes alterations in weather features (e.g., temperature, wind patterns, precipitation, and storms) that occur across the Earth as a whole. GCC and GHG emissions are an emerging environmental concern being raised on statewide, national, and global levels.

Based on the air quality analysis discussed above, the Corps has concluded that Alternative 3 would not have a significant impact on air quality. The total emissions of each criterion pollutant under Alternative 3 meets or is below the SCAQMD thresholds and *De Minimus* levels identified for federal criteria pollutant thresholds. Therefore, Alternative 3 conforms to the CAA as amended (1990).

4.4.5 Alternative 4 (Dry Dredge and Barge Alternative)

The proposed dredging activities under Alternative 4 would generate air pollutant emissions from dredging, other heavy equipment emissions, barges, ancillary vessels, and vehicles used to transport dredged material from the Lagoon to the POLB. As described above, a proposed federal action is presumed to conform and is exempt from a conformity determination if analysis shows that the total net direct and indirect emissions from the proposed federal action would be less than the applicable *De Minimis* thresholds. As shown in Table 4.4.6, the emissions levels for this alternative are less than the applicable SCAQMD and *De Minimis* thresholds.

Table 4.4.6: Alternative 4 Dredging Activity Emissions

Type of Equipment[1]	Pollutants of Concern						
	CO	**ROC**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
2 Loaders	5.0	0.7	4.2	0.0	0.4	0.4	1,068.9
4 Pumps[2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 Dozer	3.4	0.5	10.7	0.0	0.4	0.4	956.4
1 Grader	2.0	0.5	5.9	0.0	0.3	0.3	1,061.9
1 Crane	0.6	0.1	3.3	0.0	0.1	0.1	257.3
1 Pug Mill	1.1	0.4	7.4	0.0	0.4	0.3	1,088.0
1 Excavator	6.6	0.9	21.1	0.0	0.8	0.8	1,872.0
1 Tug Boat[3]	7.6	1.7	40.6	0.6	1.3	1.2	1,743.1
1 gas skiff	75.3	33.0	0.0	0.0	0.3	0.3	60.6
Haul Trucks (Cement)[4]	1.3	0.2	2.3	0.0	0.1	0.1	332.1
Haul Trucks (Stadium)[5]	0.7	0.1	1.2	0.0	0.0	0.0	173.0
Worker Commute[6]	3.3	0.1	0.4	0.0	0.0	0.0	514.4
Total (lbs/day)	**106.8**	**38.2**	**95.1**	**0.7**	**4.1**	**3.7**	**9,127.7**
SCAQMD Threshold (lbs/day)	550	75	100	150	150	55	N/A
Exceeds SCAQMD thresholds?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Alternative Total (tons)	**5.3**	**1.9**	**4.8**	**0.0**	**0.2**	**0.2**	**456.4**
De Minimus Thresholds (tons/year)	100	10	10	100	70	100	N/A

Table 4.4.6: Alternative 4 Dredging Activity Emissions

Type of Equipment[1]	Pollutants of Concern						
	CO	**ROC**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
Exceeds *De Minimus* thresholds?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

[1] All off-road construction equipment is modeled using Tier 2 emission rates.
[2] The pumps will be electrically powered.
[3] The diesel tug boat is modeled using Tier 2 emission rates.
[4] Assumes that a total of 4 truck trips at 24 miles would be required for cement import activities per day.
[5] Assumes that a total of 25 truck trips at 2 miles would be required for transfer of dredged material from the Lagoon to the Marine Stadium barge per day.
[6] Assumes that a total of 20 trips at 40 miles would be required per day.

CO = carbon monoxide
CO_2 = carbon dioxide
lbs/day = pounds per day
NO_x = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
ROC = reactive organic compounds
SO_x = sulfur oxides

Heavy-duty equipment in the project area during construction would emit odors. These odors would be limited to the time that the equipment is operating during implementation of Alternative 4. Environmental Commitments provided in Section 8.3 of this EA reduce impacts associated with objectionable odors from the operation of diesel-powered construction equipment.

As a result of the dry-dredge technique, areas that were previously submerged would become exposed during the new lower tide levels. The decaying marine vegetation that was not previously exposed may create unpleasant odors. It is anticipated that the dredged sediment would contain organic materials and that decomposition of the organic matter when exposed to air may generate unpleasant odors. Therefore, Alternative 4 may result in odor impacts at adjacent and nearby sensitive land uses.

Alternative 4 would result in approximately 456 tons (or 414 metric tons) of CO_2 emissions during dredging activities. CO_2 is a GHG that is considered to contribute to GCC. GCC describes alterations in weather features (e.g., temperature, wind patterns, precipitation, and storms) that occur across the Earth as a whole. GCC and GHG emissions are an emerging environmental concern being raised on statewide, national, and global levels.

Based on the air quality analysis discussed above, the Corps has concluded that Alternative 4 would not have a significant impact on air quality. The total emissions of each criterion pollutant under Alternative 4 meets or is below the SCAQMD thresholds and *De Minimus* levels identified for federal criteria pollutant thresholds. Therefore, Alternative 4 conforms to the CAA as amended (1990).

4.5 NOISE

4.5.1 No Federal Action Alternative

This alternative would avoid all short-term adverse noise effects related to dredging activities; however, it would not meet the purpose and need of the project. The No Federal Action Alternative would have a negative impact of not removing contaminated sediment from the western arm of the Colorado Lagoon, and the environmental benefits to the project area would not be achieved. The water and sediment quality of the Lagoon and habitat areas in and around the Lagoon would not be improved. There are no new sources of noise with implementation of this alternative.

4.5.2 Alternative 1 (Mechanical Dredge and Truck Option Alternative)

Noise impacts from construction activities under Alternative 1 are a function of the noise generated by construction equipment, the equipment location, the sensitivity of nearby land uses, and the timing and duration of the noise-generating activities.

The proposed dredging activities in the Lagoon are located in an area of established and varied noise sources that include automobiles and recreational facilities/activities. The project area already experiences some elevated noise levels from traffic along adjacent access roads.

Two types of short-term noise impacts would occur during the proposed dredging activities. The first is the increase in traffic flow on local streets associated with the transport of workers, equipment, and materials to and from the project site. The pieces of heavy equipment to be utilized during dredging will be moved to the site and remain for the duration of dredging activities. The increase in traffic flow on the surrounding roads due to construction traffic would not cause an increase in traffic that is substantial in relation to the existing traffic load of the street system. The associated increase in long-term traffic noise will not be perceptible. However, there will be short-term, intermittent, high-noise levels associated with trucks passing by from the project area.

The second type of short-term noise impact is related to the noise generated by heavy equipment operating within the project area. It is anticipated that the dredging activities under Alternative 1 would require the use of the following construction equipment:

- Electric barge-based excavator/clamshell dredge;
- Bulldozer;
- Small-track loader;
- Excavator;
- Front-end loader;

- Grader;
- Small crane;
- Pug mill;
- Generator (diesel-fueled);
- End-dump trucks; and
- Cement/reagent delivery trucks.

Table 4.5.1 lists typical construction equipment noise levels recommended for noise impact assessments, based on a distance of 50 ft between the equipment and a noise receptor.

Table 4.5.1: Typical Construction Equipment Noise Levels

Type of Equipment	Range of Maximum Sound Levels Measured (dBA at 50 ft)	Suggested Maximum Sound Levels for Analysis (dBA at 50 ft)
Pile Drivers, 12,000 to 18,000 ft-lb/blow	81–96	93
Rock Drills	83–99	96
Jackhammers	75–85	82
Pneumatic Tools	78–88	85
Pumps	74–84	80
Scrapers	83–91	87
Haul Trucks	83–94	88
Cranes	79–86	82
Portable Generators	71–87	80
Rollers	75–82	80
Dozers	77–90	85
Tractors	77–82	80
Front-End Loaders	77–90	86
Hydraulic Backhoe	81–90	86
Hydraulic Excavators	81–90	86
Graders	79–89	86
Air Compressors	76–89	86
Trucks	81–87	86

dBA = A-weighted decibels
ft = feet
ft-lb/blow = foot-pounds per blow
Source: Noise Impact Analysis, May 2008.

As previously discussed, the decibel level decreases with distance from the sources, usually at a rate of 6 dB for every doubling of distance. Noise emissions vary from each piece of equipment utilized such that it is not possible to specifically quantify the exact project-related noise impact. However, as a worst-case scenario, it was determined that dredging noise is comparable to an earth scraper working in soft dirt (approximately 80 dBA at 50 ft away from the equipment). Other construction equipment used on site, such as loaders and backhoes, would generate up to 86 dBA L_{max} at a distance of 50 ft.

Table 4.5.2 identifies the noise levels at various distances from an 80 dBA noise source.

Table 4.5.2: Typical Noise Attenuation Levels

Distance (feet)	Resulting Noise Level (dBA)
100	74
200	68
400	62
500	60
1,000	54
2,000	46
3,000	40

Note: Calculated using a point source spherical radiator equation
dBA = A-weighted decibel
Source: Caltrans Noise Manual, 1980.

Noise attenuation may reduce construction noise levels at the nearest sensitive land uses. The following sensitive land uses are located within the vicinity of the proposed project:

- **On-site Preschool.** The on-site preschool is located within the vicinity of the central Lagoon dredge area. Standard construction equipment that would generate noise levels up to 86 dBA L_{max} at a distance of 50 ft would be required for the central Lagoon dredging. Standard construction activities that occur within 315 ft of the preschool would generate noise levels in excess of the City's daytime exterior noise standard of 70 dBA L_{max}. This is an adverse noise effect. However, as identified in Environmental Commitments Section provided in 8.4, the preschool shall be closed whenever construction occurs within 315 ft.
- **Residential Developments.** The nearest residential developments are located approximately 100 ft from the proposed dredging activities. As a result, they would be exposed to dredging activity noise levels of up to 80 dBA L_{max}, which is above the City's daytime exterior noise standard of 70 dBA L_{max}.

Due to the distance between dredging activities and the existing sensitive receptors, project construction activities would result in an exceedance of the City's Noise Ordinance.

However, noise associated with the dredging activities under this alternative is anticipated to be intermittent and temporary, with noise levels returning to ambient conditions upon project completion. The City of Long Beach Municipal Code allows elevated construction-related noise levels as long as the construction activities are limited to the hours specified. Dredging activity noise impacts would result in adverse effects; however, adherence to the City's Noise Ordinance and adherence to Environmental Commitments provided in Section 8.4 would reduce construction noise impacts to sensitive receptors.

Based on the noise analysis discussed above, the Corps has concluded that Alternative 1 would not have a significant adverse impact related to noise.

4.5.3 Alternative 2 (Mechanical Dredge Equipment and Barge Alternative)

Under this alternative, the locations of the dredging activities and the treatment of the dredged material would be the same as identified for Alternative 1. It is anticipated that the dredging activities under Alternative 2 would require the use of the following construction equipment:

- Non-electric barge-based excavator or clamshell dredge;
- Bulldozer;
- Small-track loader;
- Excavator;
- Front-end loader;
- Grader;
- Small crane;
- Pug mill;
- Generator (diesel-fueled);
- Barge;
- Tugboat;
- End-dump trucks; and
- Cement/reagent delivery trucks.

Non-electric mechanical dredge/excavation equipment would be utilized and treated dredged material would be trucked into Marine Stadium for barge loading. The barge would then transport the treated dredged material to the POLB Middle Harbor CDF. It is anticipated that the use of the dredging equipment would generate a similar level of noise during the dredging activities at the nearest noise-sensitive receptor as identified in Alternative 1.

For the loading of treated dredged material onto the barge at Marine Stadium, it is anticipated that the nearest noise-sensitive receptors would be exposed to a noise level of 86 dBA L_{max}. This noise level would be above the City's daytime exterior noise standard of 70 dBA L_{max}.

Similar to what was identified for Alternative 1, due to the distance between dredging activities and the existing sensitive receptors, project construction activities would result in an exceedance of the City's Noise Ordinance. However, noise associated with the dredging activities under this alternative is anticipated to be intermittent and temporary, with noise levels returning to ambient conditions upon project completion. The City of Long Beach Municipal Code allows elevated construction-related noise levels as long as the construction activities are limited to the hours specified. Dredging activity noise would result in adverse effects; however, adherence to the City's Noise Ordinance and adherence to Environmental Commitments provided in Section 8.4 would reduce construction noise impacts to sensitive receptors.

Based on the noise analysis discussed above, the Corps has concluded that Alternative 2 would not have a significant adverse impact related to noise.

4.5.4 Alternative 3 (Non-Electric Hydraulic Equipment and Barge Alternative)

Under this alternative, the locations of the dredging activities would be the same as identified for Alternative 1. It is anticipated that the dredging activities under Alternative 3 would require the use of the following construction equipment:

- Non-electric hydraulic dredge;
- Dredge pipeline booster pump (diesel-fueled);
- Bulldozer;
- Small track loader;
- Excavator;
- Front-end loader;
- Grader;
- Small crane;
- Pug mill;
- Generator (diesel-fueled);
- Barge;
- Tugboat; and
- Cement/reagent delivery trucks.

Alternative 3 would utilize a non-electric hydraulic dredge machine that would dredge and pipe dredged material through the underground culvert to Marine Stadium. Once at Marine Stadium, the dredged material would be treated and loaded onto a barge to the POLB Middle Harbor CDF. It is anticipated that the use of the dredging equipment would generate a similar level of noise during dredging activities at the nearest noise-sensitive receptor as identified in Alternative 1.

Under this alternative, there are four potential areas where treatment and loading of the dredged material could occur (Figure 4.5-1). The nearest noise-sensitive receptors would be existing residences along Boathouse Lane and Paoli Way, approximately 50 ft from the proposed treatment and loading areas. Ancillary construction equipment used for the treatment and the loading of the dredged material would generate up to 86 dBA L_{max} at a distance of 50 ft. This would be above the City's daytime exterior noise standard of 70 dBA L_{max}. Dredging noise impacts would result in adverse effects; however, adherence to the City's Noise Ordinance and to measures identified in the Environmental Commitments Section 8.4 would reduce construction noise impacts to sensitive receptors.

Based on the noise analysis discussed above, the Corps has concluded that Alternative 3 would not have a significant adverse impact related to noise.

4.5.5 Alternative 4 (Dry Dredge and Barge Alternative)

Under this alternative, the locations of dredging activities and where the dredge material would be treated would be the same as identified for Alternative 1. It is anticipated that the dredging activities under Alternative 4 would require the use of the following construction equipment:

- Non-electric barge-based excavator or clamshell dredge;
- Bulldozer;
- Small track loader;
- Excavator;
- Front-end loader;
- Grader;
- Small crane;
- Dewater equipment/pumps;
- Pug mill;
- Generator (diesel-fueled);
- Barge;

FIGURE 4.5-1

N

0 150 300

FEET

SOURCE: Google Earth

Colorado Lagoon Estuary Restoration Project

Potential Dredging Material Treatment Plant

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- Tugboat;
- End-dump trucks; and
- Cement/reagent delivery trucks.

Alternative 4 would utilize a non-electric barge-based excavator during dredging activities. The west arm would be dewatered, and dredged material would be treated at the north shore parking lot. Treated materials would be trucked to Marine Stadium. Once at Marine Stadium, the dredged material would be loaded onto a barge to the POLB Middle Harbor CDF. It is anticipated that the use of the dredging equipment would generate a similar level of noise during dredging activities at the nearest noise-sensitive receptor as identified in Alternative 1.

Similar to what was identified for Alternative 1, due to the distance between dredging activities and the existing sensitive receptors, project construction activities would result in an exceedance of the City's Noise Ordinance. Therefore, dredging activity noise would result in a temporary adverse change in the existing noise environment. However, once the project is completed, the existing ambient noise levels would return to baseline conditions. The City of Long Beach Municipal Code allows elevated construction-related noise levels as long as the construction activities are limited to the hours specified. Dredging activity noise would result in adverse effects; however, adherence to the City's noise regulations and adherence to Environmental Commitments provided in Section 8.4 would reduce construction noise impacts to sensitive receptors.

Based on the noise analysis discussed above, the Corps has concluded that Alternative 4 would not have a significant adverse impact related to noise.

4.6 LAND USE AND RECREATION

4.6.1 No Federal Action Alternative

This alternative would avoid all short-term adverse effects to land use and recreation related to dredging activities; however, it would not meet the purpose and need of the project. The No Federal Action Alternative would have a negative impact of not removing contaminated sediment from the Lagoon, and the environmental benefits to the project area would not be achieved. The water and sediment quality of the Lagoon would not be improved.

4.6.2 Alternative 1 (Mechanical Dredge and Truck Option Alternative)

The intention of this alternative is to dredge the western arm of the Lagoon using mechanical dredge/excavation equipment (barge-based clamshell/excavator or land-based excavator) and truck the dredged material to the POLB.

Land Use. The project site is presently used for park and recreation activities. Activities under this alternative would improve water and sediment quality. This alternative would not change the existing uses within or adjacent to the project site. The Lagoon is an existing parkland/open space use. This alternative would support the City's implementation of water quality and other improvements that would enhance, but not change, the existing open space/recreation use of the site, which would continue with implementation of this alternative. Therefore, Alternative 1 would not alter the existing physical arrangement of the surrounding area and adverse impacts related to this issue would not occur.

The Lagoon is owned and operated by the City of Long Beach Department of Parks, Recreation, and Marine. Existing on-site facilities include the Colorado Lagoon Marine Science Center (which is staffed by the City and FOCL), restrooms, parking, a pedestrian bridge, a lifeguard station, sandy shoreline areas, play equipment, picnic areas, grassy open space areas, a preschool, and a model boat shop. Implementation of the proposed dredging action would support the implementation of long-term water quality control measures and enhance the Lagoon's value as a recreational resource. Implementation of this alternative would result in improved water quality within the western arm of the Lagoon, thereby providing more opportunities for swimming.

Dredging activities would be temporary and would result in a short-term impact on land use. All of the project components are consistent with the existing park, open space, and natural resources at the Lagoon. Alternative 1 would make long-term improvements to the existing land uses at the Lagoon. These improvements would enhance the value of the site's existing uses, and no conflict would occur.

Recreation. Implementation of Alternative 1 would provide improvements to enhance the existing recreation uses on the project site. The primary goal of the project is to implement long-term water quality control measures and improve water quality to enhance the swimming amenity.

Alternative 1 does not include residential development or other factors that will increase demand beyond capacity on City Department of Parks, Recreation, and Marine services and facilities. In addition, this alternative would not preclude the use of any existing recreation facilities in the project vicinity.

The Lagoon is owned and operated by the City Department of Parks, Recreation, and Marine. Existing on-site facilities include the Colorado Lagoon Marine Science Center (which is staffed by the City and FOCL), restrooms, parking, a pedestrian bridge, a lifeguard station, sandy shoreline areas, play equipment, picnic areas, grassy open space, a preschool, and a model boat shop.

Implementation of Alternative 1 would provide improvements to enhance the existing uses within and adjacent to the western arm of the Lagoon. The primary goal of the project is to improve water quality and enhance the Lagoon's value as a recreational resource, including the swimming amenity.

Short-term construction-related effects would result from development of this alternative. Use of the project area for recreational activities would be adversely affected during the construction phase of the project. Figure 4.6-1 shows the staging and stockpile areas that would be utilized during construction activities for the various project components. The Lagoon will be closed to the public (swimming) during dredging activities. During these times, opportunities for passive and active recreation, including swimming, at the western arm of the Lagoon would be affected.

To offset these short-term construction use impacts, Environmental Commitments described in Section 8.5 would provide coordination between the City Department of Parks, Recreation, and Marine and the affected park users, including identification of other available recreation facilities within the project vicinity. For example, Mother's Beach is a recreational beach area within Marine Stadium that provides many of the amenities also provided by the Lagoon, including swimming. This area, in addition to the 247 ac of ocean beaches located between the Los Angeles and San Gabriel Rivers, could be used as a substitute during construction. In addition, there are several swimming pools that are available for public use, including five City swimming pools located at the Martin Luther King, Jr. Park, Silverado Park, and the Belmont Plaza Pool Complex (3 pools); four swimming pools at LBUSD high schools that are open to the public during the summer through City/LBUSD joint use agreements; and four pools at the City colleges and California State University Long Beach that offer public pool use.

Based on the land use and recreation analysis discussed above, the Corps has concluded that Alternative 1 will not have a significant adverse impact on land use and recreation.

4.6.3 Alternative 2 (Mechanical Dredge Equipment and Barge Alternative)

This alternative involves dredging activity using non-electric mechanical dredge/excavation equipment (barge-based clamshell or land-based excavator). Alternative 2 would result in similar impacts to Land Use and Recreation as Alternative 1. The difference in the type of dredging equipment that is utilized would not result in a difference in the nature or extent of impacts to these resources. Refer to Section 4.6.2 for a discussion of Alternative 1 effects to Land Use and Recreation. Environmental Commitments are provided in Section 8.5.

Based on the land use and recreation analysis discussed above, the Corps has concluded that Alternative 2 would not have a significant adverse impact on land use and recreation.

FIGURE 4.6-1

LEGEND

- Project Boundary
- Proposed Staging Area
- Proposed Stockpile Area

0 150 300 Feet

SOURCE: Air Photo USA (2008)

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Colorado Lagoon Estuary Restoration Project

Proposed Staging and Stockpile Areas

4.6.4 Alternative 3 (Non-Electric Hydraulic Equipment and Barge Alternative)

This alternative would result in the dredging of the Lagoon using non-electric hydraulic dredge equipment. Dredged material would be piped through an underground culvert to either the Marine Stadium barge or a land-based treatment facility. Alternative 3 would result in similar impacts to Land Use and Recreation as Alternative 1. The difference in the type of dredging equipment that is utilized would not result in a difference in the nature or extent of impacts to these resources. Refer to Section 4.6.2 for a discussion of Alternative 1 effects to Land Use and Recreation. Environmental Commitments are provided in Section 8.5.

Based on the land use and recreation analysis discussed above, the Corps has concluded that Alternative 3 would not have a significant adverse impact on land use and recreation.

4.6.5 Alternative 4 (Dry Dredge and Barge Alternative)

Alternative 4 differs from the other alternatives, as it implements a dry dredge method rather than a wet dredge method. The dry dredge method would install a temporary cofferdam just west of the footbridge to isolate the west arm of the Lagoon for dredging. The dredged area would be drained of water, and the bottom sediment would be dewatered. An excavator would be used to remove the dry sediment, which would be temporarily stockpiled in the parking lot along the Lagoon's north shore and the southwest shore of the Lagoon.

Alternative 4 would result in similar impacts to Land Use and Recreation as Alternative 1. The difference between dredge methods (wet versus dry) would not result in a difference in the nature or extent of impacts to these resources. Refer to Section 4.6.2 for a discussion of Alternative 1 effects to Land Use and Recreation. Environmental Commitments are provided in Section 8.5.

Based on the land use and recreation analysis discussed above, the Corps has concluded that Alternative 4 would not have a significant adverse impact on land use and recreation.

4.7 AESTHETICS

4.7.1 No Federal Action Alternative

This alternative would avoid all short-term adverse effects to aesthetics related to dredging activities; however, it would not meet the purpose and need of the project. The No Federal Action Alternative would have a negative impact of not removing contaminated sediment from the Lagoon, and the environmental benefits to the project area would not be achieved. The water and sediment quality of the Lagoon would not be improved.

4.7.2 Alternative 1 (Mechanical Dredge and Truck Option Alternative)

The intention of this alternative is to dredge the western arm of the Lagoon using mechanical dredge/excavation equipment (barge-based clamshell/excavator or land-based excavator) and truck the dredged material to the POLB.

There are no designated scenic highways or scenic roadways adjacent or in close proximity to the project area. The project area can be viewed from public areas including adjacent streets, on-site areas within the Lagoon, Marina Vista Park, the Recreation Pak golf course (a 9-hole course), and Marine Stadium.

Scenic vistas are defined as greater than 1 mile from a receptor and consist of horizon line views. As described above, the areas surrounding the project area on the east and west are fully developed with urban residential uses. The closest residential use on the east is approximately 40 ft and the closest residential use on the west is approximately 150 ft. The areas north and south of the project area are developed with open space/recreational uses; however, there are no designated scenic vistas on site or in the surrounding area. Views from the Lagoon, south toward Marine Stadium, currently do not provide sweeping scenic vista views because there are numerous large mature trees and small building structures that obstruct views greater than 1 mile.

Implementation of Alternative 1 would not disrupt existing scenic vistas or viewsheds on or from the project area. There are no scenic vistas located on site or in the surrounding vicinity that have been designated by the City or other agency in an adopted policy or plan. Therefore, the effect of Alternative 1 on a scenic vista is not considered adverse, and no Environmental Commitments are proposed.

The roadways surrounding the project site are not designated State scenic highways or roadways and there is no scenic rock outcroppings located within the project area. Therefore, there are no designated scenic resources on the project site pertaining to rock outcroppings, scenic highways, or historic buildings.

Regarding visual character and quality, dredging the contaminated water from the Lagoon would result in significantly improved water quality. The improved water quality would be similar to the ocean and Marine Stadium in appearance, which will result in clearer water with fewer algae blooms.

As noted above, residential areas are located east, west, and south of the project site, the Recreation Park 9-hole golf course is adjacent to the north of the project site, and Marine Stadium is adjacent to the south of the project site. The sensitive land uses within the vicinity of the project site include the existing residences to the west, south, and northeast, Marina Vista Park to the east, the north and south Lagoon beaches, the on-site preschool, and the Recreation Park golf course. These land uses are located within 50 to 100 ft of the on-site construction areas. The nearest residence is approximately 50 ft from the project site. Most of

the residential areas are separated from the project site by roadways, the Lagoon water body, and landscaping. Therefore, views of the project site from the residences, parks, and adjacent open areas are generally unobstructed. As a result, views of the project site from these areas would be temporarily affected by construction activities with views of construction equipment and stockpiles. There would be heavy equipment on site throughout the approximately 4-month dredging period. Environmental Commitments are provided in Section 8.6.

Based on the aesthetics analysis discussed above, the Corps has concluded that Alternative 1 would not have a significant adverse impact on aesthetics.

4.7.3 Alternative 2 (Mechanical Dredge Equipment and Barge Alternative)

This alternative involves dredging activity using non-electric mechanical dredge/excavation equipment (barge-based clamshell or land-based excavator). Alternative 2 would result in similar impacts to Aesthetics as Alternative 1. The difference in the type of dredging equipment that is utilized would not result in a difference in the nature or extent of impacts to these resources. Refer to Section 4.7.2 for a discussion of Alternative 1 effects to Aesthetics. Environmental Commitments are provided in Section 8.6.

Based on the aesthetics analysis discussed above, the Corps has concluded that Alternative 2 would not have a significant adverse impact on aesthetics.

4.7.4 Alternative 3 (Non-Electric Hydraulic Equipment and Barge Alternative)

This alternative would result in the dredging of the Lagoon using non-electric hydraulic dredge equipment. Dredged material would be piped through an underground culvert to either the Marine Stadium barge or a land-based treatment facility. Alternative 3 would result in similar impacts to Aesthetics as Alternative 1. The difference in the type of dredging equipment that is utilized would not result in a difference in the nature or extent of impacts to aesthetics. Refer to Section 4.7.2 for a discussion of Alternative 1 effects to Aesthetics. Environmental Commitments are provided in Section 8.6.

Based on the aesthetics analysis discussed above, the Corps has concluded that Alternative 3 would not have a significant adverse impact on aesthetics.

4.7.5 Alternative 4 (Dry Dredge and Barge Alternative)

Alternative 4 differs from the other alternatives, as it implements a dry dredge method rather than a wet dredge method. The dry dredge method would install a temporary cofferdam just west of the footbridge to isolate the west arm of the Lagoon for dredging. The dredged area would be drained of water, and the bottom sediment would be dewatered. An excavator

would be used to remove the dry sediment, which would be temporarily stockpiled in the parking lot along the Lagoon's north shore and the southwest shore of the Lagoon.

Alternative 4 would result in similar impacts to Aesthetics as Alternative 1. The difference between dredge methods (wet versus dry) would not result in a difference in the nature or extent of impacts to aesthetics. Refer to Section 4.7.2 for a discussion of Alternative 1 effects to Aesthetics. Environmental Commitments are provided in Section 8.6.

Based on the aesthetics analysis discussed above, the Corps has concluded that Alternative 4 would not have a significant adverse impact on aesthetics.

4.8 CULTURAL RESOURCES

4.8.1 No Federal Action Alternative

This alternative would avoid all short-term adverse effects to cultural resources related to dredging activities; however, it would not meet the purpose and need of the project. The No Federal Action Alternative would have a negative impact of not removing contaminated sediment from the Lagoon, and the environmental benefits to the project area would not be achieved. The water and sediment quality of the Lagoon would not be improved.

4.8.2 Alternative 1 (Mechanical Dredge and Truck Option Alternative)

The intention of this alternative is to dredge the western arm of the Lagoon using mechanical dredge/excavation equipment (barge-based clamshell/excavator or land-based excavator) and truck the dredged material to the POLB. An assessment of effects to cultural resources was prepared in accordance with the Advisory Council on Historic Preservation regulations (revised January 11, 2001) for the identification of historic properties (prehistoric or historic sites, buildings, structures, objects, or districts listed in, or eligible for listing in, the NRHP as required by 36 CFR Part 800, the regulations implementing Section 106 of the National Historic Preservation Act of 1966, as amended (Section 106). The assessment concluded that there would no effect to historic properties per the Section 106 Guidelines (refer to Appendix D).

Historic Resources. The Lagoon will continue to operate as public parks after project implementation. Therefore, this discussion is limited to potential impacts to archaeological resources during construction as implementation of this alternative would not involve operational activities that would disturb or destroy underlying archaeological or paleontological remains or other cultural/scientific resources.

Dredging the Lagoon would not affect Marine Stadium. Marine Stadium is not eligible for listing in the NRHP; therefore, the project would not result in adverse effects to the Marine

Stadium as a locally designated historical resource or as a resource eligible for the NRHP (refer to Appendix E). No other historic resource or potential historic resource is located within or adjacent to the APE.

Archaeological Resources. As detailed previously, the records search identified six archaeological sites within 0.25 mi of the project area, but none within the APE. Much of the proposed dredged material within the Lagoon consists of sediment that has been deposited via the storm drains and non-native replenishment beach sand that has eroded into the Lagoon. The archaeological survey results, which are consistent with the history of the site, indicate that soil in the project area is loamy sand and that marine shell was observed over the majority of the project area. These are conditions consistent with an area of dredge and fill.

Therefore, implementation of Alternative 1 should not disturb native soils.

Paleontological Resources. Most of the dredged material within the Lagoon consists of sediment that has been deposited via the storm drains and non-native beach replenishment sand that has eroded into the Lagoon. Because of this, sensitive paleontological sediments that contain fossil remains are not likely to exist on site. Excavation and trenching for the various components of this alternative would occur within the previous dredge and fill areas. Therefore, implementation of Alternative 1 would not directly or indirectly destroy a unique paleontological resource, site, or unique geologic feature, and would not result in an adverse effect.

Human Remains. The project area does not contain any formal cemeteries. Archival research and the archaeological survey in connection with the project did not indicate the presence of any previous or existing known human remains in the project area. As a result, the Alternative 1 is not anticipated to disturb any human remains, including those outside of formal cemeteries. Environmental Commitments are provided in Section 8.7.

Based on the cultural resources analysis discussed above, the Corps has concluded that Alternative 1 would not have a significant adverse impact on cultural resources.

4.8.3 Alternative 2 (Mechanical Dredge Equipment and Barge Alternative)

This alternative involves dredging activity using non-electric mechanical dredge/excavation equipment (barge-based clamshell or land-based excavator). Alternative 2 would result in similar impacts to Cultural Resources as Alternative 1. The difference in the type of dredging equipment that is utilized would not result in a difference in the nature or extent of impacts to these resources. Environmental Commitments are provided in Section 8.7.

Based on the cultural resources analysis discussed above, the Corps has concluded that Alternative 2 would not have a significant adverse impact on cultural resources.

4.8.4 Alternative 3 (Non-Electric Hydraulic Equipment and Barge Alternative)

This alternative would result in the dredging of the Lagoon using non-electric hydraulic dredge equipment. Dredged material would be piped through an underground culvert to either the Marine Stadium barge or a land-based treatment facility. Alternative 3 would result in similar impacts to Cultural Resources as Alternative 1. The difference in the type of dredging equipment that is utilized would not result in a difference in the nature or extent of impacts to these resources. Environmental Commitments are provided in Section 8.7.

Based on the cultural resources analysis discussed above, the Corps has concluded that Alternative 3 would not have a significant adverse impact on cultural resources.

4.8.5 Alternative 4 (Dry Dredge and Barge Alternative)

Alternative 4 differs from the other alternatives, as it implements a dry dredge method rather than a wet dredge method. The dry dredge method would install a temporary cofferdam just west of the footbridge to isolate the west arm of the Lagoon for dredging. The dredged area would be drained of water, and the bottom sediment would be dewatered. An excavator would be used to remove the dry sediment, which would be temporarily stockpiled in the parking lot along the Lagoon's north shore and the southwest shore of the Lagoon.

Alternative 4 would result in similar impacts to Cultural Resources as Alternative 1. The difference between dredge methods (wet versus dry) would not result in a difference in the nature or extent of impacts to these resources. Environmental Commitments are provided in Section 8.7.

Based on the cultural resources analysis discussed above, the Corps has concluded that Alternative 4 would not have a significant adverse impact on cultural resources.

4.9 HAZARDS AND HAZARDOUS MATERIALS

4.9.1 No Federal Action Alternative

This alternative would avoid all short-term adverse effects to hazards and hazardous materials related to dredging activities; however, it would not meet the purpose and need of the project. The No Federal Action Alternative would have a negative impact of not removing contaminated sediment from the Lagoon, and the environmental benefits to the

project area would not be achieved. The water and sediment quality of the Lagoon would not be improved.

4.9.2 Alternative 1 (Mechanical Dredge and Truck Option Alternative)

Alternative 1 would result in the dredging of the western arm of the Lagoon using mechanical dredge/excavation equipment (barge-based clamshell) and the trucking of the dredged material to the POLB.

Implementation of this alternative would result in the removal of sediment from within the western portion of the Lagoon. Under this alternative, the wet dredge method would be utilized. The wet dredge method would not dewater the west arm of the Lagoon prior to dredging. The dredged area would be isolated by a silt curtain to maintain water quality. The dredged material would be temporarily stockpiled in the parking lot along the northern shore until it is drained, treated, and loaded onto trucks. Plastic tarps and containment structures would be placed under and around the stockpile areas to minimize runoff back into the Lagoon and surrounding areas.

All sediments would be hauled off site as dry and non-hazardous material. Therefore, the dredged material would be stockpiled in two designated holding areas until dry. The stockpile areas total approximately 56,000 square feet (sf) and would be located in the north parking lot and along the southwestern perimeter of the Lagoon. The main construction staging area would be located adjacent to the west arm of the Lagoon.

The dredging, stockpiling, and disposal process may involve the use of limited quantities of chemical agents, solvents, paints, vehicle fuel, and other hazardous materials. However, with the implementation of hazardous waste BMPs and compliance with local, state, and federal regulations regarding hazardous materials use and storage, potential effects associated with the routine transport, use, or disposal of hazardous materials are not anticipated to be adverse. Similarly, adherence to these existing regulations would not result in an adverse effect associated with reasonable foreseeable upset and accident conditions involving the release of hazardous materials. These standard measures include but are not limited to provisions in the Storm Water Pollution Prevention Plan (SWPPP), Air Quality Rule 403, the General Construction Permit issued by LARWQCB, and Waste Discharge Requirement (WDR) for Discharges of Groundwater from Construction and Project Dewatering to Surface Waters in Coastal Watersheds of Los Angeles and Ventura Counties.

As identified in the Treatment of Colorado Lagoon Sediments Report (Kinnetics, June 2010), sediment contamination issues in the western arm of Colorado Lagoon are largely limited to the top four feet of sediment and are most substantial in Areas A and B (farthest from the footbridge). Composites from Areas A and B exceeded California Title 22 criteria, thus classifying the sediment as hazardous. Lead contamination is generally lower in Area C (closer to the footbridge), but Area C also exhibited more variability and inconsistent spatial

patterns. Sediments in Area C also have higher sand content, which would correlate with the lower lead levels. Elevated levels of lead extend into the deeper sediments (4–7 feet) in the vicinity of the two major storm drains that discharge into the Lagoon's west arm. Removal of the top four feet of sediment throughout the western arm of Colorado Lagoon and selective removal of deeper sediment in the vicinity of the major storm drains would be expected to result in removal of all contaminated sediments.

Once removed, the lead present within the excavated sediment would be stabilized and sequestered via a cement stabilization process in order to lower the concentration of lead below the California Title 22 criteria, thus rendering the sediment as nonhazardous. The treated sediment would be disposed at POLB Middle Harbor CDF. Without treatment, the existing sediments within the Lagoon would not be authorized for placement at the POLB Middle Harbor CDF.

The proposed dredge plan calls for grading of the side slopes of the Lagoon in order to enhance intertidal habitat. Recently, testing was conducted to document levels of contaminants in these areas such that all disposal/reuse options could be considered. As identified in the Sediment/Soil Characterization of the Side Slopes of Colorado Lagoon Report (Kinnetics, June 2010), composites of sediment/soil cores from three segments of the Lagoon (T1 through T3) were analyzed for lead, organic carbon, and pH. Sediment testing in other areas of the Lagoon had demonstrated that lead was an effective indicator of other contaminants of concern present in the Lagoon. All composites were analyzed for grain size. Concentrations of all target compounds were found to be far below sediment benchmarks used to assess potential ecological impacts in the marine environment, Title 22 standards for hazardous materials in California, and Regional Screening Levels for residential soils. Therefore, this material is considered suitable to be either reused or disposed of without treatment.

As noted above, sediment testing at the Lagoon has confirmed that soluble lead concentrations exceed California Title 22 criteria, and is thus considered hazardous material. This project proposes to treat the sediments prior to transporting them to an approved disposal site. The treatment will consist of cement, lime and/or other chemical reagents that will reduce the levels of soluble lead to acceptable and non-hazardous levels. The proposed target level, post-treatment, of soluble lead is below 2.5 mg/L. A bench-scale evaluation of the treatment process was conducted over a period between October 2009 to April 2010, and the results are available in Appendix D. The bench-scale evaluation was conducted with consultation from the Southern California Dredged Material Management Team (SC-DMMT) and the Contaminated Sediments Task Force (CSTF). After multiple attempts at treating the contaminated sediments, a highly successful reagent mixture was found to successfully reduce the solubility of lead. Stabilizing reagents used as part of the treatment includes sulfates, sulfides, calcium compounds, and pH-adjusting materials in various combinations and at additive rates determined by the characteristics of the sediment. This treatment binds the lead in the sediment using a combination of mineral forms and hydroxyl

FIGURE 4.9-1

LEGEND

Project Boundary

Composite Areas and Sampling Locations

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0 150 300

FEET

SOURCE: Air Photo USA (2008).

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Colorado Lagoon Estuary Restoration Project

Composite Areas and Sampling Locations

anion fixation chemistry which lower the leachability of the lead and similar metals present in the sediments. Confirmatory testing would be conducted by the City during construction to demonstrate that lead concentrations are maintained within acceptable levels prior to transport of the materials to the approved disposal site.

Based on the hazards and hazardous materials analysis discussed above, the Corps has concluded that Alternative 1 would not have a significant adverse impact related to hazards and hazardous materials.

4.9.3 Alternative 2 (Mechanical Dredge Equipment and Barge Alternative)

This alternative involves dredging activity using non-electric mechanical dredge/excavation equipment (barge-based clamshell or land-based excavator). Alternative 2 would result in similar impacts related to Hazards and Hazardous Materials as Alternative 1. The difference in the type of dredging equipment that is utilized would not result in a difference in the nature or extent of effects to this issue. Refer to Section 4.9.2 for a discussion of Alternative 1 hazards and hazardous materials.

Based on the hazards and hazardous materials analysis discussed above, the Corps has concluded that Alternative 2 would not have a significant adverse impact related to hazards and hazardous materials.

4.9.4 Alternative 3 (Non-Electric Hydraulic Equipment and Barge Alternative)

This alternative would result in the dredging of the Lagoon using non-electric hydraulic dredge equipment. Dredged material would be piped through an underground culvert to either the Marine Stadium barge or a land-based treatment facility. Alternative 3 would result in similar impacts related to Hazards and Hazardous Materials as Alternative 1. The difference in the type of dredging equipment that is utilized would not result in a difference in the nature or extent of impacts associated with this issue. Refer to Section 4.9.2 for a discussion of Alternative 1 effects associated with the removal, transport, and disposal of hazards and hazardous materials.

Based on the hazards and hazardous materials analysis discussed above, the Corps has concluded that Alternative 3 would not have a significant adverse impact related to hazards and hazardous materials.

4.9.5 Alternative 4 (Dry Dredge and Barge Alternative)

Alternative 4 differs from the other alternatives, as it implements a dry dredge method rather than a wet dredge method. The dry dredge method would install a temporary cofferdam just west of the footbridge to isolate the west arm of the Lagoon for dredging. The dredged area

would be drained of water, and the bottom sediment would be dewatered. An excavator would be used to remove the dry sediment, which would be temporarily stockpiled in the parking lot along the Lagoon's north shore and the southwest shore of the Lagoon.

Alternative 4 would result in similar impacts related to Hazards and Hazardous Materials as Alternative 1. The difference between dredge methods (wet versus dry) would not result in a significant difference in the nature or extent of impacts to this issue. Refer to Section 4.9.2 for a discussion of Alternative 1 effects associated with this issue.

Based on the hazards and hazardous materials analysis discussed above, the Corps has concluded that Alternative 4 would not have a significant adverse impact related to hazards and hazardous materials.

4.10 HYDROLOGY AND WATER QUALITY

4.10.1 No Federal Action Alternative

This alternative would avoid all short-term adverse effects to hydrology and water quality related to dredging activities; however, it would not meet the purpose and need of the project. The No Federal Action Alternative would have a negative impact of not removing contaminated sediment from the Lagoon, and the environmental benefits to the project area would not be achieved. The water and sediment quality of the Lagoon would not be improved.

4.10.2 Alternative 1 (Mechanical Dredge and Truck Option Alternative)

Alternative 1 would result in the dredging of the western arm of the Lagoon using mechanical dredge/excavation equipment (barge-based clamshell/excavator or land-based excavator) and the trucking of the dredged material to the POLB.

The project site is not located within a groundwater recharge basin and there are no production wells within the vicinity. Therefore, there would be no impact to groundwater supply with implementation of this alternative.

Temporary impacts to water quality will occur as the result of construction of the physical improvements to the Lagoon. These project components include the removal of contaminated sediments. The potential impacts of construction activities on water quality focus primarily on sediments, turbidity, and pollutants that might be associated with sediments (e.g., phosphorus and legacy pesticides). Construction-related activities that are primarily responsible for sediment releases are related to exposing soils to potential mobilization (erosion) by rainfall/runoff and wind. Environmental factors that affect erosion include topographic, soil, and rainfall characteristics. Non-sediment-related pollutants that are also of concern during construction include waste construction materials; chemicals, liquid products,

and petroleum products used maintenance of heavy equipment; and concrete-related waste streams.

Water quality monitoring would be conducted by the City during dredging to ensure that impacts are minimal and insignificant. Measures, including changes to dredging operations, will be imposed depending on monitoring results to ensure that impacts remain localized and insignificant.

Due to the contamination levels within the Lagoon, the dredged materials from the Lagoon would be treated to sequester lead then transported to the POLB Middle Harbor CDF for permanent placement. Approximately 28,000 yd^3 of sediment would be removed from the western arm of the Lagoon.

Proposed dredging activities in the Lagoon would result in short-term disturbance of localized Lagoon sediments, which contain elevated concentrations of lead and organochlorine pesticides. As is typical for dredging projects, construction dredging of Lagoon sediments could adversely affect water quality by temporarily resuspending sediments, thereby increasing turbidity. In addition, chemicals such as lead and organochlorine pesticides that are present in the sediments could be released into the water column during resuspension, which could temporarily degrade water quality. Dredging could also expose deeper sediments with higher concentrations of lead and organochlorine pesticides to the water column, which could result in degradation of water quality. Impacts related to resuspended sediments (turbidity) and resuspended metals and chemicals are described in more detail below.

Suspended sediments in the water column can lower levels of dissolved oxygen, increase salinity, increase concentrations of suspended solids, and possibly release chemicals present in sediments into the water. The degree of turbidity resulting from the suspended sediments would vary with the quantity and duration of the construction activity and would also depend on the methods used, the quality of equipment, and the care of the operator. In all cases, increased turbidity levels would be relatively short-lived and generally confined to within a few hundred yards of the activity. After initially high turbidity levels, sediments would disperse and background levels would be restored within hours of disturbance. Substantially depressed oxygen levels (i.e., below 5 mg/L) can cause respiratory stress to aquatic life, and levels below 3 mg/L can cause mortality. However, oxygen levels resulting from project construction activities are not expected to remain low for long periods. Also, tidal flushing would improve depressed oxygen levels by introducing oxygenated water into the project area, and releases of anoxic (oxygen-poor) sediments would occur for relatively short time periods. Normal circulation and tidal effects in the Lagoon would generally disperse and dilute the water temporarily affected by construction activities. Therefore, only temporary water quality impacts related to suspended solids in the water column would be expected during dredging activities.

As discussed above, sediments would be resuspended during construction of Alternative 1 (wet dredging). Because these sediments contain lead and organochlorine pesticides, water quality in the Lagoon could be temporarily degraded during construction dredging, resulting in a potentially adverse, but temporary, impact to water quality. Equipment used for dredging would be modified or specifically designed to control the dispersion of sediments and achieve precise control over the depth and area of sediment removal. In addition, dredge operators could use automatic rather than manual monitoring of the dredging operations, which would allow continuous data logging with automatic interpretation and automatic adjustments to the dredging operations for real-time feedback for the dredge operator. Automatic systems could also be used to monitor turbidity and other water quality conditions in the vicinity of the dredging operations and allow real-time adjustments by the dredging operators to control temporary water quality effects. Water quality impacts related to the dredging of sediments containing lead and organochlorine pesticides would not result in adverse effects.

Water from the dredged material would be allowed to sheet flow back into the Lagoon if the analysis indicates that the contaminants would not leach into the runoff, or the runoff water from the dredged material would be treated by either filtering or by binding with Portland cement for disposal. With implementation of BMPs, impacts to water quality from stockpiled dredged material would not result in adverse effects.

Based on the hydrology analysis discussed above, the Corps has concluded that Alternative 1 would not have a significant adverse impact on hydrology.

4.10.3 Alternative 2 (Mechanical Dredge Equipment and Barge Alternative)

This alternative involves dredging activity using non-electric mechanical dredge/excavation equipment (barge-based clamshell). Alternative 2 would result in similar impacts to water quality as Alternative 1. The difference in the type of dredging equipment that is utilized would not result in a difference in the nature or extent of impacts to this issue. Refer to Section 4.10.2 for a discussion of Alternative 1 effects associated with hydrology and water quality.

Based on the hydrology analysis discussed above, the Corps has concluded that Alternative 2 would not have a significant adverse impact on hydrology.

4.10.4 Alternative 3 (Non-Electric Hydraulic Equipment and Barge Alternative)

This alternative would result in the dredging of the Lagoon using non-electric hydraulic dredge equipment. Dredged material would be piped through an underground culvert to either the Marine Stadium barge or a land-based treatment facility. Alternative 3 would result in similar impacts to water quality as Alternative 1. The difference in the type of dredging

equipment that is utilized would not result in a difference in the nature or extent of impacts associated with this issue. Refer to Section 4.10.2 for a discussion of Alternative 1 effects associated with this issue.

Based on the hydrology analysis discussed above, the Corps has concluded that Alternative 3 would not have a significant adverse impact on hydrology.

4.10.5 Alternative 4 (Dry Dredge and Barge Alternative)

Alternative 4 differs from the other alternatives, as it implements a dry dredge method rather than a wet dredge method. The dry dredge method would install a temporary cofferdam just west of the footbridge to isolate the west arm of the Lagoon for dredging. The dredged area would be drained of water, and the bottom sediment would be dewatered. An excavator would be used to remove the dry sediment, which would be temporarily stockpiled in the parking lot along the Lagoon's north shore and the southwest shore of the Lagoon.

Impacts to water quality would be minimal under this scenario and are limited to dewatered groundwater discharged back to the central Lagoon. The groundwater on site is variable and has been recorded at depths ranging from 5 to 7 ft bgs. Groundwater is anticipated to be encountered during dredging activities associated with the dry dredge of the west arm. Therefore, groundwater may need to be discharged back into the central Lagoon during construction. Discharge of groundwater into the Lagoon has the potential to adversely affect water quality since the overlying sediments in the west arm of the Lagoon are hazardous or contaminated. Dewatered groundwater from the site may need to be filtered prior to discharge into the Lagoon to ensure that surface water quality is protected.

Any dewatering or construction-related, non-storm water discharges would be controlled in compliance with the LARWQCB groundwater dewatering permit (Order No. R4-2003-0111, NPDES No. CAG994004). This permit requires permittees to conduct monitoring of dewatering discharges and adhere to effluent and receiving water limitations contained within the permit so that water quality of surface waters is ensured protection. If the groundwater is found to contain contaminates, the discharge permit would require the dewatered groundwater to be treated prior to discharge into the storm drain system or surface waters. Compliance with the applicable dewatering permit would further ensure that the impacts of these discharges are appropriately addressed.

The dry dredged material would be stockpiled on the north beach parking lot prior to trucking to a landfill or the POLB. The stockpiled material would be placed on a tarp or moisture barrier to prevent contamination/leaching from the material back to the Lagoon waters. Once the material is sufficiently dried, it will be hauled off by trucks.

Based on the hydrology analysis discussed above, the Corps has concluded that Alternative 4 would not have a significant adverse impact on hydrology.

5.0 UNAVOIDABLE ADVERSE EFFECTS

Pursuant to discussions cited in Section 4.0 (Environmental Effects) and Environmental Commitments detailed in Section 8.0, there are no unavoidable adverse effects to the existing environment as a result of the implementation of any of the alternatives.

6.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The Corps has concluded that the project would not result in an irreversible disturbance on the existing environment.

An analysis of significant irreversible and irretrievable effects is required by 40 CFR Section 1502.16. *Irreversible commitments* are damages to the environment (e.g., soils, wetlands, and waterfowl habitats) that cannot be reversed, even after the life of a project. Irreversible commitments are those that cause either directly or indirectly the use of natural resources so that they cannot be restored or returned to their original conditions. They are considered irreversible because their implementation would affect a resource that has deteriorated such that renewal takes extensive time or financial resources or because they would destroy a resource. The proposed federal action would support the Colorado Lagoon Restoration Project and would not incur an irreversible commitment of resources.

Irretrievable commitments are those that are lost for a long period of time (e.g., the life of a project). This includes the use of nonrenewable resources, such as metal, wood, fuel, paper, and other natural or cultural resources, which are considered consumption of energy resources to implement the project. These resources are considered committed because they would be used for the project when they could have been conserved or used for other purposes. Energy resources necessary for the project would use diesel fuel to power dredge equipment and sea boats, gasoline for the commuter vehicles, and diesel fuel for truck transport of materials and supplies. The No Federal Action Alternative would result in no energy resources expended.

7.0 GROWTH INDUCEMENT AND CUMULATIVE IMPACTS

7.1 GROWTH INDUCEMENT

The existing uses on the project site are a combination of passive and active recreation uses. The proposed federal action would implement improvements to these existing uses on the project site. The project site is currently served by all utilities and public services required for the existing and proposed uses, and no expansion or increase in these services is required for the operation of the project. The project will not remove obstacles to growth in a previously undeveloped area because the recreational and open space land uses will not change.

The potential for the proposed federal action to generate growth in the City is unlikely because the proposed federal action is to dredge, treat, transport, and dispose of approximately 28,000 yd^3 of sediment from the western arm of the Lagoon. The existing Lagoon facilities will continue to serve existing residents of the City. The project does not result in the creation of new long-term jobs and would therefore not create a need for any additional housing. Based on these considerations, the proposed federal action would not induce population growth in the community or result in economic growth.

7.2 CUMULATIVE IMPACTS

7.2.1 Environmental Context and Scope of Analysis for Cumulative Impacts

The proposed federal action evaluated in this EA encompasses dredging, treatment, transport, and disposal of approximately 28,000 yd^3 of sediment from the western arm of the Lagoon. As indicated in the analysis above, the proposed federal action alternatives would have limited and temporary impacts to air quality, traffic, aesthetics, land use, recreation and noise. The proposed federal action alternatives would not likely impact cultural resources or habitats and species protected by the Endangered Species Act. The proposed federal action alternatives would entail long-term benefits to water quality.

The Lagoon is located within the city of Long Beach, a fully urbanized 50-square-mile city with a population of approximately 462,604. The city is also home to POLB, the second busiest port in the United States, handling approximately 6,263,499 containers annually. Based on this context, the proposed federal action alternatives would not entail significant cumulative impacts to air quality, traffic, aesthetics, land use, recreation and noise. However, the proposed federal action alternatives would entail long-term benefits to water quality. Moreover, the proposed federal action alternative is located within the marine environment. As a result, impacts to water quality is the relevant environmental parameter which warrants

additional evaluation under cumulative impacts. Based on the above, the scope of analysis for cumulative impacts associated with the proposed federal action encompasses water quality within the entire Lagoon, Marine Stadium, and Alamitos Bay.

7.2.2 Evaluation of Past, Present, and Future Actions

Past Actions - Alamitos Bay, Marine Stadium, and the Lagoon are located near the mouth of the San Gabriel River. Due to the migration of the river mouth prior to channelization, all three water bodies were once a part of the historic Los Cerritos Wetlands. In 1923, the low-lying tidelands of Alamitos Bay were dredged to form the Lagoon and Marine Stadium, which were used for recreational rowing. The City then purchased the Lagoon area and Recreation Park in the 1920s through general revenue bond funding. The 1932 Los Angeles Olympic Committee chose the Lagoon for diving trials and Marine Stadium for rowing events. High diving was performed from a three-story structure that was floating in the Lagoon. To prepare for the diving trials, the Lagoon was separated from Marine Stadium by a tide gate, which was installed to maintain adequate diving depth. In 1968, the City remodeled Marine Stadium for the Olympic rowing and canoeing team trials. Also, in the late 1960s, the area between what is now the north end of Marine Stadium and the south end of the Lagoon was filled and the existing underground box culvert was constructed, thereby further separating the Lagoon from Marine Stadium. This was undertaken as part of the construction for the then-proposed Pacific Coast Freeway. This "filled" area is now Marina Vista Park.

Alamitos Bay was developed into a recreational boating facility from the early 1950s. The bay was dredged in order to support recreational boats. The salt marshes surrounding the bay were filled in order to allow development of ancillary facilities (i.e., parking lots, storage facilities, retail and commercial operations), and residential housing. Currently, Alamitos Bay is one of the two largest marinas within Los Angeles County (260 acres of waters); the other being Marina Del Rey (380 acres of waters). The number of boat docks in Alamitos Bay total approximately 3,399.

Water quality in the Lagoon is affected by inflow from 11 storm drains which have been placed over the past several decades, and the diminished tidal influence due to the presence of the approximately 900-foot-long culvert connecting the Lagoon to Marine Stadium. Additionally, accumulation of sediment and biomass has reduced the depth and capacity of the culvert, resulting in diminished tidal flushing at low tides and increased degradation of water quality. Water quality in Alamitos Bay is affected by the Los Cerritos Channel drains into the bay. The Los Cerritos Channel is concrete-lined above the tidal prism and drains a relatively small but a densely urbanized area of east Long Beach. Urban runoff coming into the Lagoon and Alamitos Bay contains many pollutants such as heavy metals, pesticides, petroleum, hydrocarbons, nutrients, and bacteria. As a result, the Lagoon and Alamitos Bay were listed in the 2006 Federal Clean Water Act (CWA) Section 303(d) lists as an impaired water bodies.

Present Actions - Projects currently scheduled for construction include:

- *Phase 1 Elements:* As indicated in Table 1.4.1, the proposed federal action evaluated in this EA is a subset of Phase 1 of the Colorado Lagoon Estuary Restoration Project. Phase 1 encompasses 24 total elements. Of that total, 12 elements are subject to the Corps' Regulatory permitting authority. In April 2009, the City submitted an application for all 12 elements subject to Corps' Regulatory permitting authority. In March 2010, Regulatory Division verified Nationwide Permit Number 27 authorizing Elements 1-4, 11, 12, 15, and 19. Element 17 was verified separately under Nationwide Permit Number 7. Permit authorization from Regulatory Division for activities associated with dredging of contaminated sediments and creation of marsh habitat (Elements 5, 6, 7) is pending. As of May 2011, the City has completed Elements 1-4, 13-16, and 19.

Foreseeable Future Actions - Projects scheduled to take place in the foreseeable future include:

- *Phase 2 of the Colorado Lagoon Estuary Restoration Project:* Phase 2 includes improvements to Marina Vista Park, including: construction of an open channel between the Lagoon and Marine Stadium; constructing two roadway bridges spanning the open channel at East Colorado Street and East Eliot Street; demolishing and replacing two public restrooms in Marina Vista Park; reconfiguring the baseball and youth overlay soccer fields; and developing a walking trail on the eastern side of the open channel and vegetation buffers on both sides of the channel.

- *Alamitos Bay Marina Rehabilitation Project:* The City is preparing to renovate the Alamitos Bay Marina dock system and conduct dredging in the Alamitos Bay marina basins. The project will be conducted within seven marina basins and phased over a 6-year period beginning in 2008. The Alamitos Bay Marina Rehabilitation project will renovate the existing Alamitos Bay Marina facilities that are 50+ years old and have physically deteriorated over time. This project involves renovations to restroom facilities, dredging the marina, sea wall repairs, and dock and piling replacement. Alamitos Bay is hydrologically connected to the Lagoon and contains 7 mi of inland waterways for recreational water-related uses, private dock and slip facilities, guest slips, a fuel dock, and federal anchorage areas.

- *Termino Avenue Drain Reconfiguration Project:* The Los Angeles County Department of Public Works is proposing to replace and reroute the Termino Avenue Drain (TAD) that currently drains to the Lagoon. The proposed federal action would involve the construction of a storm drain mainline, six lateral drains, low-flow

treatment pump station, catch basin screens, and an outlet to Marine Stadium in the City. The proposed TADP would contain two key components: the storm drain to Marine Stadium and the diversion system to the County Sanitation District sewer line. The construction was initiated in the fall of 2009 and will continue over a period of approximately 26 months. The TAD is a major outfall structure that consists of two side-by-side storm water drainage lines. The project is extending and rerouting the drain to empty into Marine Stadium, thereby bypassing the Lagoon. The TAD has been identified as a primary source of the contamination detected in the Lagoon. The TADP would also intercept three additional drain pipes that currently discharge into the Lagoon. The combined effects of these projects would benefit water quality within the Lagoon. The additional measures included within this proposed project would provide long-term benefits to water quality, habitat restoration, and recreation.

With the exception of the Alamitos Bay Marina Rehabilitation Project all present and foreseeable future projects in the Alamitos Bay area entail water quality improvement projects. Though the water quality improvement projects would improve water quality within the Lagoon, the improvements would not be significant since the Lagoon would still continue to receive inflows from storm drains. Routing of TAD into Alamitos Bay would most likely not impair water quality beyond the existing baseline. First, tidal flushing within Alamitos Bay allows for dispersion of pollutants. Second, water quality within Alamitos Bay would continue to remain impaired since it would continue to receive flows from Los Cerritos Channel.

Based on the above, the Corps concludes that the proposed federal action evaluated in this EA, combined with the past, present and the foreseeable future projects described above would not result in significant cumulative impacts when compared to the existing baseline water quality conditions.

8.0 ENVIRONMENTAL COMMITMENTS

In accordance with the conditions of the Cooperative Agreement, the Corps commits to avoiding or minimizing for adverse effects during the proposed Lagoon dredging and placement of treated dredged material activities. Based on the information available to the Corps and recommendations of Resource Agencies, the following environmental commitments will be implemented by the City to minimize potential environmental impacts.

8.1 BIOLOGICAL RESOURCES

- A field survey to investigate the presence of the invasive algae *Caulerpa taxifolia* will be conducted by the City 30 to 60 days prior to commencement of construction by qualified divers certified by the CDFG and NMFS to conduct such surveys. The preconstruction caulerpa surveys will be conducted according to the accepted criteria of the Southern California Caulerpa Action Team (SCCAT) for conducting surveys for the invasive algae and in accordance with the NMFS and CDFG caulerpa survey protocols. Surveys will be conducted at a Surveillance level for Caulerpa-free Systems.

8.2 TRAFFIC

- Prior to initiation of dredging activities, the City shall, under the direction of the City Traffic Engineer, design and implement a Construction Traffic Management Plan. The plan shall be designed by a registered Traffic Engineer and shall address traffic control for any street closure, detour, or other disruption to traffic circulation and public transit routes. The plan shall identify the routes that construction vehicles will use to access the site, the hours of construction traffic, traffic controls and detours, and off-site vehicle staging areas. The plan shall also require the City to keep all haul routes clean and free of debris including, but not limited to, gravel and dirt.
- The City's construction contractor shall time the activities so as to not interfere with peak-hour traffic and minimize obstruction of through traffic lanes adjacent to the site. If necessary, a flagperson shall be retained to maintain safety adjacent to existing roadways.
- The City shall ensure no truck trips for the hauling of dredged material will occur on PCH or 7th Street during the 7:00–9:00 a.m. or 5:00–7:00 p.m. peak traffic periods.

8.3 AIR QUALITY

- The City shall ensure haul trucks, dredges, and other construction equipment are properly maintained in order to minimize release of diesel and hydrocarbon effluent into the atmosphere. The City's contractor will follow all air quality standards, including those regarding emissions, fuel use, and fuel consumption. Appropriate measures will be taken to reduce fugitive dust caused by dredge operations. Vehicle speed will be kept at 15 mph on all unpaved surfaces to avoid the formation of dust clouds. Water sprayers or other stabilization techniques should be proactively employed to prevent dust from occurring. Other dust minimization measures recommended include reducing the amount of the disturbed area where possible; spraying dirt stockpile areas daily if needed; and coverings or maintenance of 2 ft of freeboard (in accordance with California Vehicle Code [CVC] Section 23114) for trucks hauling dirt, sand, soil, or other loose material.
- Dredging equipment and cranes are subject to permit requirements by the SCAQMD and/or statewide registration through the CARB portable equipment registration program. The contractor shall obtain a permit from the SCAQMD if and as necessary, pay all associated fees, and follow all permit requirements. A list of all equipment to be operated in the project area will be submitted to the SCAQMD. Once permits have been received, the SCAQMD Enforcement Group will be notified prior to bringing the dredge equipment on site. For any dredge that is not currently permitted, coordination with SCAQMD staff is required to determine the most appropriate measures to satisfy Best Available Control Technology (BACT) requirements.
- The City's construction contractor shall ensure that on-road construction trucks and other vehicles shall be shut off when not in use and shall not idle for more than 5 minutes.
- The City shall ensure construction equipment operating on site are equipped with two- to four-degree engine timing retard or precombustion chamber engines, where applicable.
- The City shall ensure all off-road diesel construction equipment and on-road heavy duty trucks are fueled using low-sulfur fuels.

8.4 NOISE

- The City shall ensure haul trucks and construction equipment are properly maintained and scheduled in order to minimize unsafe and nuisance noise effects to sensitive biological resources, residential areas, and the socioeconomic environment.
- The City Noise Control Officer shall ensure that the construction contractor limits construction activity that produces loud or unusual noise that annoys or disturbs a reasonable person of normal sensitivity to between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday and federal holidays, and between 9:00 a.m. and 6:00 p.m. on Saturdays, with no construction activities on Sundays in accordance with the City's Noise Ordinance.

- During all dredging activities, the City's construction contractor shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.
- The City's construction contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site.
- The City's construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction.
- Prior to initiation of dredging activities, the City's Director of Parks, Recreation, and Marine shall hold a community pre-construction meeting, in concert with the construction contractor, to provide information regarding the construction schedule (which includes dredging activities). The construction schedule information shall include the duration, location, days, and frequency of the dredging activities.
- The City's Noise Control Officer will be available to respond to public complaints about noise. Signs shall be posted at the construction site with this individual's name and a telephone number for individuals to report noise complaints.

8.5 LAND USE AND RECREATION

- The City of Long Beach Director of Parks, Recreation, and Marine will ensure that during dredging activities affecting the Lagoon, City Department of Parks, Recreation, and Marine staff will provide local residents and neighborhood groups with information regarding the availability of other nearby City parks and facilities that offer swimming, picnicking, and other passive recreation opportunities enjoyed at the Lagoon. Information regarding Lagoon and Marine Stadium closures will also be made available on the City's website, through outreach to the neighborhood groups, and other means as appropriate.

8.6 AESTHETICS

- Prior to issuance of a grading permit, the City of Long Beach Director of Development Services designee shall require the construction contractor to provide screened construction fencing around construction area boundaries to temporarily screen views of construction activities.

8.7 CULTURAL RESOURCES

- An archaeologist meeting, at a minimum, the standards of the Secretary of the Interior shall be retained by the City, shall be present at the pregrading conference, shall be on call in the event of inadvertent discovery of cultural resources and shall establish

procedures for temporarily halting or redirecting work if unrecorded cultural resources are discovered during dredging to permit the sampling, identification, and evaluation of cultural materials as appropriate. If cultural materials are identified during construction, standard professional archaeological practices shall be initiated to characterize the resources, and the Corps shall coordinate with the SHPO and mitigate any impacts to those resources. Included within this approach will be the development of a curation agreement for the permanent care of materials collected from the project. This agreement would be negotiated with a suitable repository.

- If human remains are encountered, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The County Coroner must be notified of the find immediately. If the remains are determined to be Native American, the County Coroner will notify the Native American Heritage Commission (NAHC), which will determine and notify a Most Likely Descendant (MLD). With the permission of the landowner or his/her authorized representative, the MLD may inspect the site of the discovery. The MLD shall complete the inspection within 48 hours of notification by the NAHC. The MLD may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.
- In accordance with the recommendations of the Gabrielino Tongva Indians of California Tribal Council and the Gabrielino/Tongva San Gabriel Band of Mission Indians, monitoring by a qualified Native American from either one or both of these groups shall be allowed when, and if, ground-disturbing activities occur in undisturbed native soil. The project archaeologist will notify the Director of Development Services immediately upon exposure of native soils, so that a qualified Native American monitor may be invited to monitor further excavation and/or grading.

8.8 COMPLIANCE WITH NATIONWIDE PERMITS 16 AND 33

- The City of Long Beach Director of Development Services shall fully comply with all terms and condition of Nationwide Permits 16 and 33 for activities resulting in the discharge of dredged and fill within waters of the United States.

9.0 COORDINATION

The principal agencies with which this project has and will continue to coordinate include the U.S. Fish and Wildlife Service (USFWS), National Oceanic Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS), U.S. Environmental Protection Agency (EPA), California Coastal Commission (CCC), the Los Angeles Regional Water Quality Control Board (LARWQCB) Central Coast (Region 4), the California Department of Fish and Game (CDFG), and the City of Long Beach Parks, Recreation, and Marine Department.

10.0 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

This proposed project complies with applicable environmental regulations as outlined in the following paragraphs:

10.1 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

NEPA declares it a national policy to "encourage productive and enjoyable harmony between man and the environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; and to enrich the understanding of the ecological systems and natural resources important to the Nation" (42 USC 4321). NEPA authorized and directed "that, to the fullest extent possible, the policies, regulations and public laws of the United States shall be interpreted and administered in accordance with the policies of the Act," and imposes general and specific requirements on all federal Agencies (42 USC 4332).

This EA was prepared in compliance with NEPA. Alternatives to the proposed federal action have been evaluated in this document. Full compliance will be completed upon preparation of the final EA and the signing of the Finding of No Significant Impact (FONSI).

10.2 CLEAN WATER ACT, SECTION 401

A Section 401 Water Quality Certification (Permit No. 09-024) from the Los Angeles Regional Water Quality Control Board, dated February 10, 2010, was issued to the City for discharges of fill associated with the overall Colorado Lagoon Restoration Project including dredging of the western arm. The Los Angeles Regional Water Quality Control Board issued a separate Waste Discharge Requirement authorization, which satisfies requirements pursuant to Section 401 of the CWA for disposal of dredged material at POLB Middle Harbor Project CDF. With implementation of all terms and conditions of the above Water Quality Certification and Waste Discharge Requirement, the project would be in compliance with Section 401 of the Clean Water Act.

10.3 CLEAN WATER ACT, SECTION 404

As indicated in Table 1.4.1 the proposed federal action evaluated in this EA is a subset of the entirety of elements subject to federal action by the Corps related to Phase 1 of the Colorado Lagoon Estuary Restoration Project. Phase 1 encompasses 24 total elements. Of that total,

12 elements are subject to the Corps' Regulatory permitting authority. In April 2009, the City submitted an application for all 12 elements subject to Corps' Regulatory permitting authority. In March 2010, Regulatory Division verified Nationwide Permit Number 27 authorizing Elements 1-4, 11, 12, 15, and 19. Element 17 was verified separately under Nationwide Permit Number 7. Permit authorization from Regulatory Division for activities associated with dredging of contaminated sediments and creation of marsh habitat (Elements 5, 6, 7) is pending.

10.4 COASTAL ZONE MANAGEMENT ACT OF 1972 (PL 92-583; 16 USC 1456 ET SEQ.)

As the lead federal agency, the Corps is responsible for ensuring compliance with the Federal Coastal Zone Management Act of 1972 (CZMA). Section 307 of the CZMA [Title 16, U.S. Code Section 1456(c)] states that Federal Actions must be consistent with approved state coastal management programs to the maximum extent practicable. The California Coastal Act (CCA) is California's approved coastal management program applicable to the proposed federal action.

The Corps has completed an Environmental Assessment (EA) that (1) identifies and discusses the purpose and needs related to this action, (2) evaluates alternatives, and (3) addresses the impacts of the proposed federal action alternatives as part of the decision process. The determination of consistency with the coastal zone management program is based on the analysis performed for this EA.

The CCA establishes the California Coastal Commission (CCC) as having jurisdiction over California's Coastal Zone. The CCC issued Coastal Development Permit (CDP) 5-09-071 on August 20, 2009, finding that the City's Lagoon Restoration Project, including the proposed federal action to be funded by the Corps, is consistent with the CCA because it would improve the biological, water quality, and recreation conditions of the Lagoon, a coastal resource. The CCC, in a letter dated October 5, 2010, concurred with the Corps' Negative Determination (ND-049-10) and agrees with the Corps that the proposed activities are the same as those analyzed in the above-referenced CDP 5-09-071.

10.5 FEDERAL ENDANGERED SPECIES ACT OF 1972

Section 7 of the FESA requires that any federal agency authorizing, funding, or carrying out an action that "may affect" a federally listed threatened or endangered species or its designated critical habitat consult with the USFWS or NMFS, as appropriate, prior to commencing with the federal action. Consultation culminates either with a concurrence from the USFWS and/or NMFS that the action is not likely to adversely affect the species and/or designated critical habitat, or with a Biological Opinion if the action is likely to result in adverse effects.

No species proposed for listing or designated or proposed critical habitat is located in the project area. The only federally listed threatened and endangered species which may occur in the western arm of the Colorado Lagoon during construction activities is the California least tern (*Sterna antillarum browni*), a species managed by the USFWS. Based on the results of the study conducted by Keane, the Lagoon is considered to rarely support foraging least terns (Keane 2004). Additionally, construction activities related to the proposed federal action (dredging, transportation and disposal of treated sediments from the western arm) would have no effect on foraging by the California least tern. The Corps has determined that the project would have no effect on the California least tern. Therefore, consultation with USFWS pursuant to Section 7 of the FESA is not required.

10.6 MAGNUSON-STEVENS FISHERY MANAGEMENT AND CONSERVATION ACT, AS AMENDED

In compliance with the Magnuson-Stevens Fishery Management and Conservation Act, the NMFS has been consulted regarding potential impacts to Essential Fish Habitat (EFH). Although adverse impacts will occur associated with dredging operations, NMFS believes the project will result in a net benefit to EFH. Furthermore, as part of the Section 404 Clean Water Act permitting process, Regulatory Division of the Corps initiated EFH consultation pursuant to the Magnuson-Stevens Fishery Conservation and Management Act with the NMFS on September 22, 2009. The consultation included evaluation of dredging from the central and western arms of the Lagoon. The NMFS in a letter dated November 25, 2009 concluded that mitigation measures MM BIO-1 through BIO-5 on pp.15-16 of the Marine Resources Report prepared for the project should adequately address many of the adverse impacts to EFH. Based on the above, the proposed federal action uis in compliance with the Magnuson-Stevens Act.

10.7 NATIONAL HISTORIC PRESERVATION ACT

The project is in compliance with Section 106 of the National Historic Preservation Act (NHPA) as implemented by 36 CFR 800. In accordance with 36 CFR 800.3(a)(1), the Corps has determined that the project will not cause impacts to properties listed on, or eligible for, the National Register of Historic Places. Accordingly, no further action, or coordination is required unless inadvertent discovery of cultural resources occurs.

10.8 FISH AND WILDLIFE COORDINATION ACT

Agencies must consult with the USFWS on wildlife conservation measures to be implemented during construction and maintenance of federal projects. The Corps is responsible for requesting USFWS participation to identify project impacts and conservation

measures pursuant with the Fish and Wildlife Coordination Act (FWCA). The FWCA also requires consultation with the head of the state agency that administers wildlife resources in the affected state. Although the recommendations of the USFWS and state officials are not binding, the federal agency must give them full consideration.

The proposed federal action was coordinated with the USFWS, the NOAA, NMFS, and the CDFG in accordance with the FWCA. The Corps has concluded that the project is in compliance with the FWCA.

10.9 CLEAN AIR ACT AMENDMENTS OF 1970, AS AMENDED

Air quality regulations were first promulgated with the Clean Air Act (CAA). The CAA is intended to protect the Nation's air quality by regulating emissions of air pollutants. Section 118 of the CAA requires that all Federal agencies engaged in activities that may result in the discharge of air pollutants comply with state and local air pollution control requirements. Section 176 of the CAA prohibits federal agencies from engaging in any activity that does not conform to an approved State Implementation Plan.

The CAA established the NAAQS and delegated enforcement of air pollution control to the states. In California, the Air Resources Board (CARB) has been designated as the state agency responsible for regulating air pollution sources at the state level. The CARB, in turn, has delegated the responsibility of regulating stationary emission sources to local air pollution control or management districts that, for the proposed federal action, is the San Diego Air Pollution Control District.

The CAA states that all applicable federal and state ambient air quality standards must be maintained during the operation of any emission source. The CAA also delegates to each state the authority to establish their own air quality rules and regulations. State adopted rules and regulations must be at least as stringent as the mandated federal requirements. In states where the NAAQS are exceeded, the CAA requires preparation of a State Implementation Plan (SIP) that identifies how the state will meet standards within timeframes mandated by the CAA.

The 1990 amendments to the CAA (1990 CAA) established new nonattainment classifications, new emission control requirements, and new compliance dates for areas presently in nonattainment of the NAAQS, based on the design day value. The design day value is the fourth highest pollutant concentration recorded in a 3-year period. The requirements and compliance dates for reaching attainment are based on the nonattainment classification.

One of the requirements established by the 1990 CAA was an emission reduction amount, which is used to judge how progress toward attainment of the ozone standards is measured. The 1990 CAA requires areas in nonattainment of the NAAQS for ozone to reduce basin

wide VOC emissions by 15 percent for the first 6 years and by an average 3 percent per year thereafter until attainment is reached. Control measures must be identified in the SIP, which facilitates reduction in emissions and show progress toward attainment of ozone standards.

The 1990 CAA states that a federal agency cannot support an activity in any way unless it determines the activity will conform to the most recent EPA-approved SIP. This means that Federally supported or funded activities will not: (1) cause or contribute to any new violation of any air quality standard; (2) increase the frequency or severity of any existing violation of any standard; or (3) delay the timely attainment of any standard or any required interim emission reductions or other milestones in any area. In accordance with Section 176 of the 1990 CAA, the EPA promulgated the final conformity rule for general Federal actions in the November 30, 1993 *Federal Register*. On April 5, 2010, EPA promulgated revised general conformity requirements at 40 C.F.R. Part 93 Subpart B (75 FR 17254). In the same action, EPA eliminated most of the general conformity requirements under 40 C.F.R. Part 51 Subpart W, because they were mostly duplicative of the requirements at 40 C.F.R. Part 93 Subpart B, and revised 40 C.F.R. § 51.851 to remove the obligation for states to include general conformity requirements in their implementation plans. The revised regulations took effect on July 6, 2010.

Project emissions do not exceed "de minimis" levels established as a criteria for a finding of conformity. Therefore, the project is consistent with the SIP and meets the requirements of Section 176(c).

10.10 MIGRATORY BIRD ACT, AS AMENDED

The proposed federal action will not entail the taking, killing, or possession of any migratory birds and is therefore in compliance with the MBTA. The proposed federal action also complies with Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds through implementation of Environmental Commitments.

10.11 404(b)(1) GUIDELINES

According to 40 CFR 230.5(b), evaluation for compliance with the 404(b)(1) guidelines is not required if the discharges of fill qualify for authorization under existing General permits and the project proponent implements all conditions of the General permits. The alternatives considered entail two types of discharges of fill:

> ***Discharge of return water***. This activity is common to all four alternatives considered. Under each alternative excess water from the dredged material would be treated pursuant to the conditions of the Los Angeles Regional Water Quality Control Board section 401 Water Quality Certification and returned into Colorado Lagoon. Discharge of return water would terminate upon completion of construction. Discharge of return water is authorized by Nationwide Permit 16 (Return Water from

Upland Contained Disposal Areas). With implementation of all conditions in the general permit, the discharge of return water would result in minimal impacts to the aquatic environment individually and cumulatively.

Discharge of dewatering structures. Under Alternative 4, a series of coffer dams would be discharged into the lagoon to temporarily isolate and the water the immediate dredge site. The coffer dams would be removed upon project completion. Discharge of dewatering structures is authorized by Nationwide Permit 33 (Temporary Construction, Access, and Dewatering). The placement of coffer dams would temporarily impact substrate, water quality, and circulation. However, all water quality parameters would return to baseline conditions upon project completion. With implementation of all conditions in the general permit, the discharge of return water would result in minimal impacts to the aquatic environment individually and cumulatively.

The discharges of fill in waters of the United States associated with the Project qualify for authorization under Nationwide permits 16 and 33. Furthermore, the City of Long Beach would be required to fully implement all terms and conditions of both Nationwide permits. Based on the above, discharges fill in waters of the United States associated with the Project would be in compliance with 404(b)(1) Guidelines.

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APPENDIX A:

COLORADO LAGOON RESTORATION PROJECT DRAFT TECHNICAL REPORT

DRAFT TECHNICAL REPORT

COLORADO LAGOON RESTORATION PROJECT

LONG BEACH, CALIFORNIA

Submitted to:

The City of Long Beach
and
The United States Army Corps of Engineers

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LSA Project No. CLB0803

LSA

May 2010

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1.0 INTRODUCTION

1.1 PROPOSED ACTION

The Colorado Lagoon (Lagoon) is located in the City of Long Beach (City), Los Angeles County (County), California. The Los Angeles District of the United States Army Corps of Engineers (Corps) proposes to perform dredging activities in the western arm and central portion of the Lagoon.

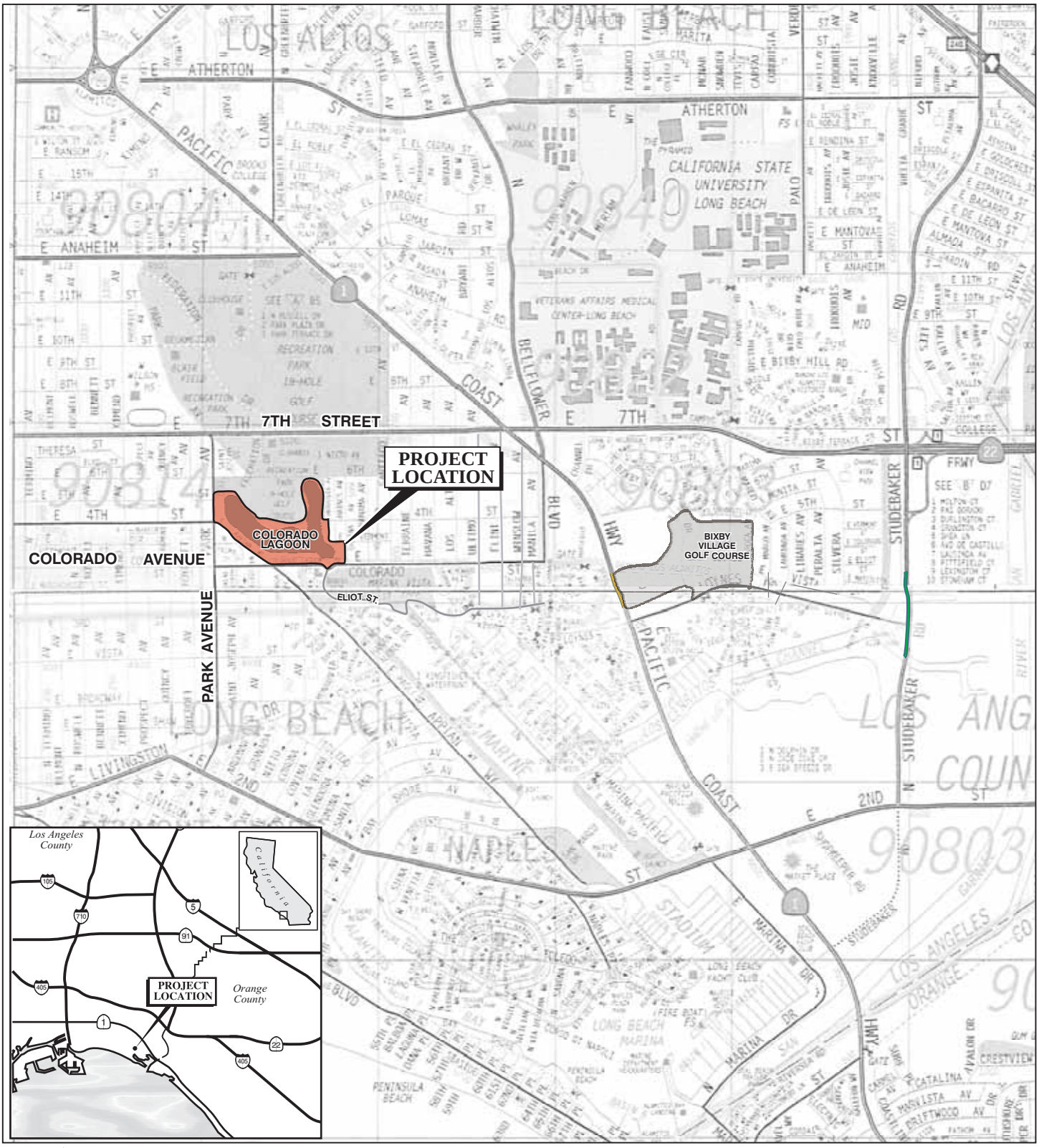
The proposed project includes the sediment removal of approximately 32,500 cubic yards (cy) from the Lagoon. Disposal of the dredge material would occur at a disposal site at the Port of Long Beach (POLB). The dredge disposal will be stabilized prior to transport with a cement stabilization process. Four dredging alternatives are proposed. The alternatives vary with regard to the type of equipment used and the method of transport of the dredge material to the POLB disposal site.

1.2 PROJECT LOCATION

The Lagoon is an approximately 11.7-acre (ac) tidal water body located in the City. The Lagoon is owned and maintained as a City park by the City Department of Parks, Recreation, and Marine. Regional access to the Lagoon is provided by Interstate 405 (I-405), Interstate 605 (I-605), and Interstate 710 (I-710) to the north and west (Figure 1). The Lagoon is primarily accessible from East Appian Way and East Colorado Street via Park Avenue from East 7th Street. However, many local streets provide access to the Lagoon and its surrounding areas. The Lagoon lies northwest of the mouth of the San Gabriel River and is north of Marine Stadium and Alamitos Bay. Connectivity of the Lagoon to Alamitos Bay and the Pacific Ocean is facilitated by a tidal culvert under Marina Vista Park that connects the Lagoon to Marine Stadium.

1.3 PROJECT HISTORY

The Lagoon was once a part of the historic Los Cerritos Wetlands. In 1923, the low-lying tidelands of Alamitos Bay were dredged to form the Lagoon and Marine Stadium, which were used for recreational rowing. The City then purchased the Lagoon area and Recreation Park in the 1920s through general revenue bond funding. The 1932 Los Angeles Olympic Committee chose the Lagoon for diving trials and Marine Stadium for rowing events. High diving was performed from a three-story structure that was floating in the Lagoon. To prepare for the diving trials, the Lagoon was separated from Marine Stadium by a tide gate, which was installed to maintain adequate diving depth. In 1968, the City remodeled Marine Stadium for the Olympic rowing and canoeing team trials. Also, in the late 1960s, the area between what is now the north end of Marine Stadium and the south end of the Lagoon was filled and the existing underground box culvert was constructed, thereby further separating the Lagoon from Marine Stadium. This was undertaken as part of the construction for the then-proposed Pacific Coast Freeway. This “filled” area is now Marina Vista Park.



LSA

FIGURE 1

SOURCE: Thomas Guide, 2007

Colorado Lagoon Restoration Project

Project Location

I:\CLB0803\G\Location.cdr (3/22/2010)

The deteriorated ecological health of the Lagoon has been established for the past several decades. In addition to tidal influence, the Lagoon receives inflow from 11 storm water drains. Since the Lagoon is a natural low point in the watershed, it accumulates pollutants deposited over the entire watershed that enter the storm drains by storm flows and dry weather runoff. Additionally, sediment deposition and marine growth have reduced the capacity of the culvert, resulting in a lack of tidal flushing at low tides and increased degradation of water quality.

The Lagoon's watershed is 1,172 ac and composed of 773 ac of residential, 125 ac of commercial, 55 ac of institutional (schools), and 219 ac of open-space land uses. Urban runoff contains many pollutants such as heavy metals, pesticides, petroleum, hydrocarbons, nutrients, and bacteria. As a result, the Lagoon is listed in the 2002 and 2006 Clean Water Act (CWA) Section 303(d) lists as an impaired water body for lead, zinc, sediment toxicity, chlordane, dichloro-diphenyl-trichloroethane (DDT), dieldrin, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and bacteria. Beach advisory postings due to elevated bacteria levels are frequent.

The County Department of Public Works (DPW) is replacing and rerouting the Termino Avenue Drain that currently drains to the Lagoon. The Termino Avenue Drain is a major outfall structure at the Lagoon that consists of two side-by-side storm water drainage lines. The County DPW project would extend and reroute the drain to empty into Marine Stadium, thereby bypassing the Lagoon. The Termino Avenue Drain Project (TADP) would also intercept three additional drainpipes that currently discharge into the Lagoon. While this project would benefit water quality within the Lagoon, additional measures, as included in the City's Colorado Lagoon Restoration Project, would provide more complete and long-term benefits to water quality, habitat restoration, and recreational enhancements.

The City certified an Environmental Impact Report (EIR) for the Colorado Lagoon Restoration Project in October 2008. Since that time, the City has obtained a Coastal Development Permit (CDP) from the California Coastal Commission (CCC) and a Water Quality Certification from the Regional Water Quality Control Board (RWQCB) for the project and continued to work with resource agencies toward the issuance of a Nationwide Permit and Letter of Permission from the Corps.

2.0 PROJECT PLAN

2.1 PROJECT DESCRIPTION

The proposed federal action under consideration by the Corps is the dredging of contaminated sediment in the western and central arms of the Lagoon.

The dredging activities proposed for the Lagoon are part of a multicomponent project known as the Colorado Lagoon Restoration Project. Phase 1 of the Colorado Lagoon Restoration Project includes improvements at the Lagoon and to the existing culvert that connects the Lagoon and Marine Stadium. Phase 2 involves improvements within Marina Vista Park, which includes developing an open channel or second underground culvert. The dredging activities would dredge material out of the western arm and central Lagoon areas.

The Lagoon is listed as impaired on California's 303(d) list of water quality limited segments due to lead, zinc, chlordane, and PAHs in the sediment; and chlordane, DDT, dieldrin, and PCBs in tissues of marine organisms. Additionally, the RWQCB has approved total maximum daily loads (TMDLs) for the Lagoon that require removal of contaminated sediments. It is estimated that the layer of contaminated sediment reaches 4–7 feet (ft) deep in portions of the western arm of the Lagoon and up to 3 ft deep in the central area. Sediment will be removed beyond these depths to provide a safeguard that only clean sediment remains. The depth of excavation at the deepest point would be down to 18 ft below the mean sea level point of 1929, or 15.4 ft below mean lower low water (MLLW). The width of the excavation footprint is intended to be as wide as possible to remove the maximum quantity of sediment while still providing for stable side slopes around the Lagoon perimeter. Slopes are to be dredged to create a smooth transition from the Lagoon bottom up the side slopes.

The proposed central Lagoon dredging activities would remove sediment and sand that has eroded and been deposited into the Lagoon waters over the years, creating a larger subtidal area. Contaminated sediments will also be removed from this area. Dredging activities would have a 4–6 month duration and would result in the removal of approximately 32,500 cy of sediment from the western arm and the central Lagoon. Dredging and placement of dredge material operations are expected to be performed by one or more of the following dredge types: hydraulic dredge; mechanical (i.e., clamshell or barge-based excavator) dredge; or a combination of the above listed dredges. The City is also investigating the feasibility of using electric excavators to dredge the Lagoon. All excavated material would be transported to POLB after being treated with cement to stabilize lead.

2.2 PROJECT PURPOSE AND NEED

The existing water and sediment quality within the Lagoon is degraded due to elevated levels of lead, zinc, chlordane, and PAHs in the sediment; and chlordane, DDT, dieldrin, and PCBs in fish and mussel tissue. In addition, testing confirmed the presence of PCBs, cadmium, copper, mercury, and silver as secondary contaminants of concern. The purpose of the proposed dredging of the Lagoon is to remove the contaminated sediment.

The objective of the Proposed Action is to support the City's efforts to restore the Lagoon by implementing an important component of the Colorado Lagoon Restoration Project. Primary benefits to be realized from the proposed dredging activities include improved sediment and water quality from the removal of existing sediment and establishing conditions that enable the City to implement biological restoration and recreation improvements at the Lagoon.

The purpose of this technical report is to address potential air quality, noise, and traffic impacts that may result from each of the dredging alternatives.

2.3 ALTERNATIVES

The purpose of analyzing four alternatives is to increase the number of options available for the contractor carrying out the dredging activities. The decision for the type of dredge to be used would be left to the discretion of the contractor or by funding requirements.

2.3.1 No Action Alternative

The "No Action" Alternative, or that of not dredging the Lagoon, would result in the continuance of existing conditions. If dredging did not occur, the contaminated sediment would continue to be present and untreated, and is expected to result in continued adverse impacts to the environment.

2.3.2 Alternative 1 (Mechanical Dredge and Truck Option Alternative)

The intention of this alternative is to dredge the central and western areas of the Lagoon using mechanical dredge/excavation equipment (barge-based clamshell/excavator or land-based excavator) and truck the dredge material to the Port of Long Beach. The City is also investigating the feasibility of using electric excavators to dredge the Lagoon. The dredge area would be isolated by a silt curtain, and closed "environmental" buckets would be used to maintain water quality. Clamshell/bucket-type dredging equipment would be used or temporary shore-perpendicular berms or piers would be built into the Lagoon to allow a land-based dredger to access depths not within reach from the Lagoon's shores. The dredge material would be temporarily stockpiled in the parking lot along the northern shore of the Lagoon until it was treated with cement and loaded onto trucks. Plastic tarps and containment structures would be placed under and around the stockpile areas to minimize runoff back into the Lagoon and surrounding areas.

The equipment that would be utilized for dredging activities is listed in Table A. The other equipment on site (bulldozer, loader, etc.) would be diesel fueled. The dredge material would be treated on site (at the Lagoon) through cement stabilization and solidification. The cement stabilization process would occur with a pug mill that would mix the dredge material with cement at an up to 20 percent mixture ratio. Once the cement stabilization process is complete, the treated dredge material would be loaded onto trucks and transported to the POLB disposal site (an approximately 24-mile [mi] roundtrip truck trip from the Lagoon). The trucked material would be put into the Slip 1 fill site at the POLB from dockside. The amount of dredge material is anticipated to be 32,500 cy (52,000 tons). Approximately 10,400 tons of cement would be required to maintain a 20 percent mixture ratio for

Table A: Proposed Dredging Equipment

Type of Equipment	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Barge-based excavator or clamshell dredge[1]	X	X		X
Non-electric hydraulic dredge			X	
Dredge pipeline booster pump (diesel fueled)			X	
Bulldozer	X	X	X	X
Small Track Loader	X	X	X	X
Excavator	X	X	X	X
Front-end Loader	X	X	X	X
Grader	X	X	X	X
Small Crane	X	X	X	X
Dewater Equipment/Pumps				X
Pug mill	X	X	X	X
Conveyor				
Generator (diesel fueled)	X	X	X	X
Barge		X	X	X
Tugboat		X	X	X
End-Dump Trucks	X	X		X
Cement Delivery Trucks	X	X	X	X

[1] Electric dredge equipment will be utilized if feasible.

the cement stabilization process. The cement that would be used for this process is anticipated to come from one of the several cement companies located at POLB. The total amount of treated dredge material is anticipated to be 39,000 cy (62,400 tons).

It is anticipated that this alternative would require a total of 2,275 truck trips (which includes trucks coming from POLB to the Lagoon for cement import activities and truck trips from the Lagoon to POLB to transport treated dredge material).

2.3.3 Alternative 2 (Non-Electric Mechanical Dredge Equipment Alternative)

This alternative involves dredging activity using non-electric mechanical dredge/excavation equipment (barge-based clamshell or land-based excavator). The dredge area would be isolated by a silt curtain, and closed "environmental" buckets would be used to maintain water quality. The dredge material would be treated on site through cement stabilization and solidification. Similar to Scenario 1, the cement stabilization process would occur using a pug mill to mix the dredge material with cement at an up to 20 percent mixture ratio.

Alternative 2 differs from Alternative 1 in the mode of transport to the disposal site at the POLB. For Alternative 2, once the cement stabilization process is complete, the treated dredge material would be loaded onto trucks and transported to Marine Stadium (an approximately 2 mi roundtrip truck trip from the Lagoon). The treated dredge material would be transferred from the trucks onto a barge/scow located at Marine Stadium. From there, the barge would transport treated dredge material to the POLB disposal site (an approximately 20 mi roundtrip barge trip from Marine Stadium).

It is anticipated that this alternative would require 325 truck trips from POLB to the Lagoon for cement import activities and 1,950 truck trips from the Lagoon to Marine Stadium for treated dredge

material transport activities. In addition to these truck trips, approximately 35 barge trips from the Marine Stadium loading dock to POLB would also occur (based on an average barge capacity of 1,200 cy and based on the assumption that the barge is propelled by tug boats).

2.3.4 Alternative 3 (Non-Electric Hydraulic Equipment Alternative)

This alternative would result in the dredging of the Lagoon using a non-electric hydraulic dredge equipment. Dredged material would be piped through an underground culvert to either the Marine Stadium barge or land-based treatment facility. It is anticipated that the piping of the dredge material would require the use of a diesel-fueled booster pump and that the pug mill operation would be powered with a diesel-fueled generator. Once the piped dredge material reaches the Marine Stadium barge or land-based treatment facility, the dredge material would be dewatered. This process may include a flocculation process, where a chemical reagent (e.g., coagulants or flocculants) is added to the dredge material and causes the separation of sediment and water to occur. Water resulting from the dewatering process would be treated prior to discharge into the Marine Stadium/Colorado Lagoon. Sediment resulting from the dewatering process would be treated through cement stabilization and loaded onto a barge located at the northwest end of Marine Stadium. From there, the barge would transport treated dredge material to the POLB disposal site (an approximately 20 mi roundtrip barge trip from Marine Stadium to POLB).

It is anticipated that this alternative would require 325 truck trips from POLB to the Lagoon for cement import activities. In addition to these truck trips, approximately 35 barge trips from the Marine Stadium loading dock to POLB would also occur (based on an average barge capacity of 1,200 cy and based on the specification that the barge is propelled by tug boats). It is anticipated that the barge location for this alternative would be adjacent to the treatment site, eliminating the need to truck material between the treatment at Marine Stadium and the Marine Stadium barge.

2.3.5 Alternative 4 (Dry Dredge Alternative)

This alternative would utilize the dry dredge method that would install a temporary coffer dam to isolate the west and central areas of the Lagoon. The dredge area would be drained of water, and the bottom sediment would be dewatered. An excavator would be used to remove the dry sediment, which would be temporarily stockpiled in the parking lot along the Lagoon's north shore and the southwest shore of the Lagoon. Plastic tarps and containment structures would be placed under and around the stockpile area to minimize runoff back into the Lagoon and surrounding areas.

Dredging activities would be carried out using a non-electric mechanical excavator. It is anticipated that the dewatering of the west arm and central Lagoon would require the use of diesel-fueled pumps to dewater groundwater. Similar to Alternatives 1 and 2, the dredge material would be treated on site through the cement stabilization process. This alternative specifies the use of a diesel generator at the treatment site. Once the cement stabilization process is complete, the treated dredge material would be loaded onto trucks and trucked to Marine Stadium, where it would be transferred from the trucks onto a barge/scow located at the northwest end of Marine Stadium and transported to the POLB disposal site.

It is anticipated that this alternative would require 325 truck trips from POLB to the Lagoon for cement import activities and 1,950 truck trips from the Lagoon to Marine Stadium. In addition to these truck trips, approximately 35 barge trips from the Marine Stadium loading dock to POLB would also occur (based on an average barge capacity of 1,200 cy and based on the specification that the barge is propelled by tug boats).

3.0 AFFECTED ENVIRONMENT

3.1 PHYSICAL ENVIRONMENT

The City is approximately 20 mi south of downtown Los Angeles and is adjacent to the Pacific Ocean. The Lagoon, Marina Vista Park, and Marine Stadium (which comprise the proposed project site) are located in the southeastern portion of the City. The Lagoon lies northwest of the mouth of the San Gabriel River and is north of Marine Stadium and Alamitos Bay. The Lagoon is primarily accessible from East Appian Way and East Colorado Street via Park Avenue from East 7th Street. However, many local streets provide access to the Lagoon and its surrounding areas. Regional access to the project site is provided by I-405, I-605, and I-710 to the north and west.

The project location is within the United States Geological Survey (USGS) *Long Beach, California* 7.5-minute quadrangle. The site lies within the southwestern block of the Los Angeles Basin, which is comprised of a low alluvial floodplain. The floodplain is bound by a line of elongated low hills, folds, and faults, which delineate the northwest-trending Newport-Inglewood Structural Zone.

Prior to extensive dredging of the Lagoon and Marine Stadium area in the 1920s, the site was a tidal mudflat that received alternating alluvial deposits of marine sands, organic silts and clays, and fluvial deposits. In the 1960s, the previously dredged area between what is now the north end of Marine Stadium and the south end of the Lagoon was filled and the existing underground box culvert constructed. This was undertaken as part of the construction for the then-proposed Pacific Coast Freeway. This “filled” area is now Marina Vista Park. Consistent with the project area’s history, the soil underlying the project site is characterized by predominately younger alluvial deposits and artificial fill. Younger alluvial deposits consist of Holocene alluvial soft clay, silt, silty sand, and sand.

Recreation Park is adjacent to the Lagoon on the north and includes a 9-hole and 18-hole golf course, a baseball stadium, a casting pond, picnic areas, a dog park, tennis courts, a community center, lawn bowling, and a playground. In addition, Marina Vista Park is located to the southeast of the Lagoon, on the south side of East Colorado Street. Marina Vista Park overlooks the water of Marine Stadium to the south and provides the following amenities: two soccer fields, tennis courts, a baseball diamond, play equipment, picnic areas, and restrooms.

The Colorado Lagoon Playgroup Preschool, which is a program for 3- to 5-year-old children, and a model boat shop are located on the south side of the Lagoon. Other on-site facilities at the Lagoon include the City’s Colorado Lagoon Marine Science Center, which is staffed by the City and Friends of the Colorado Lagoon (FOCL), restrooms, parking, a pedestrian bridge, a lifeguard station, sandy shoreline areas, play equipment, picnic areas, and grassy open-space areas.

The area surrounding the Lagoon is composed primarily of park and recreational area and existing residential neighborhoods, as described below.

- **North:** Recreation Park, which is a City park, is adjacent to the Lagoon on the north and includes 9-hole and 18-hole golf courses, a baseball stadium, a softball stadium, a casting pond, picnic areas, a dog park, tennis courts, a community center, lawn bowling, a bandshell, and a playground.
- **South:** Developed neighborhoods, which are largely composed of residential land uses, are located to the south. Small areas of commercial and institutional development are located to the south of the Lagoon and to the west of Marina Vista Park. In addition, Marine Stadium, which is a recreational water body, is located to the south of the project site.
- **East:** Developed residential land uses are located to the east of the project site.
- **West:** Developed residential land uses are located to the west of the project site.

3.2 AIR QUALITY

3.2.1 Meteorology

Climate in the South Coast Air Basin (SCAB) is determined by its terrain and geographical location. The SCAB is a coastal plain with connecting broad valleys and low hills. The Pacific Ocean forms the southwestern border, and high mountains surround the rest of the SCAB. The SCAB lies in the semipermanent high-pressure zone of the eastern Pacific; the resulting climate is mild and tempered by cool ocean breezes. This climatological pattern is rarely interrupted; however, periods of extremely hot weather, winter storms, or Santa Ana wind conditions do occur.

The annual average temperature varies little throughout the SCAB, ranging from the low to middle 60s, measured in degrees Fahrenheit (°F). With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas. The climatological station closest to the site is the Long Beach Station.[1] The monthly average maximum temperature recorded at this station from April 1958 to August 2009 ranged from 66.9°F in January to 83.9°F in August, with an annual average maximum of 74.2°F. The monthly average minimum temperature recorded at this station ranged from 45.3°F in December to 64.9°F in August, with an annual average minimum of 54.8°F. January is typically the coldest month, and August is typically the warmest month in this area of the SCAB.

Most rainfall in the SCAB occurs between November and April. Summer rainfall is minimal and is generally limited to scattered thundershowers in coastal regions and slightly heavier showers in the eastern portion of the SCAB and along the coastal side of the mountains. The Long Beach Station monitored precipitation from April 1958 to August 2009. Average monthly rainfall during that period varied from 2.94 inches in February to 0.39 inch or less between May and October, with an annual total of 11.89 inches. Patterns in monthly and yearly rainfall totals are unpredictable due to fluctuations in the weather.

Although the SCAB has a semiarid climate, air near the surface is generally moist because of the presence of a shallow marine layer. With very low average wind speeds, there is a limited capacity to disperse air contaminants horizontally. The dominant daily wind pattern is an onshore 8- to 12-mile

[1] Western Regional Climate Center, http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca5085, website accessed March 18, 2010.

per hour (mph) daytime breeze and an offshore 3–5 mph nighttime breeze. The typical wind flow pattern fluctuates only with occasional winter storms or strong northeasterly (Santa Ana) winds from the mountains and deserts northeast of the SCAB. Summer wind flow patterns represent worst-case conditions because this is the period of higher temperatures and more sunlight, which results in ozone formation.

3.2.2 Air Quality

Many factors have a potential impact on air quality, including local climate, topography, and land use. The proposed project is located within the City, which is within the non-desert portion of the County. Los Angeles County is part of the SCAB and is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). Air quality is determined primarily by meteorological conditions, the type and amount of pollutants emitted, and their subsequent dispersion into the atmosphere. The combination of topography, low mixing height, abundant sunshine, and emissions from the second largest urban area in the United States gives the SCAB the worst air pollution problem in the nation.

During spring and early summer, pollution produced during any one day is typically blown out of the SCAB through mountain passes or lifted by warm, vertical currents adjacent to mountain slopes. Air contaminants can be transported 60 mi or more from the SCAB by ocean air during the afternoons. From early fall to winter, the transport is less pronounced because of slower average wind speed and the appearance of drainage winds earlier in the day. During stagnant wind conditions, offshore drainage winds may begin by late afternoon. Pollutants remaining in the SCAB are trapped and begin to accumulate during the night and the following morning. A low morning wind speed in pollutant source areas is an important indicator of air stagnation and the potential for buildup of primary air contaminants.

Inversions are generally lower in the nighttime when the ground is cool than during daylight hours when the sun warms the ground and, in turn, the surface air layer. As this heating process continues, the temperature of the surface air layer approaches the temperature of the inversion base, causing heating along its lower edge. If enough warming takes place, the inversion layer becomes weak and opens up to allow the surface air layers to mix upward. This can be seen in the middle to late afternoon on a hot summer day when the smog appears to clear up suddenly. Winter inversions typically break earlier in the day, preventing excessive contaminant buildup.

The combination of stagnant wind conditions and low inversions produces the greatest pollutant concentrations. On days of no inversion or high wind speeds, ambient air pollutant concentrations are lowest. During periods of low inversions and low wind speeds, air pollutants generated in urbanized areas are transported predominantly onshore into Riverside and San Bernardino Counties. In the winter, the greatest pollution problem is accumulation of carbon monoxide (CO) and oxides of nitrogen (NO_X) due to extremely low inversions and air stagnation during the night and early morning hours. In the summer, the longer daylight hours and the brighter sunshine combine to cause a reaction between hydrocarbons and NO_X to form photochemical smog.

Pollutants of potential concerns include ozone (O_3), CO, nitrogen dioxide (NO_2), particulate matter (PM_{10}, $PM_{2.5}$), sulfur dioxide (SO_2), and lead. These chemicals, called criteria pollutants, are harmful to an individual's health, materials, and agriculture. The quality of surface air (air quality) is evaluated by measuring ambient concentrations of pollutants that are known to have harmful effects

on public health. The degree of air quality degradation is then compared to ambient air quality standards (AAQS) such as the California and National Ambient Air Quality Standards (CAAQS and NAAQS, respectively). The Federal Clean Air Act (CAA) (42 United States Code [USC] Sections 7401–7671q) requires the adoption of NAAQS to protect the public health and welfare from the effects of air pollution. The NAAQS have been updated on many occasions to adjust the criteria pollutants. Current standards are set for SO_2, CO, NO_2, O_3, PM_{10} and $PM_{2.5}$, and lead. The California Air Resources Board (ARB) has established additional standards that are generally more restrictive than the NAAQS.

The 1990 Federal CAA amendments, Section 176, requires the United States Environmental Protection Agency (EPA) to put into effect rules to ensure that federal actions conform to the appropriate State Implementation Plan (SIP). These rules, known together as the General Conformity Rule (40 Code of Federal Regulations [CFR] Sections 51.850–.860 and 40 CFR Sections 93.150-.160), require any federal agency responsible for an action in a non-attainment area, to determine that the action is either exempt from the General Conformity Rule's requirements or to positively determine that the action conforms to the applicable SIP. In addition to the roughly 30 presumptive exemptions established and available in the General Conformity Rule, an agency may establish that emission rates would be less than specified emission rate thresholds, known as *De Minimis* limits. An action is exempt from a conformity determination if an applicability analysis shows that the total direct and indirect emissions from the project will be below the applicable *De Minimis* thresholds and will not be regionally significant, which is defined as representing 10 percent or more of an area's emissions inventory or budget. Air quality in the United States is governed by the Federal CAA and is administered by the EPA. In addition to being subject to the requirements of the CAA, air quality in California is also governed by more stringent regulations under the California CAA. Table B summarizes the CAAQS and NAAQS for pollutants.

The SCAQMD is the agency responsible for attaining state and federal clean air standards in the SCAB that includes the Colorado Lagoon Dredging Project area. The SCAQMD is the regional agency charged with being primarily responsible for managing local air quality by regulating emissions from stationary sources of air pollution. Standards for motor vehicle emissions are set by the ARB and apply uniformly statewide. The SCAQMD Rules and Regulations are adopted by the SCAQMD and apply to the area and activities within the SCAB. The SCAQMD also is involved with the overall development and implementation of the SIP, as well as adopting and enforcing emissions from motor vehicles, fuels, and consumer products at the state level. The SCAQMD is also charged with updating the air quality management plan (AQMP) for the SCAB. The AQMP outlines the District's strategies to reduce ozone precursor emissions from a wide variety of stationary and mobile sources.

Air quality in the proposed Colorado Lagoon Dredging Project area is generally good. As noted above, however, standards for ozone are exceeded, most often in summer months. Although standards are exceeded only a few times annually in the coastal zone, they are exceeded more frequently inland due to pollutants carried by prevailing winds. The major source of air pollution in the project area is automobiles, followed by recreational facilities.

Table B: Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone (O_3)	1-Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	--	Same as Primary Standard	Ultraviolet Photometry
	8-Hour	0.07 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM_{10})	24-Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		--		
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15.0 µg/m^3		
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1-Hour	20 ppm (23 mg/m^3)		35 ppm(40 mg/m^3)		
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	—
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminescence
	1-Hour	0.18 ppm (339 µg/m^3)		0.100 ppm (see footnote 8)	None	
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	—	Ultraviolet Fluorescence	0.030 ppm (80 µg/m^3)	—	Spectrophotometry (Pararosaniline Method)
	24-Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (365 µg/m^3)	—	
	3-Hour	—		—	0.5 ppm (1300 µg/m^3)	
	1-Hour	0.25 ppm (655 µg/m^3)		—	—	
Lead[10]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High-Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3	Same as Primary Standard	
	Rolling 3-Month Average[9]	—		0.15 µg/m^3		
Visibility-Reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer - visibility of ten miles or more (0.07-30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		**No Federal Standards**		
Sulfates	24-Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[9]	24-Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Source: California Air Resources Board, February 16, 2010.

Table footnotes are provided on the following page.

Footnotes:

[1] California standards for ozone; carbon monoxide (except Lake Tahoe); sulfur dioxide (1- and 24-hour); nitrogen dioxide; 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 California Code of Regulations.

[2] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth-highest eight-hour concentration in a year, averaged over three 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 above 150 $\mu g/m^3$ 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 three years, are equal to or less than the standard. Contact the EPA for further clarification and current federal policies.

[3] 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 a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[4] Any equivalent procedure which can be shown to the satisfaction of ARB to give equivalent results at or near the level of the air quality standard may be used.

[5] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[6] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[7] Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the EPA.

[8] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).

[9] The ARB has identified lead and vinyl chloride as "toxic air contaminants" with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[10] National lead standard, rolling 3-month average: final rule signed October 15, 2008.

°C = degrees Celsius
EPA = United States Environmental Protection Agency
$\mu g/m^3$ = micrograms per cubic meter
mg/m^3 = milligrams per cubic meter
ppm = parts per million

3.3 NOISE

Noise is generally defined as unwanted or objectionable sound. Noise levels are measured on a logarithmic scale because of physical characteristics of sound transmission and reception. Noise energy is typically reported in units of decibels (dB) in which a change of 10 units on the decibel scale reflects an increase of 10 times the noise energy and roughly translates to a doubling of perceived loudness. The human ear does not respond uniformly to sounds at all frequencies, being less sensitive to low and high frequencies than to medium frequencies, which correspond with human speech. In response to this, the A-weighted noise level (or scale) was developed. The A-weighted scale corresponds better with people's subjective judgment of sound levels than does the traditional decibel scale. The A-weighted sound level is called the "noise level" referenced in dBA. Noise is measured on a logarithmic scale; a doubling of sound energy results in a 3 dBA increase in noise levels. However, changes in noise levels of less than 3 dBA are not typically noticeable by the human ear. Changes from 3–5 dBA may be noticed by some individuals who are extremely sensitive to changes in noise. A 5.0 dBA increase is readily noticeable, while the human ear perceives a 10 dBA increase in sound level to be a doubling of sound.

Noise levels diminish (or attenuate) as distance to the source increases according to the inverse square rule, but the rate constant varies with type of sound source. Sound attenuation from point sources, such as industrial facilities, is approximately 6 dB per doubling of distance. Heavily traveled roads with few gaps in traffic behave as continuous line sources and attenuate at 3 dB per doubling of distance. Noise from more lightly traveled roads is attenuated at 4.5 dB per doubling of distance.

Community decibel levels are reported in different ways. The two most common reporting mechanisms used in environmental analysis of community noise levels are the Community Noise Equivalent Level (dBA, CNEL) and the Equivalent Noise Level (dBA, L_{eq}). The CNEL is a 24-hour weighted noise average, which assigns a 5 dB penalty to the noise levels (adds 5 dB to the measured noise level before computing the noise average) between the hours of 7:00 p.m. and 10:00 p.m. and a 10 dB penalty from 10:00 p.m. to 7:00 a.m. These penalties are intended to account for a greater sensitivity to noise, which occurs during quiet evening hours and overnight hours when people sleep.

The CNEL is therefore most appropriate for analysis of projects that are anticipated to generate substantial noise during nighttime and overnight hours, such as supermarkets, which experience predawn deliveries of goods (such as associated heavy truck noise and loading/unloading noise), other 24-hour retail uses, and certain industrial uses. Similar to the CNEL, the L_{eq} is also a type of noise average, but the L_{eq} does not assign a penalty or weighting to record noise levels as the CNEL does. Rather, the L_{eq} represents the average of the fluctuating noise levels recorded in any given time period, usually 1 hour, or $L_{eq\,(h)}$. The L_{dn} index, the average A-weighted noise level during a 24-hour day, obtained after addition of 10 dB to levels measured in the night between 10:00 p.m. and 7:00 a.m., penalizes nighttime noise the same as the CNEL index, but does not penalize evening noise.

People are subject to a multitude of sounds in the environment. Excessive noise cannot only be undesirable but may also cause physical and/or psychological damage. The amount of annoyance or damage caused by noise is dependent primarily upon three factors: the amount and nature of the noise, the amount of ambient noise present before the intruding noise, and the activity of the person working or living in the noise source area. The difficulty in relating noise exposure to public health and welfare is one of the major obstacles in determining appropriate maximum noise levels. Although

there is some dispute in the scientific community regarding the detrimental effects of noise, a number of general conclusions have been reached:

- Noise of sufficient intensity can cause irreversible hearing damage
- Noise can produce physiological changes in humans and animals
- Noise can interfere with speech and other communication
- Noise can be a major source of annoyance by disturbing sleep, rest, and relaxation

The City of Long Beach Noise Element contains noise standards for mobile noise sources. These standards address the impacts of noise from adjacent roadways and airports. The City specifies outdoor and indoor noise limits for residential uses, places of worship, educational facilities, hospitals, hotels/motels, and commercial and other land uses. The noise standard for exterior living areas is 65 dBA CNEL. The indoor noise standard is 45 dBA CNEL, which is consistent with the standard in the California Noise Insulation Standard.

In addition to the Noise Element of the General Plan, the City has adopted a quantitative Noise Control Ordinance, No. C-5371, Long Beach 1977 (Municipal Code, Chapter 8.80). The ordinance establishes maximum permissible hourly noise levels (L_{50}) for different districts throughout the City. Tables C and D list exterior noise and interior noise limits for various land uses. For the purposes of the proposed project, the exterior noise standard of 70 dBA L_{max} has been applied to all of the sensitive land uses, the residences, the preschool, and the open space located within the vicinity of the project dredging areas.

Table C: Exterior Noise Limits, L_N (dBA)

Receiving Land Use	Time Period	L_{50}	L_{25}	L_8	L_2	L_{max}
Residential (District One)	Night: 10:00 p.m.–7:00 a.m.	45	50	55	60	65
	Day: 7:00 a.m.–10:00 p.m.	50	55	60	65	70
Commercial (District Two)	Night: 10:00 p.m.–7:00 a.m.	55	60	65	70	75
	Day: 7:00 a.m.–10:00 p.m.	60	65	70	75	80
Industrial (District Three)	Anytime[1]	65	70	75	80	85
Industrial (District Four)	Anytime[1]	70	75	80	85	90

[1] For use at boundaries rather than for noise control within industrial districts.
dBA = A-weighted decibels
L_2 = A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 2% of a stated time period.
L_8 = A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 8% of a stated time period.
L_{25} = A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 25% of a stated time period.
L_{50} = A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 50% of a stated time period.
L_{max} = maximum sound level
L_N = percentile noise exceedance level

Table D: Maximum Interior Sound Levels, L_N (dBA)

Receiving Land Use	Time Interval	L_8	L_2	L_{max}
Residential	10:00 p.m.–7:00 a.m.	35	40	45
	7:00 a.m.–10:00 p.m.	45	50	55
School	7:00 a.m.–10:00 p.m. (while school is in session)	45	50	55
Hospital and other noise-sensitive zones	Anytime	40	45	50

dBA = A-weighted decibels
L_2 = A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 2% of a stated time period.
L_8 = A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 8% of a stated time period.
L_{max} = maximum sound level
L_N = percentile noise exceedance level

The City's Noise Control Ordinance (Section 8.80.202) governs the time of day that construction work can be performed. The Noise Ordinance prohibits construction, drilling, repair, remodeling, alteration, or demolition work between the hours of 7:00 p.m. and 7:00 a.m. on weekdays or federal holidays (considered a weekday) if the noise would create a disturbance across a residential or commercial property line or violate the quantitative provisions of the ordinance, except for emergency work authorized by the building official.

The Noise Ordinance prohibits construction, drilling, repair, remodeling, alteration, or demolition work between the hours of 7:00 p.m. on Friday and 9:00 a.m. on Saturday and after 6:00 p.m. on Saturday, except for emergency work authorized by the building official. No construction, drilling, repair, remodeling, alteration, or demolition work shall occur at anytime on Sundays, except for emergency work authorized by the building official.

The Colorado Lagoon is located in an area characterized primarily by residences, parks, and schools. Although noise measurements have not been taken, ambient noise levels are generally quiet. The primary existing noise sources in the project area are transportation facilities. Traffic on streets adjacent to the project site is the dominant source contributing to ambient noise levels in the project vicinity. Noise from motor vehicles is generated by engine vibrations, the interaction between the tires and the road, and the exhaust system. In addition, recreational facilities and activities contribute to the human-made ambient noise environment in the Lagoon. Noise levels tend to increase during summer months from heavy recreational activities.

3.4 TRAFFIC

The proposed project area is located in the southeastern portion of the City. The Lagoon and Marina Vista Park lie northwest of the mouth of the San Gabriel River and are north of Marine Stadium and Alamitos Bay. The closest major roadway to the project site is East 7th Street, which is a six-lane, east-west regional corridor located north of the project area. The proposed project area is bound by several local streets, including East 6th Street, Park Avenue, East Appian Way, East Colorado Street, East Eliot Street, Monrovia Avenue, Haines Avenue, and Orlena Avenue.

The City Traffic and Transportation Bureau of the Department of Public Works has estimated the following existing traffic volumes on the streets near the project site:

- East 7th Street currently carries approximately 45,000 vehicles a day between Pacific Coast Highway (PCH) and Park Avenue.
- The intersection of East 7th Street and PCH has an existing level of service (LOS) F in the a.m. and p.m. peak hours, which is below the City's established threshold of LOS D as the minimum operating level for roadway segments and intersections.[1]
- The portion of East Colorado Street adjacent to the Lagoon carries approximately 11,000 vehicles a day.
- Park Avenue carries approximately 15,000 vehicles a day north of East 4th Street and East Appian Way.
- Park Avenue carries approximately 10,500 vehicles a day south of East 4th Street and East Appian Way.
- East Appian Way carries approximately 9,000 vehicles a day.

The City does not have existing LOS information for the local streets serving the project area. However, the City Traffic Engineer has stated that existing traffic volumes on the local roads adjacent to the Lagoon area are higher than many residential/park areas due to the existing roadway network and other physical constraints such as the waters of Marine Stadium and Alamitos Bay and the bridges that cross Alamitos Bay. These physical constraints result in a somewhat discontinuous street network in the southeastern portion of Long Beach, and much of the traffic destined to or from Belmont Park, Belmont Shore, and portions of Belmont Heights utilize Park Avenue to access East 7th Street. East Appian Way also provides a secondary route to and from Belmont Park and Naples via a bridge over Alamitos Bay that connects to PCH.

[1] Long Beach Home Depot Traffic Impact Analysis, April 2005.

4.0 ENVIRONMENTAL EFFECTS

4.1 AIR QUALITY

Air quality impacts under any of the alternatives would be significant if emissions (including mobile and stationary sources) permanently exceed the following federal emission criteria pollutant thresholds:

- 10 tons per year (tons/yr) of ROC
- 10 tons/yr of NO_x
- 100 tons/yr of CO
- 100 tons/yr of SO_x
- 70 tons/yr of PM_{10}
- 100 tons/yr of $PM_{2.5}$

or the following South Coast Air Quality Management District (SCAQMD) thresholds:

- 70 pounds per day (lbs/day) of ROC
- 100 lbs/day of NO_x
- 550 lbs/day of CO
- 150 lbs/day of SO_x
- 150 lbs/day of PM_{10}
- 55 lbs/day of $PM_{2.5}$

4.1.1 No Action Alternative

This alternative would avoid all adverse effects to noise related to dredging activities; however, this alternative would not fulfill any of the project's objectives. The No Action Alternative would have a negative impact of not removing contaminated sediment from the Lagoon, and the environmental benefits to the project area would not be achieved. The water and sediment quality of the Lagoon would not be improved. There are no new sources of air emissions with implementation of this alternative.

4.1.2 Alternative 1 (Mechanical Dredge and Truck Option Alternative)

The proposed dredging activities under Alternative 1 would generate air emissions from heavy equipment emissions, and from emissions from vehicles used to transport dredge material from the Lagoon to POLB. Dredging activities under Alternative 1 would require the use of equipment identified previously in Table A. Dredge equipment could be electrically powered, in which case it would not result in on-site emissions. However, because the City has been unable to confirm the feasible availability of electric dredge equipment, diesel-powered dredge is assumed for purposes of air emission calculations and conformity determination. Emissions generated from the use of

equipment, transport of concrete and dredge material, and construction worker commutes are provided in Table E.

Table E: Alternative 1 Emissions

Type of Equipment[1]	Pollutants of Concern						
	CO	**ROC**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
2 Loaders	5.0	1.0	5.1	0.0	0.8	0.7	1,068.9
1 Generator	2.5	0.5	5.8	0.0	0.5	0.4	322.0
1 Dozer	4.1	0.7	14.9	0.0	0.6	0.6	956.4
1 Grader	2.0	0.5	8.2	0.0	0.5	0.5	1,061.9
1 Crane	0.8	0.2	4.6	0.0	0.2	0.1	257.3
1 Pug Mill	1.1	0.4	7.4	0.0	0.4	0.3	1,088.0
1 Clamshell Dredge	8.0	1.4	29.2	0.0	1.3	1.2	1,872.0
Haul Trucks[2]	9.4	1.4	17.6	0.0	0.6	0.6	2,490.6
Worker Commute[3]	3.3	0.1	0.4	0.0	0.0	0.0	514.4
Total (lbs/day)	**36.2**	**6.3**	**93.1**	**0.1**	**4.8**	**4.4**	**9,631.6**
SCAQMD Threshold (lbs/day)	550	75	100	150	150	55	N/A
Exceeds SCAQMD thresholds?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Alternative Total (tons)	**1.8**	**0.3**	**4.7**	**0.0**	**0.2**	**0.2**	**481.6**
De Minimus Thresholds (tons/year)	100	10	10	100	70	100	N/A
Exceeds De Minimus thresholds?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

[1] All off-road construction equipment is modeled using Tier 1 emission rates.
[2] Assumes that a total of 30 truck trips at 24 miles would be required per day.
[3] Assumes that a total of 20 trips at 40 miles would be required per day.

CO = carbon monoxide
CO_2 = carbon dioxide
lbs/day = pounds per day
NO_x = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
ROC = reactive organic compounds
SO_x = sulfur oxides

An action is presumed to conform and is exempt from a conformity determination if analysis shows that the total net direct and indirect emissions from the Proposed Action would be less than the applicable SCAQMD and *De Minimis* thresholds and if the project-related emissions are not regionally significant (would be less than 10 percent of the area emissions budget). The Proposed Action is dredging to remove contaminated sediment from the Lagoon and would result in emissions from the operation of equipment, the delivery of materials and equipment, removal of dredge material from the site, and construction worker commutes. The emissions from these sources represent the total net direct and indirect emissions from the Proposed Action. As shown in the table above, the emissions levels for this Alternative are less than the applicable SCAQMD and *De Minimis* thresholds.

The most recent EPA-approved SIP at the time of the release of the final general conformity determination is used for emission budget analyses. The 1997 AQMP together with supplemental information form the basis for the current, EPA-approved O3 SIP. The emissions inventories developed by SCAQMD and fully documented in the AQMPs are delineated by source types. The applicable source types for the proposed action include heavy-duty diesel truck, commercial boats, and mobile equipment. The emission budgets for these sources in the approved SIP are summarized in Table F.

Table F: Area Emission Budget (tons per day)

Source Category	TOG	VOC	CO	NO_X	SO_X	TSP	PM_{10}
Heavy-Duty Diesel Trucks	17.62	17.12	180.60	153.08	12.49	7.96	6.68
Commercial Boats	0.51	0.49	2.00	10.22	1.71	0.19	0.18
Mobile equipment	46.77	45.07	918.49	119.16	3.53	8.85	8.50
Total Applicable Source Categories	64.90	62.68	1,101.09	282.46	17.73	17.00	15.36

Source: 1997 AQMP
CO = carbon monoxide
NO_X = nitrogen oxide
PM_{10} = particulate matter less than 10 microns in diameter
SO_X = sulfur oxide
TOG =
TSP = total suspended solids
VOC = volatile organic compound

These daily source emission budgets were annualized (daily budget x 365) and compared to the annual emission generated by the project alternatives. The project-related emissions are substantially less than 10 percent of the area emissions budget (less than .01 percent) and therefore are not considered to be regionally significant.

Emissions from the dredge and other support equipment would result in minimal air impacts that are temporary and short term during dredging activity. Air quality would return to preproject conditions following completion of dredging. Therefore, the Corps has concluded that the air quality impacts generated by the proposed Colorado Lagoon Dredging Project would be temporary, short term, and minimal, and the Proposed Action will not have a significant adverse effect on air quality.

The Corps has concluded that the air conformity analyses described above, and the Environmental Commitments cited under Section 5 of this report adequately address impacts from the diesel operated dredge and supporting equipment during the proposed dredging of the Lagoon.

Heavy-duty equipment in the project area during construction would emit odors. These odors would be limited to the time that the equipment is operating during the period for the Proposed Action. Environmental Commitments identified in Section 5.0 of this report reduce impacts associated with objectionable odors from the operation of diesel-powered construction equipment.

The dredge material may be spread out on site to dry before being treated and hauled off site. It is anticipated that the dredged sediment will contain organic materials and that decomposition of the organic matter when exposed to air may generate unpleasant odors. The decaying marine vegetation that was not previously exposed may create unpleasant odors. Therefore, the dredge material may result in odor impacts at the adjacent and nearby sensitive land uses. If the dredge material remains exposed to the air before treatment, implementation of Environmental Commitments identified in Section 5.0 of this report would require the application of a mixture of Simple Green and water to the excavated sediment as part of an overall Soil Management Plan. Simple Green accelerates the decomposition process and will have the overall result of shortening the duration of odor emissions.

Alternative 1 would result in approximately 482 tons (or 437 metric tons) of carbon dioxide (CO_2) emissions during dredging activities. CO_2 is a greenhouse gas (GHG) that is considered to contribute

to global climate change (GCC). GCC describes alterations in weather features (e.g., temperature, wind patterns, precipitation, and storms) that occur across the Earth as a whole. GCC and GHG emissions are an emerging environmental concern being raised on statewide, national, and global levels.

The ARB has published draft preliminary guidance to agencies on how to establish interim significance thresholds for analyzing GHG emissions called *Recommended Approaches for Setting Interim Thresholds for Greenhouse Gases Under the California Environmental Quality Act* (October 2008). The ARB document supports identifying emissions up to 1,600 metric tons of CO_2 equivalent (CO_{2e}) per year or less as less than significant. The ARB report indicates that emissions under 1,600 metric tons would not interfere with achieving the State's emission reduction objectives in AB 32 (and EO S-03-05) and thus may be deemed categorically exempt from CEQA. Traffic and other equipment associated with Alternative 1 would emit approximately 437 metric tons of CO_2 per year, well below the screening threshold of 1,600 metric tons. Therefore, the proposed action would not result in significant global climate change impacts.

Based on the air quality analysis discussed above, the Corps has concluded that the proposed Colorado Lagoon Dredging Project will not have a significant adverse impact on air quality. The total emissions of each criteria pollutant under Alternative 1 meets or is below the SCAQMD thresholds and *De Minimus* levels identified for federal criteria pollutant thresholds. Therefore, Alternative 1 of the proposed Colorado Lagoon Dredging Project conforms to the CAA as amended (1990).

4.1.3 Alternative 2 (Non-Electric Mechanical Dredge Equipment Alternative)

The proposed dredging activities under Alternative 2 would generate air emissions from dredging, other heavy equipment, barges, ancillary vessels, and vehicles used to transport dredge material from the Lagoon to POLB. Dredging activities under Alternative 1 would require the use of equipment identified previously in Table A. Emissions generated from the use of equipment transport of concrete and dredge material and from construction worker commutes are provided in Table G.

As described above, a proposed action is presumed to conform and is exempt from a conformity determination if analysis shows that the total net direct and indirect emissions from the Proposed Action would be less than the applicable SCAQMD and *De Minimis* thresholds and if the project-related emissions are not regionally significant (would be less than 10 percent of the area emissions budget). The Proposed Action is dredging to remove contaminated sediment from the Lagoon and would result in emissions from the operation of equipment, the delivery of materials and equipment, removal of dredge material from the site, and construction worker commutes. The emissions from these sources represent the total net direct and indirect emissions from the Proposed Action. As shown in Table G, the emissions levels for this alternative are less than the applicable SCAQMD and *De Minimis* thresholds. Also, the daily source emission budgets for the area (Table F) were annualized and compared to the annual emission generated by the project alternatives. The project-related emissions are substantially less than 10 percent of the area emissions budget (less than .01 percent) and therefore are not considered to be regionally significant.

Emissions from the dredge and other support equipment would result in minimal air impacts that are temporary and short term during dredging activity. Air quality would return to preproject conditions following completion of dredging. Therefore, the Corps has concluded that the air impacts generated

Table G: Alternative 2 Emissions

Type of Equipment[1]	Pollutants of Concern						
	CO	**ROC**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
2 Loaders	5.0	0.7	4.2	0.0	0.4	0.4	1,068.9
1 Generator	2.5	0.4	4.9	0.0	0.2	0.2	322.0
1 Dozer	3.4	0.5	10.7	0.0	0.4	0.4	956.4
1 Grader	2.0	0.5	5.9	0.0	0.3	0.3	1,061.9
1 Crane	0.6	0.1	3.3	0.0	0.1	0.1	257.3
1 Pug Mill	1.1	0.4	5.4	0.0	0.2	0.2	1,088.0
1 Clamshell Dredge	6.6	0.9	21.1	0.0	0.8	0.8	1,872.0
1 Tug Boat[2]	7.6	1.7	40.6	0.6	1.3	1.2	1,743.1
1 gas skiff	75.3	33.0	0.0	0.0	0.3	0.3	60.6
Haul Trucks (Cement)[3]	1.3	0.2	2.3	0.0	0.1	0.1	332.1
Haul Trucks (Stadium)[4]	0.7	0.1	1.2	0.0	0.0	0.0	173.0
Worker Commute[5]	3.3	0.1	0.4	0.0	0.0	0.0	514.4
Total (lbs/day)	**109.3**	**38.6**	**100.0**	**0.7**	**4.3**	**3.9**	**9,449.7**
SCAQMD Threshold (lbs/day)	550	75	100	150	150	55	N/A
Exceeds SCAQMD thresholds?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Alternative Total (tons)	**5.5**	**1.9**	**5.0**	**0.0**	**0.2**	**0.2**	**472.5**
De Minimus Thresholds (tons/year)	100	10	10	100	70	100	N/A
Exceeds De Minimus thresholds?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

[1] All off-road construction equipment is modeled using Tier 2 emission rates.
[2] The diesel tug boat is modeled using Tier 2 emission rates.
[3] Assumes that a total of 4 truck trips at 24 miles would be required for cement import activities per day.
[4] Assumes that a total of 25 truck trips at 2 miles would be required for transfer of dredge material from the Lagoon to the Marine Stadium barge per day.
[5] Assumes that a total of 20 trips at 40 miles would be required.

CO = carbon monoxide
CO_2 = carbon dioxide
lbs/day = pounds per day
NO_x = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
ROC = reactive organic compounds
SO_x = sulfur oxides

by the proposed Colorado Lagoon Dredging Project would be temporary, short term, and minimal, and will not have a significant adverse effect on air quality.

The Corps has concluded that the air conformity analyses described above and the Environmental Commitments cited under Section 5 of this report adequately address impacts from the diesel-operated dredge and supporting equipment during the proposed dredging of the Lagoon.

Heavy-duty equipment in the project area during construction would emit odors. These odors would be limited to the time that the equipment is operating during the period for the Proposed Action. Environmental Commitments identified in Section 5.0 of this report reduce impacts associated with objectionable odors from the operation of diesel-powered construction equipment.

The dredge material may be spread out on site to dry before being treated and hauled off site. It is anticipated that the dredged sediment will contain organic materials and that decomposition of the organic matter when exposed to air may generate unpleasant odors. The decaying marine vegetation that was not previously exposed may create unpleasant odors. Therefore, the dredge material may result in odor impacts at the adjacent and nearby sensitive land uses. If the dredge material remains exposed to the air before treatment, implementation of Environmental Commitments identified in

Section 5.0 of this report would require the application of a mixture of Simple Green and water to the excavated sediment as part of an overall Soil Management Plan. Simple Green accelerates the decomposition process and will have the overall result of shortening the duration of odor emissions.

Alternative 2 would result in approximately 473 tons (or 429 metric tons) of CO_2 emissions during dredging activities. CO_2 is a GHG that is considered to contribute to global climate change (GCC). GCC describes alterations in weather features (e.g., temperature, wind patterns, precipitation, and storms) that occur across the Earth as a whole. GCC and GHG emissions are an emerging environmental concern being raised on statewide, national, and global levels.

The ARB has published draft preliminary guidance to agencies on how to establish interim significance thresholds for analyzing GHG emissions called *Recommended Approaches for Setting Interim Thresholds for Greenhouse Gases Under the California Environmental Quality Act* (October 2008). The ARB document supports identifying emissions up to 1,600 metric tons of CO_{2e} per year or less as less than significant. The ARB report indicates that emissions under 1,600 metric tons would not interfere with achieving the State's emission reduction objectives in AB 32 (and EO S-03-05) and thus may be deemed categorically exempt from CEQA. Traffic and other equipment associated with Alternative 2 would emit approximately 429 metric tons of CO_2 per year, well below the screening threshold of 1,600 metric tons. Therefore, the proposed action would not result in significant global climate change impacts.

Based on the air quality analysis discussed above, the Corps has concluded that the proposed Colorado Lagoon Dredging Project will not have a significant impact on air quality. The total emissions of each criteria pollutant under Alternative 2 meets or is below the SCAQMD thresholds and *De Minimus* levels identified for federal criteria pollutant thresholds. Therefore, Alternative 2 of the proposed Colorado Lagoon Dredging Project conforms to the CAA as amended (1990).

4.1.4 Alternative 3 (Non-Electric Hydraulic Equipment Alternative)

As described above, a proposed action is presumed to conform and is exempt from a conformity determination if analysis shows that the total net direct and indirect emissions from the Proposed Action would be less than the applicable SCAQMD and *De Minimis* thresholds and if the project-related emissions are not regionally significant (would be less than 10 percent of the area emissions budget). The Proposed Action is dredging to remove contaminated sediment from the Lagoon and would result in emissions from the operation of equipment, the delivery of materials and equipment, removal of dredge material from the site, and construction worker commutes. The emissions from these sources represent the total net direct and indirect emissions from the Proposed Action. As shown in Table H, the emissions levels for this alternative are less than the applicable SCAQMD and *De Minimis* thresholds. Also, the daily source emission budgets for the area (Table F) were annualized and compared to the annual emission generated by the project alternatives. The project-related emissions are substantially less than 10 percent of the area emissions budget (less than .01 percent) and therefore are not considered to be regionally significant.

Emissions from the dredge and other support equipment would result in minimal air impacts that are temporary and short term during dredging activity. Air quality would return to preproject conditions following completion of dredging. Therefore, the Corps has concluded that the air impacts generated

Table H: Alternative 3 Dredging Activity Emissions

Type of Equipment[1]	Pollutants of Concern						
	CO	ROC	NO_x	SO_x	PM_{10}	$PM_{2.5}$	CO_2
2 Loaders	5.0	0.7	4.2	0.0	0.4	0.4	1,068.9
1 Pump[2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 Dozer	3.4	0.5	10.7	0.0	0.4	0.4	956.4
1 Grader	2.0	0.5	5.9	0.0	0.3	0.3	1,061.9
1 Crane	0.6	0.1	3.3	0.0	0.1	0.1	257.3
1 Pug Mill[2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 Hydraulic Dredge	5.5	1.1	28.3	0.0	1.6	1.4	2,760.0
1 Tug Boat[3]	7.6	1.7	40.6	0.6	1.3	1.2	1,743.1
1 Gas Skiff	75.3	33.0	0.0	0.0	0.3	0.3	60.6
Haul Trucks (Cement) [4]	1.3	0.2	2.3	0.0	0.1	0.1	332.1
Worker Commute[5]	3.3	0.1	0.4	0.0	0.0	0.0	514.4
Total (lbs/day)	**104.0**	**37.9**	**95.8**	**0.7**	**4.5**	**4.1**	**8,754.8**
SCAQMD Threshold (lbs/day)	550	75	100	150	150	55	N/A
Exceeds SCAQMD thresholds?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Alternative Total (tons)	**5.2**	**1.9**	**4.8**	**0.0**	**0.2**	**0.2**	**437.7**
De Minimus Thresholds (tons/year)	100	10	10	100	70	100	N/A
Exceeds De Minimus thresholds?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

[1] All off-road construction equipment is modeled using Tier 2 emission rates.
[2] The pug mill and pump will be electrically powered.
[3] The diesel tug boat is modeled using Tier 2 emission rates.
[4] Assumes that a total of 4 truck trips at 24 miles would be required for cement import activities per day.
[5] Assumes that a total of 20 trips at 40 miles would be required per day.

CO = carbon monoxide
CO_2 = carbon dioxide
lbs/day = pounds per day
NO_x = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
ROC = reactive organic compounds
SO_x = sulfur oxides

by the proposed Colorado Lagoon Dredging Project would be temporary, short term, and minimal, and will not have a significant adverse effect on air quality.

The Corps has concluded that the air conformity analyses described above and the Environmental Commitments cited under Section 5 of this report adequately address impacts from the diesel-operated dredge and supporting equipment during the proposed dredging of the Lagoon.

Heavy-duty equipment in the project area during construction would emit odors. These odors would be limited to the time that the equipment is operating during the period for the Proposed Action. Environmental Commitments identified in Section 5.0 of this report reduce impacts associated with objectionable odors from the operation of diesel-powered construction equipment.

It is anticipated that the dredged sediment will contain organic materials and that decomposition of the organic matter when exposed to air may generate unpleasant odors. The decaying marine vegetation that was not previously exposed may create unpleasant odors. Therefore, the dredge material may result in odor impacts at the adjacent and nearby sensitive land uses. If the dredge material remains exposed to the air before treatment, implementation of Environmental Commitments identified in Section 5.0 of this report would require the application of a mixture of Simple Green and water to the excavated sediment as part of an overall Soil Management Plan. Simple Green

accelerates the decomposition process and will have the overall result of shortening the duration of odor emissions.

Alternative 3 would result in approximately 438 tons (or 397 metric tons) of CO_2 emissions during dredging activities. CO_2 is a GHG that is considered to contribute to GCC. GCC describes alterations in weather features (e.g., temperature, wind patterns, precipitation, and storms) that occur across the Earth as a whole. GCC and GHG emissions are an emerging environmental concern being raised on statewide, national, and global levels.

The ARB has published draft preliminary guidance to agencies on how to establish interim significance thresholds for analyzing GHG emissions called *Recommended Approaches for Setting Interim Thresholds for Greenhouse Gases Under the California Environmental Quality Act* (October 2008). The ARB document supports identifying emissions up to 1,600 metric tons of CO_{2e} per year or less as less than significant. The ARB report indicates that emissions under 1,600 metric tons would not interfere with achieving the State's emission reduction objectives in AB 32 (and EO S-03-05) and thus may be deemed categorically exempt from CEQA. Traffic and other equipment associated with Alternative 3 would emit approximately 397 metric tons of CO_2 per year, well below the screening threshold of 1,600 metric tons. Therefore, the proposed action would not result in significant global climate change impacts.

Based on the air quality analysis discussed above, the Corps has concluded that the proposed Colorado Lagoon Dredging Project will not have a significant impact on air quality. The total emissions of each criteria pollutant under Alternative 3 meets or is below the SCAQMD thresholds *and De Minimus* levels identified for federal criteria pollutant thresholds. Therefore, Alternative 3 of the proposed Colorado Lagoon Dredging Project conforms to the CAA as amended (1990).

4.1.5 Alternative 4 (Dry Dredge Alternative)

The proposed dredging activities under Alternative 4 would generate air emissions from dredging, other heavy equipment emissions, barges, ancillary vessels, and vehicles used to transport dredge material from the Lagoon to POLB. As described above, a proposed action is presumed to conform and is exempt from a conformity determination if analysis shows that the total net direct and indirect emissions from the Proposed Action would be less than the applicable SCAQMD and *De Minimis* thresholds and if the project-related emissions are not regionally significant (would be less than 10 percent of the area emissions budget). As shown in Table I, the emissions levels for this alternative are less than the applicable SCAQMD and *De Minimis* thresholds. Also, the daily source emission budgets for the area (Table F) were annualized and compared to the annual emission generated by the project alternatives. The project-related emissions are substantially less than 10 percent of the area emissions budget (less than .01 percentage) and therefore are not considered to be regionally significant.

Heavy-duty equipment in the project area during construction would emit odors. These odors would be limited to the time that the equipment is operating during the period for the Proposed Action. Environmental Commitments identified in Section 5.0 of this report reduce impacts associated with objectionable odors from the operation of diesel-powered construction equipment.

Table I: Alternative 4 Emissions

Type of Equipment[1]	Pollutants of Concern						
	CO	**ROC**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
2 Loaders	5.0	0.7	4.2	0.0	0.4	0.4	1,068.9
4 Pumps[2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 Dozer	3.4	0.5	10.7	0.0	0.4	0.4	956.4
1 Grader	2.0	0.5	5.9	0.0	0.3	0.3	1,061.9
1 Crane	0.6	0.1	3.3	0.0	0.1	0.1	257.3
1 Pug Mill	1.1	0.4	7.4	0.0	0.4	0.3	1,088.0
1 Excavator	6.6	0.9	21.1	0.0	0.8	0.8	1,872.0
1 Tug Boat[3]	7.6	1.7	40.6	0.6	1.3	1.2	1,743.1
1 gas skiff	75.3	33.0	0.0	0.0	0.3	0.3	60.6
Haul Trucks (Cement)[4]	1.3	0.2	2.3	0.0	0.1	0.1	332.1
Haul Trucks (Stadium)[5]	0.7	0.1	1.2	0.0	0.0	0.0	173.0
Worker Commute[6]	3.3	0.1	0.4	0.0	0.0	0.0	514.4
Total (lbs/day)	**106.8**	**38.2**	**95.1**	**0.7**	**4.1**	**3.7**	**9,127.7**
SCAQMD Threshold (lbs/day)	550	75	100	150	150	55	N/A
Exceeds SCAQMD thresholds?	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Alternative Total (tons)	**5.3**	**1.9**	**4.8**	**0.0**	**0.2**	**0.2**	**456.4**
De Minimus Thresholds (tons/year)	100	10	10	100	70	100	N/A
Exceeds De Minimus thresholds?	**No**	**No**	**No**	**No**	**No**	**No**	**No**

[1] All off-road construction equipment is modeled using Tier 2 emission rates.
[2] The pumps will be electrically powered.
[3] The diesel tug boat is modeled using Tier 2 emission rates.
[4] Assumes that a total of 4 truck trips at 24 miles would be required for cement import activities per day.
[5] Assumes that a total of 25 truck trips at 2 miles would be required for transfer of dredge material from the Lagoon to the Marine Stadium barge per day.
[6] Assumes that a total of 20 trips at 40 miles would be required per day.

CO = carbon monoxide
CO_2 = carbon dioxide
lbs/day = pounds per day
NO_x = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
ROC = reactive organic compounds
SO_x = sulfur oxides

As a result of the dry-dredge technique, areas that were previously submerged will become exposed during the new lower tide levels. The decaying marine vegetation that was not previously exposed may create unpleasant odors. It is anticipated that the dredged sediment will contain organic materials and that decomposition of the organic matter when exposed to air may generate unpleasant odors. Therefore, the proposed action may result in odor impacts at adjacent and nearby sensitive land uses. implementation of Environmental Commitments identified in Section 5.0 of this report require the application of a mixture of Simple Green and water to the excavated areas and sediment as part of an overall Soil Management Plan. Simple Green accelerates the decomposition process and will have the overall result of shortening the duration of odor emissions.

Alternative 4 would result in approximately 456 tons (or 414 metric tons) of CO_2 emissions during dredging activities. CO_2 is a GHG that is considered to contribute to GCC. GCC describes alterations in weather features (e.g., temperature, wind patterns, precipitation, and storms) that occur across the Earth as a whole. GCC and GHG emissions are an emerging environmental concern being raised on statewide, national, and global levels.

The ARB has published draft preliminary guidance to agencies on how to establish interim significance thresholds for analyzing GHG emissions called *Recommended Approaches for Setting Interim Thresholds for Greenhouse Gases Under the California Environmental Quality Act* (October 2008). The ARB document supports identifying emissions up to 1,600 metric tons of CO_{2e} per year or less as less than significant. The ARB report indicates that emissions under 1,600 metric tons would not interfere with achieving the State's emission reduction objectives in AB 32 (and EO S-03-05) and thus may be deemed categorically exempt from CEQA. Traffic and other equipment associated with Alternative 4 would emit approximately 414 metric tons of CO_2 per year, well below the screening threshold of 1,600 metric tons. Therefore, the proposed action would not result in significant global climate change impacts.

Based on the air quality analysis discussed above, the Corps has concluded that the proposed Colorado Lagoon Dredging Project will not have a significant impact on air quality. The total emissions of each criteria pollutant under Alternative 4 meets or is below the SCAQMD thresholds *and De Minimus* levels identified for federal criteria pollutant thresholds. Therefore, Alternative 4 of the proposed Colorado Lagoon Dredging Project conforms to the CAA as amended (1990).

4.2 NOISE

4.2.1 No Action

This alternative would avoid all adverse effects to noise related to dredging activities. However, this alternative would not fulfill any of the project's objectives. The No Action Alternative would have a negative impact of not removing contaminated sediment from the Colorado Lagoon, and the environmental benefits to the project area would not be achieved. The water and sediment quality of the Lagoon and habitat areas in and around the Lagoon would not be improved. There are no new sources of noise with implementation of this alternative.

4.2.2 Alternative 1 (Mechanical Dredge and Truck Option Alternative)

Noise impacts from construction activities of the proposed project are a function of the noise generated by construction equipment, the equipment location, the sensitivity of nearby land uses, and the timing and duration of the noise-generating activities.

The proposed dredging activities in the Lagoon are located in an area of established and varied noise sources that include automobiles and recreational facilities/activities. The project area already experiences some elevated noise levels from traffic along adjacent access roads.

Two types of short-term noise impacts would occur during the proposed dredging activities. The first is the increase in traffic flow on local streets associated with the transport of workers, equipment, and materials to and from the project site. The pieces of heavy equipment to be utilized during dredging will be moved to the site and remain for the duration of dredging activities. The increase in traffic flow on the surrounding roads due to construction traffic would not cause an increase in traffic that is substantial in relation to the existing traffic load of the street system. The associated increase in long-term traffic noise will not be perceptible. However, there will be short-term, intermittent, high-noise levels associated with trucks passing by from the project area.

The second type of short-term noise impact is related to the noise generated by heavy equipment operating within the project area. It is anticipated that the dredging activities under Alternative 1 would require the use of the following construction equipment:

- Electric barge-based excavator/clamshell dredge
- Bulldozer
- Small-track loader
- Excavator
- Front-end loader
- Grader
- Small crane
- Pug mill
- Generator (diesel fueled)
- End-dump trucks
- Cement delivery trucks

Table J lists typical construction equipment noise levels recommended for noise impact assessments, based on a distance of 50 ft between the equipment and a noise receptor.

Table J: Typical Construction Equipment Noise Levels

Type of Equipment	Range of Maximum Sound Levels Measured (dBA at 50 ft)	Suggested Maximum Sound Levels for Analysis (dBA at 50 ft)
Pile Drivers, 12,000 to 18,000 ft-lb/blow	81–96	93
Rock Drills	83–99	96
Jackhammers	75–85	82
Pneumatic Tools	78–88	85
Pumps	74–84	80
Scrapers	83–91	87
Haul Trucks	83–94	88
Cranes	79–86	82
Portable Generators	71–87	80
Rollers	75–82	80
Dozers	77–90	85
Tractors	77–82	80
Front-End Loaders	77–90	86
Hydraulic Backhoe	81–90	86
Hydraulic Excavators	81–90	86
Graders	79–89	86
Air Compressors	76–89	86
Trucks	81–87	86

Source: Noise Impact Analysis, May 2008.
dBA = A-weighted decibels
ft = feet
ft-lb/blow = foot-pounds per blow

As previously discussed, the decibel level decreases with distance from the sources, usually by a rate of 6 dB for every doubling of distance. Noise emissions vary from each piece of equipment utilized such that it is not possible to specifically quantify the exact project-related noise impact. However, as a worst-case scenario, it was determined that dredging noise is comparable to an earth scraper working in soft dirt (approximately 80 dBA at 50 ft away from the equipment). Other construction equipment used on site, such as loaders and backhoes, would generate up to 86 dBA L_{max} at a distance of 50 ft. Table K identifies the noise levels at various distances from an 80 dBA noise source.

Table K: Typical Noise Attenuation Levels

Distance (ft)	Resulting Noise level (dBA)
100	74
200	68
400	62
500	60
1,000	54
2,000	46
3,000	40

Source: Caltrans Noise Manual, 1980.
Note: Calculated using a point source spherical radiator equation
dBA = A-weighted decibel
ft = feet

Noise attenuation may reduce construction noise levels at the nearest sensitive land uses. The following sensitive land uses are located within the vicinity of the proposed dredging activities:

- **On-site Preschool.** The on-site preschool is located within the vicinity of the central Lagoon dredge area. Standard construction equipment that would generate noise levels up to 86 dBA L_{max} at a distance of 50 ft would be required for the central Lagoon dredging. Standard construction activities that occur within 315 ft of the preschool would generate noise levels in excess of the City's daytime exterior noise standard of 70 dBA L_{max}. This is an adverse noise effect. However, as identified in Environmental Commitments section, the preschool shall be closed whenever construction occurs within 315 ft.
- **Residential Developments.** The nearest residential developments are located approximately 100 ft from the proposed dredging activities. As a result, the proposed dredging activities would be exposed to dredging activity noise levels of up to 80 dBA L_{max}, which is above the City's daytime exterior noise standard of 70 dBA L_{max}.

Due to the distance between dredging activities and the existing sensitive receptors, project construction activities would result in an exceedence of the City's Noise Ordinance. However, noise associated with the dredging activities under this alternative are anticipated to be intermittent and temporary, with noise levels returning back to ambient conditions upon project completion. The City of Long Beach Municipal Code allows elevated construction-related noise levels as long as the construction activities are limited to the hours specified. Dredging activity noise impacts would result in adverse effects; however, adherence to the City's Noise Ordinance and adherence to measures identified in the Environmental Commitments section would reduce construction noise impacts to sensitive receptors.

4.2.3 Alternative 2 (Non-Electric Mechanical Dredge Equipment Alternative)

Under this alternative, the locations of the dredging activities and the treatment of the dredge material would remain the same as identified for Alternative 1. It is anticipated that the dredging activities under Alternative 2 would require the use of the following construction equipment:

- Non-electric barge-based excavator or clamshell dredge
- Bulldozer
- Small-track loader
- Excavator
- Front-end loader
- Grader
- Small crane
- Pug mill
- Generator (diesel fueled)
- Barge
- Tugboat
- End-dump trucks
- Cement delivery trucks

Non-electric mechanical dredge/excavation equipment would be utilized and treated dredge material would be trucked into Marine Stadium for barge loading. The barge would then transport the treated dredge material to the POLB disposal site. It is anticipated that the use of the dredging equipment would generate a similar level of noise at the nearest noise-sensitive receptor, as identified in Alternative 1 during the dredging activities.

For the loading of treated dredge material onto the barge at Marine Stadium, it is anticipated that the nearest noise sensitive receptors would be exposed to a noise level of 86 dBA L_{max}. This noise level would be above the City's daytime exterior noise standard of 70 dBA $L_{max.}$

Similar to what was identified for Alternative 1, due to the distance between dredging activities and the existing sensitive receptors, project construction activities would result in an exceedence of the City's Noise Ordinance. However, noise associated with the dredging activities under this alternative are anticipated to be intermittent and temporary, with noise levels returning back to ambient conditions upon project completion. The City of Long Beach Municipal Code allows elevated construction-related noise levels as long as the construction activities are limited to the hours specified. Dredging activity noise would result in adverse effects; however, adherence to the City's Noise Ordinance and adherence to measures identified in the Environmental Commitments section would reduce construction noise impacts to sensitive receptors.

4.2.4 Alternative 3 (Non-Electric Hydraulic Equipment Alternative)

Under this alternative, the locations of the dredging activities would remain the same as identified for Alternative 1. It is anticipated that the dredging activities under Alternative 3 would require the use of the following construction equipment:

- Non-electric hydraulic dredge
- Dredge pipeline booster pump (diesel fueled)
- Bulldozer
- Small track loader
- Excavator
- Front-end loader
- Grader
- Small crane
- Pug mill
- Generator (diesel fueled)
- Barge
- Tugboat
- Cement delivery trucks

Alternative 3 would utilize a non-electric hydraulic dredge machine that would dredge and pipe dredge material through the underground culvert to Marine Stadium. Once at Marine Stadium, the dredge material would be treated and loaded onto a barge headed to the POLB disposal site. It is anticipated that the use of the dredging equipment would generate a similar level of noise at the nearest noise sensitive as identified in Alternative 1 during dredging activities.

Under this alternative, there are four potential areas where treatment and loading of the dredge material could occur (Figure 2). The nearest noise-sensitive receptors would be existing residences along Boathouse Lane and Paoli Way, approximately 50 ft from the proposed treatment and loading areas. Ancillary construction equipment used for the treatment and the loading of the dredge material would generate up to 86 dBA L_{max} at a distance of 50 ft. This would be above the City's daytime exterior noise standard of 70 dBA $L_{max.}$ Dredging noise impacts would still result in adverse effects; however, adherence to the City's Noise Ordinance and to measures identified in the Environmental Commitments section would reduce construction noise impacts to sensitive receptors.

4.2.5 Alternative 4 (Dry Dredge Alternative)

Under this alternative, the locations of dredging activities and where the dredge material would be treated would remain the same as identified for Alternative 1. It is anticipated that the dredging activities under Alternative 4 would require the use of the following construction equipment:

- Non-electric barge-based excavator or clamshell dredge
- Bulldozer
- Small track loader
- Excavator
- Front-end loader
- Grader
- Small crane
- Dewater equipment/pumps
- Pug mill

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FIGURE 2

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SOURCE: Google Earth

Colorado Lagoon Restoration Project

Potential Dredging Material Treatment Plant

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- Generator (diesel fueled)
- Barge
- Tugboat
- End-dump trucks
- Cement delivery trucks

Alternative 4 would utilize a non-electric barge-based excavator during dredging activities. The west arm and central Lagoon would be dewatered, and dredge material would be treated at the north shore parking lot. Treated materials would be trucked over to Marine Stadium. Once at Marine Stadium, the dredge material would be loaded onto a barge headed to the POLB disposal site. It is anticipated that the use of the dredging equipment would generate a similar level of noise at the nearest noise-sensitive receptor, as identified in Alternative 1 during dredging activities.

Similar to what was identified for Alternative 1, due to the distance between dredging activities and the existing sensitive receptors, project construction activities would result in an exceedence of the City's Noise Ordinance. Therefore, dredging activity noise would result in a temporary adverse change in the existing noise environment. However, once the project is completed, the existing ambient noise levels would return to baseline conditions. The City of Long Beach Municipal Code allows elevated construction-related noise levels as long as the construction activities are limited to the hours specified. Dredging activity noise would result in adverse effects; however, adherence to the City's noise regulations and adherence to measures identified in the Environmental Commitments section would reduce construction noise impacts to sensitive receptors.

4.3 TRAFFIC

4.3.1 No Action Alternative

This alternative would avoid all adverse effects to traffic related to dredging activities. However, this alternative would not fulfill any of the project's objectives. The No Action Alternative would have a negative impact of not removing contaminated sediment from the Lagoon, and the environmental benefits to the project area would not be achieved. The water and sediment quality of the Lagoon and habitat areas in and around the Lagoon would not be improved. There are no new sources of traffic with implementation of this alternative.

4.3.2 Alternative 1 (Mechanical Dredge and Truck Option Alternative)

Under this alternative, there would be trips associated with trucking the cement to the north shore parking lot for the cement stabilization process, trips associated with the transport of treated dredge material from the Lagoon to the POLB disposal site, and construction worker trips. As identified in the EIR for the Colorado Lagoon Restoration Program, during Phase 1 (which includes the dredging of the Lagoon), approximately 10 construction workers will be on site per day. These workers will add 20 daily passenger car trips (10 inbound in the morning and 10 outbound in the evening). Worker commute trips will not add a.m. peak-hour trips to construction traffic because the workers will arrive on site before the 7:00 a.m.–9:00 a.m. peak period. However, worker commute trips will add p.m. peak-hour trips because the workers will depart between 5:30 and 6:00 p.m. Other trips associated with cement importation and the trucking of treated dredge material are anticipated to occur

throughout the day. Table L provides a summary of trip generation that is associated with Alternative 1 dredging activities.

Table L: Alternative 1 Construction Trips by Component

Dredging Activity Components	Trips
Delivery of cement for cement stabilization process	325 truck trips
Removal of dredge material from the Lagoon to POLB disposal site	1,950 truck trips
Construction worker trips	1,600 car trips

Note: This table represents the total number of trips that would occur during all the dredging activities.
POLB = Port of Long Beach

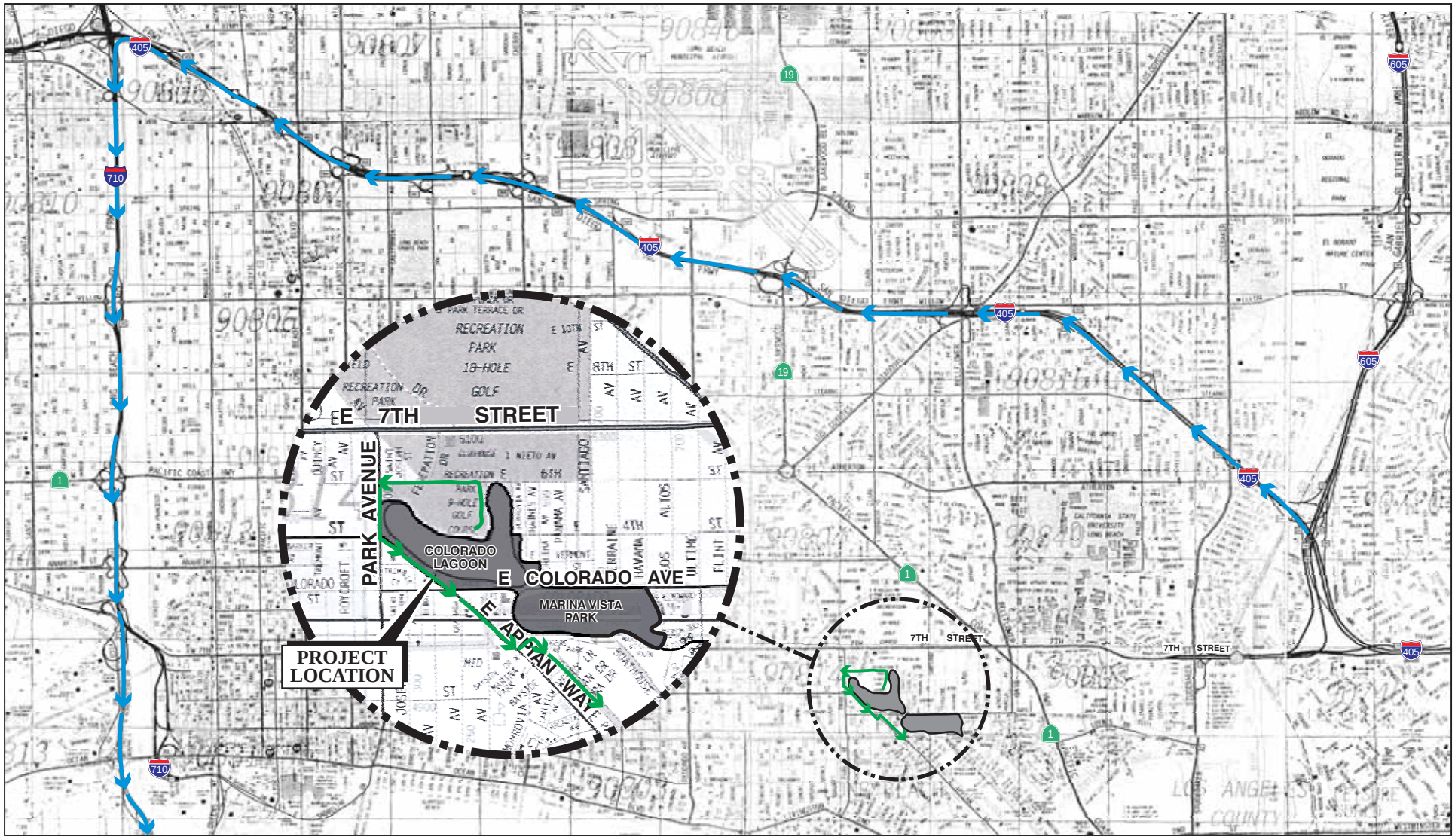
Trucks containing the treated dredge material and headed for the POLB disposal site would travel east on East 7th Street, north on I-405, and then south on I-710. The haul routes are illustrated in Figure 3.

As identified in the overall environmental documentation for the Colorado Lagoon Restoration Program, Phase 1 construction activity (which includes the dredging activities) is anticipated to add approximately 90 daily passenger car equivalent (PCE) trips, 28 a.m. peak-hour PCE trips, and 30 p.m. peak-hour PCE trips. All of the truck trips would travel on East 7th Street.

As described previously, East 7th Street is a four-lane roadway with an hourly capacity of 6,400 vehicles and an existing LOS F in the a.m. and p.m. peak hours at the intersection of East 7th Street and PCH. The addition of up to 28 p.m. peak-hour, construction-related, short-term trips would add less than 0.5 percent of the capacity of the roadway during the peak hour. In addition, most truck trips would occur during the day, when ambient traffic is less. Therefore, since the dredging activities are only a small portion of the overall Phase 1 construction of the Lagoon, the dredging activities would not cause an increase in traffic that is substantial in relation to the existing traffic load of the street system. In addition, construction traffic effects are temporary during the period of construction, and the number of construction workers and truck trips would vary depending on the specific construction activities. However, because the intersection of East 7th Street and PCH has an existing LOS of F in the a.m. and p.m. peak hours (which is below the City's established threshold of LOS D as the minimum operating level for roadway segments and intersections) and is located in the project vicinity and along the haul route, additional measures in the Environmental Commitments section, which require implementation of a Construction Traffic Management Plan, and timing considerations for dredge haul trips have been included to reduce the impact of construction traffic on the local circulation system.

4.3.3 Alternative 2 (Non-Electric Mechanical Dredge Equipment Alternative)

Trips associated with this alternative would come from trucking cement onto the site for the cement stabilization process, the trips associated with trucks transporting treated dredge material to Marine Stadium, barge trips of treated dredge material from Marine Stadium to the POLB disposal site, and construction worker trips. A trip summary associated with this alternative is provided in Table M.



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LEGEND

- to PORT OF LONG BEACH
- to MARINE STADIUM

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SOURCE: Thomas Guide, 2007

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FIGURE 3

Colorado Lagoon Restoration Project

Construction Haul Routes

Table M: Alternative 2 Construction Trips by Component

Dredging Activity Components	Trips
Delivery of cement for cement stabilization process	325 truck trips
Removal of dredge material from the Lagoon to Marine Stadium	1,950 truck trips
Barge transport of treated dredge material from Marine Stadium to POLB disposal site	35 barge trips
Construction worker trips	1,600 car trips

Note: This table represents the total number of trips that would occur during all the dredging activities.
POLB = Port of Long Beach

It is expected that the barge dock would be located on the northwest side of Marine Stadium, with an anticipated route from the Lagoon to the barge dock as follows: from the Colorado Lagoon access road, left on 6th Street, left on Park Avenue, left on Appian Way, left on Nieto, and right onto the Marine Stadium access road.

The dredging activities would not cause an increase in traffic that is substantial in relation to the existing traffic load of the street system. Also, while Alternative 2 would result in the same number of haul trips for treated dredge material, the trips would be substantially shorter in length (2 mi rather than 12 mi) because the destination would be Marine Stadium rather than the POLB. In addition, construction traffic effects are temporary during the period of construction, and the number of construction workers and truck trips would vary depending on specific construction activities. However, because the intersection of East 7th Street and PCH has an existing LOS F in the a.m. and p.m. peak hours (which is below the City's established threshold of LOS D as the minimum operating level for roadway segments and intersections) and is located in the project vicinity and along the material and equipment delivery route, additional measures in the Environmental Commitments section, which require implementation of a Construction Traffic Management Plan, have been included to reduce the impact of construction traffic on the local circulation system.

4.3.4 Alternative 3 (Non-Electric Hydraulic Equipment Alternative)

Under this alternative, dredge material would be piped to Marine Stadium to be treated and loaded directly onto the Marine Stadium barge. Therefore, trips associated this alternative would be limited to truck trips to transport cement to the site for the cement stabilization process, barge trips of treated dredge material from Marine Stadium to the POLB disposal site, and construction worker trips. A trip summary associated with this alternative is provided in Table N.

Table N: Alternative 3 Construction Trips by Component

Dredging Activity Components	Trips
Delivery of cement for cement stabilization process	325 truck trips
Barge transport of treated dredge material from Marine Stadium to POLB disposal site	35 barge trips
Construction worker trips	1,600 car trips

Note: This table represents the total number of trips that would occur during all the dredging activities.
POLB = Port of Long Beach

The temporary increase in local traffic due to construction worker commutes, including hauls and construction equipment truck traffic to and from the site, would not add substantially to existing traffic in the project area. However, because the intersection of East 7th Street and PCH has an existing LOS F in the a.m. and p.m. peak hours (which is below the City's established threshold of LOS D as the minimum operating level for roadway segments and intersections) and is located in the project vicinity and along the haul route, additional measures in the Environmental Commitments section, which require implementation of a Construction Traffic Management Plan, and timing considerations for dredge haul trips have been included to reduce the impact of construction traffic on the local circulation system.

4.3.5 Alternative 4 (Dry Dredge Alternative)

Trips associated this alternative would come from the transport of cement to the site for the cement stabilization process, the trips associated with the haul of treated dredge material to Marine Stadium, barge trips of treated dredge material from Marine Stadium to the POLB disposal site, and construction worker trips. A trip summary associated with this alternative is provided in Table O.

Table O: Alternative 4 Construction Trips by Component

Dredging Activity Components	Trips
Delivery of cement for cement stabilization process	325 truck trips
Removal of dredge material from the Lagoon to Marine Stadium	1,950 truck trips
Barge transport of treated dredge material from Marine Stadium to POLB disposal site	35 barge trips
Construction worker trips	1,600 car trips

Note: This table represents the total number of trips that would occur during all the dredging activities.
POLB = Port of Long Beach

As identified in the overall environmental documentation for the Colorado Lagoon Restoration Program, Phase 1 construction activity (which includes the dredging activities) is anticipated to add approximately 90 daily PCE trips, 28 a.m. peak-hour PCE trips, and 30 p.m. peak-hour PCE trips. All of the truck trips would travel on East 7th Street.

The addition of up to 28 p.m. peak-hour, construction-related, short-term trips would add less than 0.5 percent of the capacity of the roadway during the peak hour. In addition, most truck trips would occur during the day, when ambient traffic is less. Therefore, since the dredging activities are only a small portion of the overall Phase 1 construction of the Lagoon, the dredging activities would not cause an increase in traffic that is substantial in relation to the existing traffic load of the street system. However, because the intersection of East 7th Street and PCH has an existing LOS F in the a.m. and p.m. peak hours (which is below the City's established threshold of LOS D as the minimum operating level for roadway segments and intersections) and is located in the project vicinity and along the haul route, additional measures in the Environmental Commitments section, which require implementation of a Construction Traffic Management Plan, and timing considerations for dredge haul trips have been included to reduce the impact of construction traffic on the local circulation system.

5.0 ENVIRONMENTAL COMMITMENTS

The Corps and contractors commit to avoiding or minimizing for adverse effects during the proposed Lagoon dredging and placement of dredge material activities. Based on the information available to the Los Angeles District Corps and recommendations of Resource Agencies, the following Environmental Commitments will be implemented to minimize potential environmental impacts. Applicable commitments will be incorporated into the project plans and contract specifications.

5.1 AIR QUALITY

- Haul trucks, dredges, and other construction equipment will be properly maintained in order to minimize release of diesel and hydrocarbon effluent into the atmosphere. The contractor will follow all air quality standards, including those regarding emissions, fuel use and fuel consumption. Appropriate measures will be taken to reduce fugitive dust caused by dredge operations. Vehicle speed will be kept at 15 miles per hour (mph) on all unpaved surfaces to avoid the formation of dust clouds. Water sprayers or other stabilization techniques should be proactively employed to prevent dust from occurring. Other dust minimization measures recommended include: reducing the amount of the disturbed area where possible; spraying dirt stockpile areas daily if needed; and coverings or maintenance of 2 ft of freeboard (in accordance with California Vehicle Code [CVC] Section 23114) for trucks hauling dirt, sand, soil, or other loose material.
- Dredging equipment and cranes are subject to permit requirements by the South Coast Air Quality Management District (SCAQMD) and/or statewide registration through the Air Resources Board (ARB) portable equipment registration program. The contractor shall obtain a permit from the SCAQMD if and as necessary, pay all associated fees, and follow all permit requirements. A list of all equipment to be operated in the project area will be submitted to the SCAQMD. Once permits have been received, the SCAQMD Enforcement Group will be notified prior to bringing the dredge equipment on site. For any dredge that is not currently permitted, coordination with SCAQMD staff is required to determine the most appropriate measures to satisfy Best Available Control Technology (BACT) requirements.
- A mixture of Simple Green and water (10:1) will be lightly applied to exposed excavated sediments/soils to control odor as needed.
- The Construction Contractor shall ensure that on-road construction trucks and other vehicles shall be shut off when not in use and shall not idle for more than 5 minutes.
- Construction equipment operating on site shall be equipped with two- to four-degree engine timing retard or precombustion chamber engines.
- All off-road diesel construction equipment and on-road heavy duty trucks shall be fueled using low-sulfur fuels.

5.2 NOISE

- Haul trucks and construction equipment will be properly maintained and scheduled in order to minimize unsafe and nuisance noise effects to sensitive biological resources, residential areas, and the socioeconomic environment. Sensitive receptors, such as schools and hospitals, will be avoided whenever possible.
- The City of Long Beach (City) Noise Control Officer shall ensure that the Construction Contractor limits construction activity that produces loud or unusual noise that annoys or disturbs a reasonable person of normal sensitivity to between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday and federal holidays, and between 9:00 a.m. and 6:00 p.m. on Saturdays, with no construction activities on Sundays in accordance with the City's Noise Ordinance.
- During all dredging activities, the Project Contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards, as documented in construction plans and verified by the City Building Official or the United States Army Corps of Engineers (Corps).
- The Project Contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site, as documented in construction plans and verified by the City Building Official or the United States Army Corps of Engineers (Corps).
- The Construction Contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction, as documented in construction plans and verified by the City Building Official or the United States Army Corps of Engineers (Corps).
- Prior to initiation of dredge activities, the Director of Parks, Recreation, and Marine shall hold a community preconstruction meeting, in concert with the Construction Contractor, to provide information regarding the construction schedule (which includes dredging activities). The construction schedule information shall include the duration, location, days, and frequency of the dredging activities.

5.3 TRAFFIC

- Prior to the issuance of a permit for dredging activities, the United States Army Corps of Engineers (Corps) and the City of Long Beach (City) shall, under the direction of the City Traffic Engineer, design and implement a Construction Traffic Management Plan. The plan shall be designed by a registered Traffic Engineer and shall address traffic control for any street closure, detour, or other disruption to traffic circulation and public transit routes. The plan shall identify the routes that construction vehicles will use to access the site, the hours of construction traffic, traffic controls and detours, and off-site vehicle staging areas. The plan shall also require the City to keep all haul routes clean and free of debris including, but not limited to, gravel and dirt.
- The Construction Contractor shall time the activities so as to not interfere with peak-hour traffic and minimize obstruction of through traffic lanes adjacent to the site. If necessary, a flagperson shall be retained to maintain safety adjacent to existing roadways.
- No truck trips for the hauling of dredge material will occur on Pacific Coast Highway or 7th Street during the 7:00–9:00 a.m. or 5:00–7:00 p.m. peak traffic periods.

6.0 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

This proposed project complies with applicable environmental regulations as outlined in the following paragraphs.

6.1 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 (NEPA)

The National Environmental Policy Act (NEPA) declares it a national policy to "encourage productive and enjoyable harmony between man and the environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; and to enrich the understanding of the ecological systems and natural resources important to the Nation" (42 USC 4321). The Act authorized and directed "that, to the fullest extent possible, the policies, regulations and public laws of the United States shall be interpreted and administered in accordance with the policies of the Act and imposes general and specific requirements on all Federal Agencies (42 USC 4332).

This technical report for dredging activities in the Lagoon was with prepared in compliance with NEPA. Alternatives to the Proposed Action have been included in this document. Full compliance will be completed upon preparation of the EA and the signing of the Finding of No Significant Impact (FONSI).

6.2 CLEAN AIR ACT AMENDMENTS OF 1970, AS AMENDED

Emissions generated by this project are expected to be temporary and insignificant. Furthermore, the contractor must obtain a permit from the SCAQMD or ARB prior to commencement of work. The Corps has determined, therefore, that the proposed dredge project is in compliance with the following sections of the Clean Air Act (CAA) Amendments of 1970, as amended (PL 95-95, H.R.6161, August 7, 1977):

- Title I Amendments relating primarily to stationary sources and Section 109 New Source Standards of Performance.
- Title II Amendments relating primarily to mobile sources and Section 204 emission standards from heavy duty vehicles or engines, and from certain other vehicles or engines.
- Title III Miscellaneous Amendments, Section 303 Delegation to Local Government under the Federal Plan, and Section 313 Air Quality Monitoring by the EPA.

Under Section 176(c) of the CAA of 1990, the Lead Agency is required to make a determination of whether the Proposed Action "conforms" with the SIP. Conformity is defined in Section 176(c) of the CAA as compliance with the SIP's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. However, if the total direct and indirect emissions from the Proposed Action are below the General Conformity Rule

De Minimis emission thresholds, the Proposed Action would be exempt from performing a comprehensive Air Quality Conformity Analysis and would be considered to be in conformity with the SIP.

APPENDIX B:

RESULTS OF THE CULTURAL RESOURCES ASSESSMENT FOR THE COLORADO LAGOON

LSA

LSA ASSOCIATES, INC.
20 EXECUTIVE PARK, SUITE 200
IRVINE, CALIFORNIA 92614
949.553.0666 TEL
949.553.8076 FAX

BERKELEY
CARLSBAD
FORT COLLINS
FRESNO
PALM SPRINGS
POINT RICHMOND
RIVERSIDE
ROCKLIN
SAN LUIS OBISPO
S. SAN FRANCISCO

July 1, 2010

Mr. Eric Lopez
City of Long Beach Community Development Department
333 W. Ocean Boulevard, 3rd Floor
Long Beach, California 90802

Subject: Results of the Cultural Resources Assessment for the Colorado Lagoon, City of Long Beach, Los Angeles County, California (LSA Project No. CLB0803)

Dear Mr. Lopez:

LSA Associates, Inc. (LSA) is pleased to submit the results of the cultural resources assessment for the Colorado Lagoon (Lagoon) Restoration Project located in the City of Long Beach (City), Los Angeles County, California (attached Figure 1). In addition to other improvements, the City is proposing to perform dredging activities in the Lagoon that fall under the jurisdiction of the U.S. Army Corps of Engineers (USACE; see Figure 2). As such, this assessment was prepared in accordance with the Advisory Council on Historic Preservation regulations (revised January 11, 2001) for the identification of historic properties (prehistoric or historic sites, buildings, structures, objects, or districts listed in, or eligible for listing in, the National Register of Historic Places [National Register]) as required by 36 CFR Part 800, the regulations implementing Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA Section 106). This assessment also addresses the requirements of the California Environmental Quality Act (CEQA) (as amended January 1, 2007); Public Resources Code (PRC), Division 13 (Environmental Quality), Chapter 2.6 §21083.2 (Archaeological Resources) and §21084.1 (Historical Resources); and the Guidelines for CEQA (as amended July 11, 2006), California Code of Regulations (CCR) Title 14, Chapter 3, Article 5 §15064.5 (Determining the Significance of Impacts on Historical and Unique Archaeological Resources).

METHODS

Records Search

On September 27, 2007, a records search was conducted at the South Central Coastal Information Center (SCCIC) of the California Historical Resources Information System (CHRIS), located at California State University, Fullerton. It included a review of all recorded cultural resources located within a 0.25-mile radius of the project area, as well as a review of known cultural resource survey and excavation reports. In addition, the California Points of Historical Interest (PHI), California Historical Landmarks (CHL), California Register of Historical Resources (California Register), National Register, and California State Historic Resources Inventory (HRI) listings were reviewed. LSA also reviewed the following historical maps of the project area: the United States Geological Survey (USGS) *Downey, California* 15-minute topographic quadrangle (1896 and 1942) and the USGS *Long Beach, California* 6-minute topographic quadrangle (1932). Several historical aerials of the project location were also reviewed.

Survey

On November 8, 2007, and February 12, 2008, an archaeological survey was conducted by LSA archaeologist Natalie Lawson. She completed the survey by walking parallel transects spaced by 10 meters across the project area until the entire project area, including all open space around the Lagoon as well as all open space south of the Lagoon to Eliot Street, had been surveyed. Soil profiles and rodent backdirt were examined for evidence of cultural remains. Photographs were taken of the surveyed area as well as the surrounding areas, including the Long Beach Marine Stadium (Marine Stadium).

Native American Consultation

Native American consultation was conducted by the City as required by Senate Bill 18 (Burton, SB 18), following the guidelines of the California Office of Planning and Research (OPR, November 14, 2005). Written in 2004, SB 18 addresses the potential environmental impact of projects on California Native American Cultural Places. SB 18 requires planning agencies such as the City to consult with California Native American tribes during the preparation, updating, or amendment of General/Specific Plans. The purpose of the consultation is to identify and preserve specified places, features, and objects located within the City's jurisdiction that have a unique and significant meaning to California Native Americans.

Consultation was initiated in November 2007 by the City in a letter to the Native American Heritage Commission (NAHC). The letter requested a search of the Sacred Lands File (SLF) to determine whether cultural or traditional resources significant to a California Native American Tribe are present in the project area. In a letter response dated November 15, 2007, the NAHC stated that the results of the SLF search were negative. However, the NAHC recommended that seven groups be contacted that may have knowledge of cultural resources that could be affected by the project. The City contacted each group via certified letter dated December 10, 2007. At the request of the City, follow-up telephone calls were made by LSA to the seven groups to ensure that their input regarding the project would be included. Details of the consultation are provided in Attachment A.

RESULTS

Records Search

Five studies have been conducted within a 0.25-mile radius of the project area; however, none of these studies included any portion of the project area, and the project area has never been surveyed for cultural resources. Seven resources have been identified within the 0.25-mile radius of the project area, including six archaeological sites and one historical resource. None of the archaeological sites are located within the project area; however, one historical resource is located partially within the project area. This resource is Marine Stadium (CA-LAN-056). The stadium is listed in the California Register, the CHL (No. 1014), and the PHI (No. 19-186115). Marine Stadium was evaluated for historical significance and was determined to be a significant Point of Historical Interest in 1993.

The Lagoon and Marine Stadium are tidal water bodies located in the southwestern portion of the City. They lie northwest of the mouth of the San Gabriel River and north of Alamitos Bay. The Lagoon was once a part of the historic Los Cerritos Wetlands. In 1923, the low-lying tidelands of Alamitos Bay were dredged to form the Lagoon and Marine Stadium, which were used for

recreational rowing. A review of historical aerials of the project area revealed that extensive dredging occurred within the project area in the late 1920s. The City then purchased the Lagoon area and Recreation Park in the 1920s through general revenue bond funding. In 1932, the Los Angeles Olympic Committee chose the Lagoon for diving trials and Marine Stadium for rowing events. High diving was performed from a three-story structure that was floating in the Lagoon. To prepare for the diving trials, the Lagoon was separated from Marine Stadium by a tide gate, which was installed to maintain adequate diving depth. In 1968, the City remodeled Marine Stadium for the Olympic rowing and canoeing team trials. Also, in the late 1960s, the area between what is now the north end of Marine Stadium and the south end of the Lagoon was filled, and the existing underground box culvert was constructed. This was part of the construction for the then-proposed Pacific Coast Freeway and further separated Colorado Lagoon from Marine Stadium. This "filled" area is now Marina Vista Park.

Survey

No cultural resources were identified during the survey. Soil in the project area is loamy sand. Marine shell was observed over the majority of the project area and appears to be the result of extensive dredging and filling, which is consistent with the historical aerials. Although the Colorado Lagoon Restoration Project and several of the project alternatives involve developing infrastructure to improve the tidal flows between the Lagoon and Marine Stadium, a Point of Historical Interest, the proposed project will not adversely affect the historical significance or continued uses of the Stadium.

Native American Consultation

A letter response dated January 4, 2008, was received from Robert Dorame of the Gabrielino Tongva Indians of California Tribal Council. Mr. Dorame stated that the Tribe has information indicating the area is sensitive for cultural resources. He recommended Tribal involvement and monitoring during all phases of the project and that the City have a treatment plan in place should ancestral remains be encountered. No responses were received from any of the other Tribes contacted.

On behalf of the City, LSA made one round of follow-up telephone calls to the remaining six Tribes. Ron Andrade of the Los Angeles City/County Native American Indian Commission deferred comment to Anthony Morales of the Gabrieleno/Tongva San Gabriel Band of Mission Indians. Mr. Morales responded that the Tribe considers the area sensitive for cultural resources and recommends monitoring by an archaeologist and Native American during project construction. Roberta Cordero of the Coastal Band of the Chumash Nation recommended that Darlene Hall, the spokesperson for cultural resources, be contacted. Ms. Hall stated that the project is outside of the Tribe's traditional use area and deferred to the recommendations of local Tribes. Messages were left for Qun-tan Shup, Owl Clan; Cindi Alvitre, Ti'At Society; and John Tommy Rosas, Tongva Ancestral Territorial Tribal Nation, requesting that they return the call or contact the City should they have any concerns about the project impacting cultural resources.

The City received a letter dated January 27, 2008, from Qun-tan Shup, Owl Clan. The letter expressed concern for the Chumash sites in the area and requested involvement in any future meetings regarding the project, as well as a specific meeting with the City if no other meetings were formally scheduled. Per City direction, LSA attempted to contact Mr. Shup by telephone on February 8 and 14, 2008. Voice messages were left each time requesting that the tribe return the calls to elaborate on their

concerns, and so that more information could be provided about the current condition of the project area. To date, no response has been received.

For additional details regarding the Native American consultation please see Attachment A.

RECOMMENDATIONS

Based on the results of the record search and field survey, LSA recommends that no further cultural resources studies or monitoring by an archaeologist be performed. However, in the event that archaeological resources are encountered during construction-related ground-disturbing activities, a qualified archaeologist should be contacted to assess the find and determine appropriate mitigation measures. Recommendations by two Tribes for construction monitoring have also been made to the City as a result of the consultation detailed above. If human remains are encountered, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to PRC Section 5097.98. The County Coroner must be notified of the find immediately. If the remains are determined to be Native American, the County Coroner will notify the NAHC, which will determine and notify a Most Likely Descendant (MLD). With the permission of the landowner or his/her authorized representative, the MLD may inspect the site of the discovery. The MLD shall complete the inspection within 48 hours of notification by the NAHC. The MLD may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

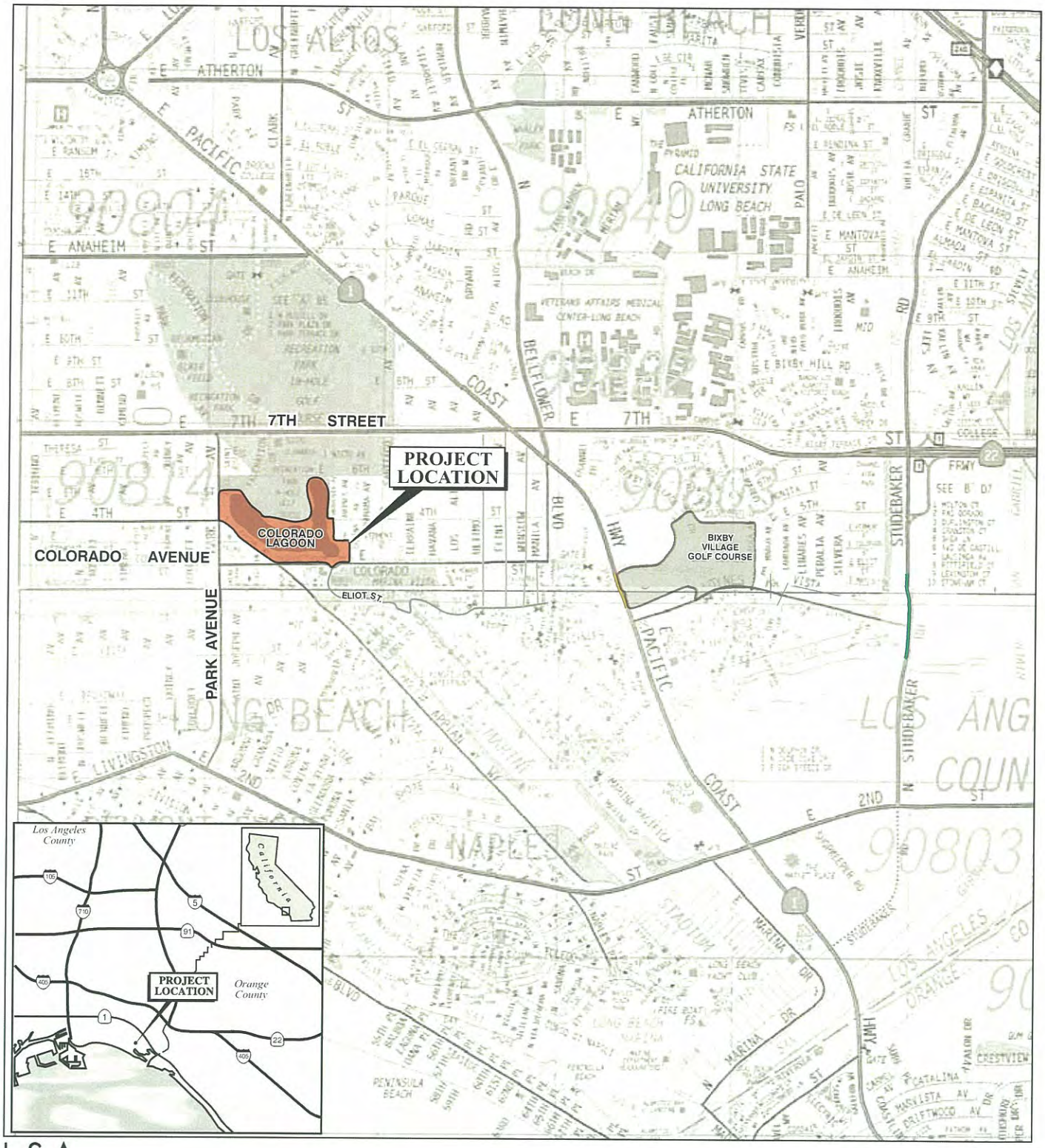
LSA is pleased to have been able to work with you on this project. If you have any questions or comments, please contact me at (949) 553-0666 or at terri.fulton@lsa-assoc.com.

Sincerely,

LSA ASSOCIATES, INC.

Terri Fulton
Senior Cultural Resources Manager

Attachments: Figures 1 and 2
A: Native American Consultation



LSA

FIGURE 1

Project Area

N

0 1000 2000
FEET

SOURCE: Thomas Guide, 2007

I:\CLB0803\G\Location.cdr (3/22/2010)

Colorado Lagoon Restoration Project

Project Location

LSA

LEGEND

Corps Area of Potential Effects

FIGURE 2

N

0 100 200

FEET

SOURCE: Use Upper and Lower Case Fonts (MM/YY)

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Colorado Lagoon Restoration Project

Corps Area of Potential Effects

ATTACHMENT A:

NATIVE AMERICAN CONSULTATION

SENATE BILL 18 (Burton 2004) NATIVE AMERICAN CONSULTATION RECORD
Proposed Colorado Lagoon Restoration Project, City of Long Beach, Los Angeles County, California

Table A: Initial Consultation Based on Native American Heritage Commission List Dated November 15, 2007

Groups Contacted	Date City Sent Letter to Tribes	Date Response from Tribes Received by City	Date and Results of LSA Follow-up Telephone Calls
LA City/County Native American Indian Commission Ron Andrade, Director	12/10/07	No response received.	1/08/08: Mr. Andrade has reviewed the information sent by the City and will defer comment to Anthony Morales, Gabrieleno/Tongva San Gabriel Band of Mission Indians, Chairperson. Please see below.
Owl Clan Qun-tan Shup Chumash	12/10/07	1/27/08: A letter was received by the City. The letter stated that the Tribe has concerns regarding the Chumash sites in the project area, and requested involvement in any future meetings regarding the project. If no future meetings are scheduled, the tribe requested a specific meeting with the City. Please see attached letter.	1/08/08: A voice mail was left for Mr. Shup asking that he please respond to the City should the Tribe have concerns about cultural resources being impacted by this project. In response, a letter dated January 27, 2008 was received by the City from Mr. Shup. Please see information at left. 2/08/08 and 2/14/08: Per City direction, two attempts were made to contact Mr. Shup in response to the January 27, 2008 letter. Voice messages were left each time requesting that he return the calls to elaborate on the Tribe's concerns and so that more information could be provided about the current condition of the project area. To date, no response has been received.
Ti'At Society Cindi Alvitre Gabrielino	12/10/07	No response received.	1/08/08: A voice mail was left for Ms. Alvitre asking that she please respond to the City should the Tribe have concerns about cultural resources being impacted by this project. To date, to response has been received.
Tongva Ancestral Territorial Tribal Nation John Tommy Rosas, Tribal Administrator Gabrielino Tongva	12/10/07	No response received.	1/08/08: A voice mail was left for Mr. Rosas asking that he please respond to the City should the Tribe have concerns about cultural resources being impacted by this project. To date, no response has been received.
Gabrieleno/Tongva San Gabriel Band of Mission Indians Anthony Morales, Chairperson Gabrielino Tongva	12/10/07	No response received.	1/08/08: A voice mail was left for Mr. Morales asking that he please respond to the City should the Tribe have concerns about cultural resources being impacted by this project. 1/09/08: Mr. Morales returned the call to say that the Tribe considers the area to be sensitive for cultural resources, and recommends monitoring by a Native American and archaeologist during construction.

CITY OF LONG BEACH

DEPARTMENT OF PLANNING & BUILDING

333 W. Ocean Blvd, 5th Floor Long Beach, CA 90802 (562) 570-6357 FAX (562) 570 -6068

COMPREHENSIVE & ENVIRONMENTAL PLANNING

December 10, 2007

Ron Andrade, Director
LA City/County Native American Indian Commission
3175 West 6th Street
Room 403
Los Angeles, CA 90020

RE: Sacred Lands File Search for Colorado Lagoon Restoration Project Site, Long Beach, California

Dear Mr. Andrade:

Attached is a copy of the Notice of Preparation/Initial Study for the Colorado Lagoon Restoration Project. The City of Long Beach, as Lead Agency for this project, has initiated an environmental review process in accordance with the California Environmental Quality Act (CEQA). The project will involve sediment removal and construction of an open channel between the Lagoon and Marine Stadium. Please notify us of any Traditional Cultural Properties (TCPs), Traditional Tribal Cultural Sites (TTCSs) and/or any sacred site that may be impacted by this project.

Thank you very much for your assistance. If you have any questions or comments, please feel free to call me at (562) 570-6368.

Sincerely,

Craig Chalfant
Planner

Attachment: Notice of Preparation/Initial Study

CITY OF LONG BEACH

DEPARTMENT OF PLANNING & BUILDING

333 W. Ocean Blvd, 5th Floor Long Beach, CA 90802 (562) 570-6357 FAX (562) 570 -6068

COMPREHENSIVE & ENVIRONMENTAL PLANNING

December 10, 2007

Owl Clan
Qun-tan Shup
48825 Sapaque Road
Bradley, CA 93426

RE: Sacred Lands File Search for Colorado Lagoon Restoration Project Site, Long Beach, California

Dear Mr. Shup:

Attached is a copy of the Notice of Preparation/Initial Study for the Colorado Lagoon Restoration Project. The City of Long Beach, as Lead Agency for this project, has initiated an environmental review process in accordance with the California Environmental Quality Act (CEQA). The project will involve sediment removal and construction of an open channel between the Lagoon and Marine Stadium. Please notify us of any Traditional Cultural Properties (TCPs), Traditional Tribal Cultural Sites (TTCSs) and/or any sacred site that may be impacted by this project.

Thank you very much for your assistance. If you have any questions or comments, please feel free to call me at (562) 570-6368.

Sincerely,

Craig Chalfant
Planner

Attachment: Notice of Preparation/Initial Study

CITY OF LONG BEACH

DEPARTMENT OF PLANNING & BUILDING

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COMPREHENSIVE & ENVIRONMENTAL PLANNING

December 10, 2007

Cindi Alvitre
Ti'At Society
6515 E. Seaside Walk
Suite C
Long Beach, CA 90803

RE: Sacred Lands File Search for Colorado Lagoon Restoration Project Site, Long Beach, California

Dear Ms. Alvitre:

Attached is a copy of the Notice of Preparation/Initial Study for the Colorado Lagoon Restoration Project. The City of Long Beach, as Lead Agency for this project, has initiated an environmental review process in accordance with the California Environmental Quality Act (CEQA). The project will involve sediment removal and construction of an open channel between the Lagoon and Marine Stadium. Please notify us of any Traditional Cultural Properties (TCPs), Traditional Tribal Cultural Sites (TTCSs) and/or any sacred site that may be impacted by this project.

Thank you very much for your assistance. If you have any questions or comments, please feel free to call me at (562) 570-6368.

Sincerely,

Craig Chalfant
Planner

Attachment: Notice of Preparation/Initial Study

CITY OF LONG BEACH

DEPARTMENT OF PLANNING & BUILDING

333 W. Ocean Blvd, 5th Floor Long Beach, CA 90802 (562) 570-6357 FAX (562) 570 -6068

COMPREHENSIVE & ENVIRONMENTAL PLANNING

December 10, 2007

John Tommy Rosas
Tribal Administrator
Tongva Ancestral Territorial Tribal Nation
4712 Admiralty Way
Suite 172
Marina Del Rey, CA 90292

RE: Sacred Lands File Search for Colorado Lagoon Restoration Project Site, Long Beach, California

Dear Mr. Rosas:

Attached is a copy of the Notice of Preparation/Initial Study for the Colorado Lagoon Restoration Project. The City of Long Beach, as Lead Agency for this project, has initiated an environmental review process in accordance with the California Environmental Quality Act (CEQA). The project will involve sediment removal and construction of an open channel between the Lagoon and Marine Stadium. Please notify us of any Traditional Cultural Properties (TCPs), Traditional Tribal Cultural Sites (TTCSs) and/or any sacred site that may be impacted by this project.

Thank you very much for your assistance. If you have any questions or comments, please feel free to call me at (562) 570-6368.

Sincerely,

Craig Chalfant
Planner

Attachment: Notice of Preparation/Initial Study

CITY OF LONG BEACH

DEPARTMENT OF PLANNING & BUILDING

333 W. Ocean Blvd, 5th Floor Long Beach, CA 90802 (562) 570-6357 FAX (562) 570 -6068

COMPREHENSIVE & ENVIRONMENTAL PLANNING

December 10, 2007

Anthony Morales
Chairperson
Gabrieleno/Tongva San Gabriel Band of Mission Indians
P.O. Box 693
San Gabriel, CA 91778

RE: Sacred Lands File Search for Colorado Lagoon Restoration Project Site, Long Beach, California

Dear Mr. Morales:

Attached is a copy of the Notice of Preparation/Initial Study for the Colorado Lagoon Restoration Project. The City of Long Beach, as Lead Agency for this project, has initiated an environmental review process in accordance with the California Environmental Quality Act (CEQA). The project will involve sediment removal and construction of an open channel between the Lagoon and Marine Stadium. Please notify us of any Traditional Cultural Properties (TCPs), Traditional Tribal Cultural Sites (TTCSs) and/or any sacred site that may be impacted by this project.

Thank you very much for your assistance. If you have any questions or comments, please feel free to call me at (562) 570-6368.

Sincerely,

Craig Chalfant
Planner

Attachment: Notice of Preparation/Initial Study

CITY OF LONG BEACH

DEPARTMENT OF PLANNING & BUILDING

333 W. Ocean Blvd, 5th Floor Long Beach, CA 90802 (562) 570-6357 FAX (562) 570 -6068

COMPREHENSIVE & ENVIRONMENTAL PLANNING

December 10, 2007

Roberta Cordero
Coastal Band of Chumash Nation
4454 La Paloma Road
Santa Barbara, CA 93105

RE: Sacred Lands File Search for Colorado Lagoon Restoration Project Site, Long Beach, California

Dear Ms. Cordero:

Attached is a copy of the Notice of Preparation/Initial Study for the Colorado Lagoon Restoration Project. The City of Long Beach, as Lead Agency for this project, has initiated an environmental review process in accordance with the California Environmental Quality Act (CEQA). The project will involve sediment removal and construction of an open channel between the Lagoon and Marine Stadium. Please notify us of any Traditional Cultural Properties (TCPs), Traditional Tribal Cultural Sites (TTCSs) and/or any sacred site that may be impacted by this project.

Thank you very much for your assistance. If you have any questions or comments, please feel free to call me at (562) 570-6368.

Sincerely,

Craig Chalfant
Planner

Attachment: Notice of Preparation/Initial Study

CITY OF LONG BEACH

DEPARTMENT OF PLANNING & BUILDING

333 W. Ocean Blvd, 5th Floor Long Beach, CA 90802 (562) 570-6357 FAX (562) 570 -6068

COMPREHENSIVE & ENVIRONMENTAL PLANNING

December 10, 2007

Robert Dorame
Tribal Chair/Cultural Resources
Gabrielino Tongva Indians of California Tribal Council
5450 Slauson Avenue
Suite 151 PMB
Culver City, CA 90230

RE: Sacred Lands File Search for Colorado Lagoon Restoration Project Site, Long Beach, California

Dear Mr. Dorame:

Attached is a copy of the Notice of Preparation/Initial Study for the Colorado Lagoon Restoration Project. The City of Long Beach, as Lead Agency for this project, has initiated an environmental review process in accordance with the California Environmental Quality Act (CEQA). The project will involve sediment removal and construction of an open channel between the Lagoon and Marine Stadium. Please notify us of any Traditional Cultural Properties (TCPs), Traditional Tribal Cultural Sites (TTCSs) and/or any sacred site that may be impacted by this project.

Thank you very much for your assistance. If you have any questions or comments, please feel free to call me at (562) 570-6368.

Sincerely,

Craig Chalfant
Planner

Attachment: Notice of Preparation/Initial Study

Robert F. Dorame
Tribal Chair/Cultural Resources

Gabrielino Tongva
Indians of California
Tribal Council
5450 Slauson avenue
Suite 151 PMB
Culver City, CA 90230
562-761-6417
gtongva@verizon.net

January 4, 2008

Craig Chalfant
Planner
City of Long Beach
Department of Planning and Building
333 W. Ocean Blvd, 5th Floor
Long Beach, CA 90802

Dear Mr. Chalfant:

Thank you so much for forwarding a copy of the Initial Study for the Colorado Lagoon Restoration Project.

I have researched the site location and have verified the existence of an occupational site, LA 5869, within the boundaries of ½ mile that may be impacted by the project. In addition, I recently surveyed the golf course and surrounding land located due north of the proposed project site resulting in visible surface midden including pectin, cockle and oyster shells spread over a large area that are indicative of Indian habitation. As you probably know, estuaries were a typical source of reliable food for the early inhabitants along the California coastline.

We recommend that a member of our tribe participate in any survey work and provide monitoring services during any soil disturbances that may impact this site as well as any other as yet unknown sites that may be uncovered during the development of this project.

Further, as a Most Likely Descendant and a tribal elder with more than 30 years experience in cultural resources, I am concerned that the City be prepared to appropriately handle any ancestral remains that may be uncovered during this project. I have worked at many sites that did not become controversial because an appropriate treatment plan was in place from the beginning, thus avoiding problems due to our recommendations for re-internment with dignity.

Thank you again for the opportunity to comment on this project plan. If you have any questions or require further consultation, please contact me at 562-761-6417 or by email at gtongva@verizon.net.

Happy New Year.

Robert Dorame
Tribal Chair

OWL CLAN CONSULTANTS

805-472-9536
48825 Sapague Rd. Bradley Ca. 93426
MUPAKA@gmail.com

January 29, 2008

Angela Reynolds
Planning Officer
City of Long Beach
333 W. Ocean Boulevard, 5th floor
Long Beach, Ca. 90802

Subject: Colorado Lagoon Restoration Project

Dear Angela Reynolds,

This letter is in response to the public notice regarding the notice of intent to prepare a Draft Environmental Impact Report for the restoration project mentioned above.

Owl Clan Consultants are expressing concern for our Chumash Cultural sites, located in the proposed project area and up to a 5mile radius around the proposed project sites.

Please inform us of any meetings that occur in which we can formally discuss our concerns, or if no meetings are scheduled we can arrange to meet as soon as possible.

Thank you for your cooperation,

Owl Clan Consultants

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
e-mail: ds_nahc@pacbell.net

June 5, 2008

Mr. Craig Chalfant, Director, Department of Development Services
CITY OF LONG BEACH
333 W. Ocean Boulevard, 5th Floor
Long Beach, CA 90802

Re: SCH#2007111034; CEQA Notice of Completion; draft Environmental Impact Report (DEIR) for the Colorado Lagoon Restoration Project; City of Long Beach; Los Angeles County, California

Dear Mr. Chalfant:

The Native American Heritage Commission is the state agency designated to protect California's Native American Cultural Resources. The California Environmental Quality Act (CEQA) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the California Code of Regulations §15064.5(b)(c (CEQA guidelines). Section 15382 of the 2007 CEQA Guidelines defines a significant impact on the environment as "a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including ...objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE)', and if so, to mitigate that effect. To adequately assess the project-related impacts on historical resources, the Commission recommends the following action:

√ Contact the appropriate California Historic Resources Information Center (CHRIS) for possible 'recorded sites' in locations where the development will or might occur.. Contact information for the Information Center nearest you is available from the State Office of Historic Preservation (916/653-7278)/ http://www.ohp.parks.ca.gov. The record search will determine:

- If a part or the entire APE has been previously surveyed for cultural resources.
- If any known cultural resources have already been recorded in or adjacent to the APE.
- If the probability is low, moderate, or high that cultural resources are located in the APE.
- If a survey is required to determine whether previously unrecorded cultural resources are present.

√ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.

- The final report containing site forms, site significance, and mitigation measurers should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for pubic disclosure.
- The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.

√ Contact the Native American Heritage Commission (NAHC) for:

* A Sacred Lands File (SLF) search of the project area and information on tribal contacts in the project vicinity that may have additional cultural resource information. Please provide this office with the following citation format to assist with the Sacred Lands File search request: USGS 7.5-minute quadrangle citation with name, township, range and section: .

- The NAHC advises the use of Native American Monitors whenever there is justification for utilizing the services of an archaeologist in orderto ensure proper identification and care given cultural resources that may be discovered. The NAHC recommends that contact be made with Native American Contacts on the attached list to get their input on potential project impact (APE). In some cases, the existence of a Native American cultural resources may be known only to a local tribe(s).

√ Lack of surface evidence of archeological resources does not preclude their subsurface existence.

- Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) §15064.5 (f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
- A culturally-affiliated Native American tribe may be the only source of information about a Sacred Site/Native American cultural resource.
- Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.

√ Lead agencies should include provisions for discovery of Native American human remains or unmarked cemeteries in their mitigation plans.

* CEQA Guidelines, Section 15064.5(d) requires the lead agency to work with the Native Americans identified by this Commission if the initial Study identifies the presence or likely presence of Native American human remains within the APE. CEQA Guidelines provide for agreements with Native American, identified by the NAHC, to assure the appropriate and dignified treatment of Native American human remains and any associated grave liens.

√ Health and Safety Code §7050.5, Public Resources Code §5097.98 and Sec. §15064.5 (d) of the California Code of Regulations (CEQA Guidelines) mandate procedures to be followed, including that construction or excavation be stopped in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery until the county coroner or medical examiner can determine whether the remains are those of a Native American. . Note that §7052 of the Health & Safety Code states that disturbance of Native American cemeteries is a felony.

√ Lead agencies should consider avoidance, as defined in §15370 of the California Code of Regulations (CEQA Guidelines), when significant cultural resources are discovered during the course of project planning and implementation

Please feel free to contact me at (916) 653-6251 if you have any questions.

Sincerely,

Dave Singleton
Program Analyst

Attachment: List of Native American Contacts

Cc: State Clearinghouse

Native American Contacts
Los Angeles County
June 5, 2008

LA City/County Native American Indian Comm
Ron Andrade, Director
3175 West 6th Street, Rm. 403
Los Angeles , CA 90020
(213) 351-5324
(213) 386-3995 FAX

Gabrielino Tongva Indians of California Tribal Council
Robert Dorame, Tribal Chair/Cultural Resources
5450 Slauson, Ave, Suite 151 PMB Gabrielino Tongva
Culver City , CA 90230
gtongva@verizon.net
562-761-6417 - voice
562-925-7989 - fax

Ti'At Society
Cindi Alvitre
6515 E. Seaside Walk, #C Gabrielino
Long Beach , CA 90803
calvitre@yahoo.com
(714) 504-2468 Cell

Gabrieleno/Tongva San Gabriel Band of Mission
Anthony Morales, Chairperson
PO Box 693 Gabrielino Tongva
San Gabriel , CA 91778
ChiefRBwife@aol.com
(626) 286-1632
(626) 286-1758 - Home
(626) 286-1262 Fax

Gabrielino/Tongva Council / Gabrielino Tongva Nation
Sam Dunlap, Tribal Secretary
761 Terminal Street; Bldg 1, 2nd floor Gabrielino Tongva
Los Angeles , CA 90021
office @tongvatribe.net
(213) 489-5001 - Office
(909) 262-9351 - cell
(213) 489-5002 Fax

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the propose SCH#2007111034; CEQA Notice of Completion; draft Environmental Impact Report (DEIR) for the Colorado Lagoon Restoration Project; City of Long Beach; los Angeles County, California.

LSA

LSA ASSOCIATES, INC.
20 EXECUTIVE PARK, SUITE 200
IRVINE, CALIFORNIA 92614

949.553.0666 TEL
949.553.8076 FAX

BERKELEY
CARLSBAD
COLMA
FORT COLLINS
PALM SPRINGS
POINT RICHMOND
RIVERSIDE
ROCKLIN
SAN LUIS OBISPO

June 10, 2008

Gabrielino/Tongva Council/Gabrielino Tongva Nation
Sam Dunlap, Tribal Secretary
761 Terminal Street, Building 1, 2nd Floor
Los Angeles, CA 90021

RE: Sacred Lands File Search for the Colorado Lagoon Restoration Project Site
City of Long Beach, Los Angeles County, California

Dear Mr. Dunlap:

LSA Associates, Inc. (LSA) is contacting you on behalf of the City of Long Beach (City), California, regarding the Colorado Lagoon Restoration Project. The project will involve sediment removal and construction of an open channel between the Lagoon and Marine Stadium. A map of the project area is attached.

The City of Long Beach, as the Lead Agency for the project, has initiated an environmental review process in accordance with the California Environmental Quality Act. Because the project will involve a change to the General Plan Amendment, the City is also initiating Native American consultation as required by Senate Bill 18 (Burton 2004). The Native American Heritage Commission has recommended you as someone who may know about the presence of cultural resources that may be impacted by this project.

If you are aware of any Traditional Cultural Properties (TCPs), Traditional Tribal Cultural Sites (TTCSs), sacred sites, or other sensitive areas that may be impacted by this project, please contact:

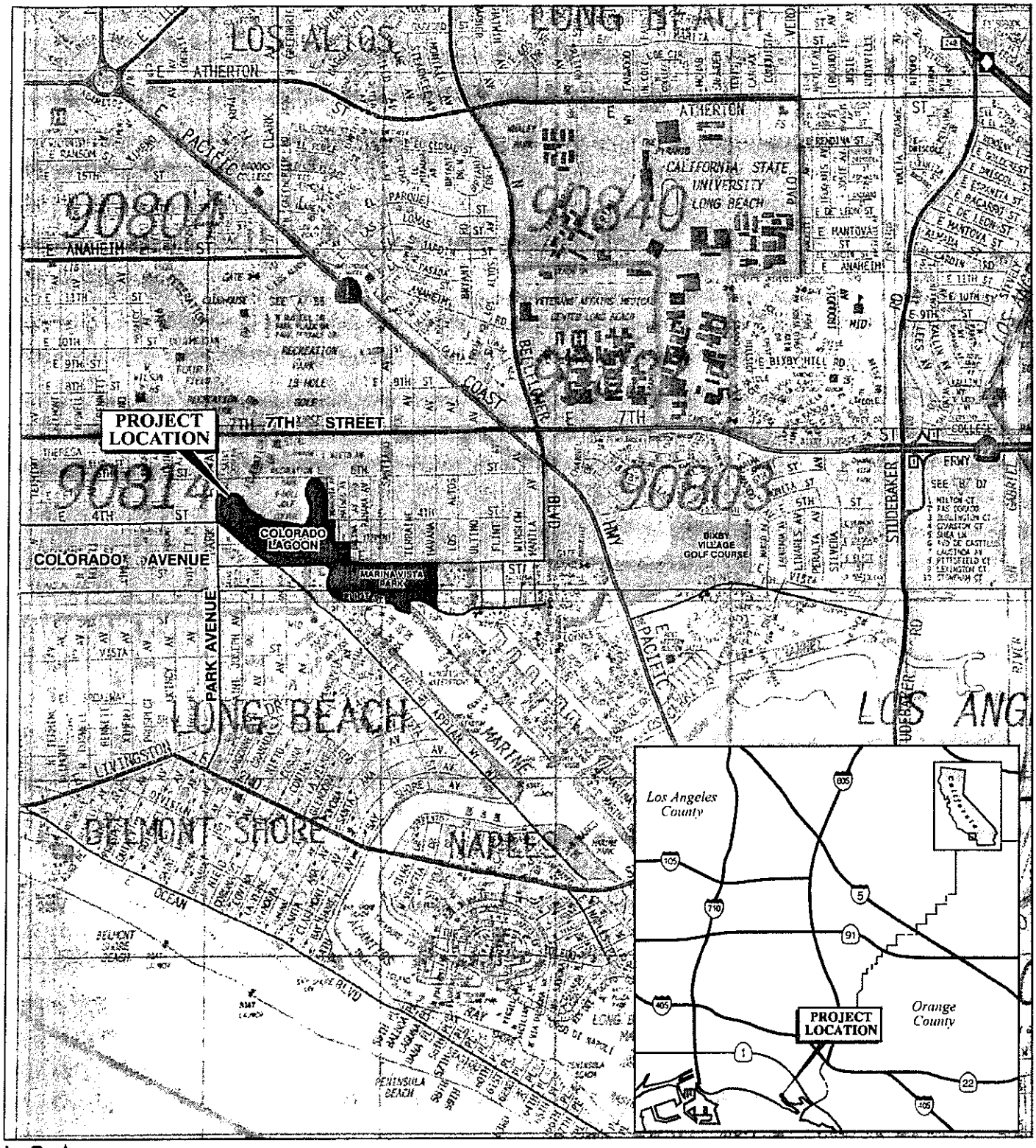
Craig Chalfant, Planner
City of Long Beach
Department of Planning and Building
333 W. Ocean Blvd. 5th Floor
Long Beach, CA 90802
Phone: (562) 570-6357
FAX: (562) 570-6068

You may also contact me at the number above with any questions. If we do not hear from you, I will call in the next several weeks to ensure that your input is received. On behalf of the City, thank you very much for your assistance in this process.

Best Regards,

LSA ASSOCIATES, INC.

Terri Fulton
Senior Cultural Resources Manager
Native American Consultation



LSA

FIGURE 1

Colorado Lagoon Restoration Project

Project Location

I:\CLB0702\G\Location2 Fig1.cdr (4/7/08)

Terri Fulton

From: Terri Fulton
Sent: Tuesday, June 10, 2008 4:47 PM
To: sam dunlap
Cc: Terri Fulton
Subject: Consultation letter for City of Long Beach
Attachments: Sam Dunlap.pdf

Hi Sam,

Here is the letter I left you a voice mail about today. It's for the Colorado Lagoon project in Long Beach. I tried to fax it but the number for the Tribal office was disconnected. I'm also sending it certified mail to cover all bases. Please let me know if you have any questions and I'll be in touch soon.

Thanks,

Terri Fulton
Archaeologist/Senior Cultural Resources Manager
Native American Consultation

LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, CA 92614-4731
Phone (949) 553-0666
Fax (949) 553-8076
Wireless (949) 337-5454
terri.fulton@lsa-assoc.com

Terri Fulton

From: Terri Fulton
Sent: Tuesday, June 24, 2008 9:45 AM
To: 'sam dunlap'
Subject: FW: Scan from a Xerox WorkCentre Pro

Attachments: Scan001.PDF

Scan001.PDF (483 KB)

Hi Sam,

Here it is! Let me know your thoughts on this project. Thanks for your help.

T.

-----Original Message-----
From: CulturalXRX@lsa-assoc.com [mailto:CulturalXRX@lsa-assoc.com]
Sent: Tuesday, June 24, 2008 10:47 AM
To: Terri Fulton
Subject: Scan from a Xerox WorkCentre Pro

Please open the attached document. It was scanned and sent to you using a Xerox WorkCentre Pro.

Sent by: Guest [CulturalXRX@lsa-assoc.com] Number of Images: 2 Attachment File Type: PDF

WorkCentre Pro Location: Irvine, Cultural Device Name: CulturalXRX

For more information on Xerox products and solutions, please visit http://www.xerox.com

Terri Fulton

From: sam dunlap [samdunlap@earthlink.net]
Sent: Wednesday, June 25, 2008 5:05 PM
To: Terri Fulton
Subject: Re: FW: FW: Scan from a Xerox WorkCentre Pro

Thanks Terri for the added info. I am pleased to see the mitigation measures are in place.
Sam

-----Original Message-----
>From: Terri Fulton <Terri.Fulton@lsa-assoc.com>
>Sent: Jun 24, 2008 10:55 AM
>To: sam dunlap <samdunlap@earthlink.net>
>Subject: FW: FW: Scan from a Xerox WorkCentre Pro
>
>Hi Sam,
>
>Here is a little more information - please see Renee's response below.
>We have a mitigation for monitoring by both an archaeologist and Native
>American when/if construction goes into native soil, but apparently
>it's not expected to. Let me know if this changes anything.
>
>-----Original Message-----
>From: Renee Escario
>Sent: Tuesday, June 24, 2008 10:47 AM
>To: Terri Fulton; Mona Deleon
>Subject: RE: FW: Scan from a Xerox WorkCentre Pro
>
>Terri,
>
>We already have the monitoring mitigation measure in the document.
>However, the potential for impacting resources is NOT substantial. The
>project area is an area of dredge and fill. No native soils would be
>affected by the project.
>
>-----Original Message-----
>From: Terri Fulton
>Sent: Tuesday, June 24, 2008 10:32 AM
>To: Mona Deleon; Renee Escario
>Subject: FW: FW: Scan from a Xerox WorkCentre Pro
>
> Here is Sam's response. I think we can wrap this up now. I'll update
>everything and get the paperwork to you today.
>
>-----Original Message-----
>From: sam dunlap [mailto:samdunlap@earthlink.net]
>Sent: Tuesday, June 24, 2008 10:17 AM
>To: Terri Fulton
>Subject: Re: FW: Scan from a Xerox WorkCentre Pro
>
>Terri,
>After review of the information you sent to me on the Colorado Lagoon
>Project I would suspect that the potential for impacting cultural
>resorces of our tribe is somewhat substantial. My understanding is that
>there are several recorded prehistoric archaeological sites within a
>one mile radius of the proposed project. I will investigate a little
>further. My recommendation at this time would be that an archaeological
>monitoring component, as well as a Native American monitoring component
>from our tribal group, be included in the mitigation measures for this
>project.

>I will follow up with correspondence to the City of Long Beach,
>attention Craig Chalfant.
>
>Sam Dunlap
>Gabrielino Tongva Nation
>(909) 262-9351 cell
>
>-----Original Message-----
>>From: Terri Fulton <Terri.Fulton@lsa-assoc.com>
>>Sent: Jun 24, 2008 9:45 AM
>>To: sam dunlap <samdunlap@earthlink.net>
>>Subject: FW: Scan from a Xerox WorkCentre Pro
>>
>>Hi Sam,
>>
>>Here it is! Let me know your thoughts on this project. Thanks for your
>>help.
>>
>>T.
>>
>>-----Original Message-----
>>From: CulturalXRX@lsa-assoc.com [mailto:CulturalXRX@lsa-assoc.com]
>>Sent: Tuesday, June 24, 2008 10:47 AM
>>To: Terri Fulton
>>Subject: Scan from a Xerox WorkCentre Pro
>>
>>
>>
>>Please open the attached document. It was scanned and sent to you
>>using a Xerox WorkCentre Pro.
>>
>>Sent by: Guest [CulturalXRX@lsa-assoc.com] Number of Images: 2
>>Attachment File Type: PDF
>>
>>WorkCentre Pro Location: Irvine, Cultural Device Name: CulturalXRX
>>
>>
>>For more information on Xerox products and solutions, please visit
>>http://www.xerox.com
>

APPENDIX C:

DETERMINATION OF NON-ELIGIBILITY FOR LONG BEACH MARINE STADIUM

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2711
LOS ANGELES, CALIFORNIA 90053-2325

REPLY TO
ATTENTION OF

January 26, 1990

Office of the Chief
Environmental Resources Branch

Ms. Kathryn Gualtieri
State Historic Preservation Officer
Office of Historic Preservation
P.O. Box 942896
Sacramento, California 94296-0001

Dear Ms. Gualtieri:

The Los Angeles District Corps of Engineers (Corps) is reviewing a proposed Section 404 project at Marine Stadium in Long Beach, Los Angeles County. The proposed project consists of the construction of swimming beaches and a boat mooring dock. This would require the removal of existing armor rock, the importation of beach sand, and excavation of the site to configure it for construction of the beach (enclosure 1).

A field investigation of the area of potential effects was conducted by the Corps archeology staff (enclosure 2). In addition, we reviewed a National Register nomination form which was submitted to your office in 1985 (enclosure 3). This information revealed the presence of only one potentially National Register eligible property, the Marine Stadium. Prior to the field survey, the Marine Stadium was considered potentially eligible under criterion a. for its association with the 1932 Olympics.

Based on a review of the National Register nomination form and the results of the site visit by the Corps archeology staff we have determined that Marine Stadium is not eligible for the National Register of Historic Places as it lacks sufficient integrity. Therefore, the proposed project will not involve properties listed in, or eligible for, the NRHP.

Please review the enclosed information. If you agree with our determinations please transmit you concurrence. We would appreciate a response within thirty days.

If you have any questions on this project, please call Mr. Stephen Dibble, Project Archeologist, at (213) 894-0244.

Sincerely,

Charles M. Holt
Chief, Regulatory Branch

Enclosures

STATE OF CALIFORNIA — THE RESOURCES AGENCY GEORGE DEUKMEJIAN, *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
POST OFFICE BOX 942896
SACRAMENTO, CALIFORNIA 94296-0001
(916) 445-8006

28 February 1990

Reply to: CoE 900129A

Charles M. Holt, Chief
Environmental Resources Branch
US Army Corps of Engineers
Los Angeles District
P.O. Box 2711
Los Angeles, CA 90053-2325

Subject: **Determination of Eligibility - Long Beach Marine Stadium**

Dear Mr. Holt:

Thank you for consulting with us in compliance with Section 106 of the National Historic Preservation Act.

Thank you for sending us the photos of what remains of the Long Beach marine Stafdium. We agree that very little remains of the facility that hosted the 1932 Olympics. You have applied the National Register Criteria and found the site under discussion to be ineligible for inclusion in the National Register. I agree with your finding.

Your evaluation efforts conducted in compliance with 36 CFR 800.4(c) were adequate to confirm that your project will not affect historic properties.

Please note, however, that your agency will have additional responsibilities under 36 CFR 800 under the following circumstances:

1. If any person requests that the Advisory Council on Historic Preservation review your determination in accordance with 36 CFR 800.6(e).

2. If the project changes in ways that could affect historic properties [36 CFR 800.5(c)].

3. If historic properties are discovered while carrying out the project [36 CFR 800.11].

Unless any of the above conditions apply, my concurrence completes Section 106 review.

Thank you for your concern for California's heritage resources. If you have any questions, please call staff archaeologist Nicholas Del Cioppo at (916) 322-4419.

Sincerely,

Kathryn Gualtieri
State Historic Preservation Officer

[photographs enclosed]

APPENDIX D:

TREATMENT OF COLORADO LAGOON SEDIMENTS

Treatment of Colorado Lagoon Sediments

June 2010

Prepared for:
City of Long Beach
and
Moffatt & Nichol

Prepared by:
Kinnetic Laboratories, Inc.
5225 Avenida Encinas
Carlsbad, CA 9200

KINNETIC LABORATORIES INCORPORATED

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Contents

Appendices Available Separately on CD

Figures

Tables

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1.0 EXECUTIVE SUMMARY

In October 2009, vibracore sampling was conducted in the western arm of Colorado Lagoon to address two primary objectives. The first objective was to assess the efficacy of cement for stabilizing sediments. Testing was to be conducted on sediments representative of three areas of the western arm. A series of laboratory bench tests were conducted in order to evaluate appropriate concentrations of Portland cement for reducing the soluble concentration of lead to a level below 2.5 mg/L (nonhazardous target level) and still meet geotechnical characteristics desired for material to be used as fill at the Port of Long Beach. The second objective was to provide improved resolution as to the vertical and horizontal distribution of lead in the western arm of Colorado Lagoon.

This study focuses on lead which is the main contaminant of concern and the only contaminant that was found to exceed California Title 22 criteria. In addition, earlier testing demonstrated that elevated levels of other contaminants of concern coincided with elevated concentrations of lead. When lead concentrations were measured at low levels, other anthropogenic contaminants were either not detected or present at levels below ecological benchmarks of concern.

Sediment contamination issues in the western arm of Colorado Lagoon were found to be largely limited to the top four feet of sediment and were most substantial in areas A and B (farthest from the walk bridge). Composites from areas A and B exceeded California Title 22 criteria for soluble lead, thus classifying the sediment as hazardous. Lead contamination is generally lower in area C (closer to the walk bridge).

Elevated levels of lead extend into the deeper sediments (four to six feet) in the vicinity of the two major storm drains which discharge into the Lagoon's west arm. Both storm drains are owned by Los Angeles County. The Termino Avenue Drain enters the Lagoon from the west along the former Pacific Electric Train right-of-way and Drain No. 452 enters at the extreme northern end of the western arm. Removal of the top four feet of sediment throughout the western arm of Colorado Lagoon and selective removal of deeper sediment in the vicinity of the major storm drains would be expected to result in sediments that meet the National Oceanographic and Atmospheric Administration's (NOAA) Effects Range Low (ERL) target levels. This action would also effectively remove all other sediment contaminants of concern in the Lagoon including other metals, chlordane, and polycyclic aromatic hydrocarbons (PAHs), dichloro-diphenyl-trichloroethane (DDT), dieldrin and polychlorinated biphenyls (PCBs).

Concentrations of contaminants in these sediments will require stabilization to address the soluble lead if they are to be used either as fill at a Port of Long Beach Confined Disposal Facility or disposed at a Class II or III landfill. Bench testing was used to evaluate the treatability of these sediments.

The first round of bench tests using three different concentrations of cement with sediment from each of the three composite areas failed to show any substantial improvements in soluble lead. In addition, treated sediment using even the lowest of the three cement concentrations (5%) exceeded (did not meet) a preliminary fill site unconfined compressive (UC) strength target of less than 10 psi. Screening tests with alternative treatment media (FS-100, FS-200, TSP, lime and cement) also failed to provide the desired chemical stabilization of the lead.

A final round of tests using a customized reagent mixture developed by ADT Environmental Solutions proved to be highly successful in reducing the solubility of lead in Colorado Lagoon sediments. Stabilizing reagents used by ADT consist of sulfates, sulfides, calcium compounds, and pH-adjusting materials in various combinations and at additive rates determined by the characteristics of the sediment. This treatment binds the lead in the sediment using a combination of mineral forms and hydroxyl anion fixation chemistry which lower the leachability of the lead and similar metals present in the sediments.

An initial screening test conducted with one concentration of ADT Synthetic Metals Mineralization System (SMMS) reagents demonstrated effective stabilization of the soluble lead. California Waste Extraction Tests (WET) conducted on the treated sediment indicated that soluble lead had been reduced to levels below the analytical detection limit of 0.025 mg/L.

Further testing was conducted with the ADT SMMS treatment to determine if sediments could be: 1) stabilized with lower quantities of reagents and 2) effectively dewatered. WET tests demonstrated that the SMMS reagents were still highly effective at stabilizing the lead even when treated at 50 percent of the initial test strength. The highest concentration of soluble lead associated with treatment of sediments from areas A and B was 0.14 mg/L. This compared to the target level of 2.5 mg/L which was selected to provide a conservative margin of safety below the California Title 22 criteria. The efficacy of the SMMS treatment at the lowest loading rates suggests that treatment may be achieved with even lower quantities of reagents which would further improve the overall cost effectiveness of this approach.

2.0 INTRODUCTION

Lead has been found to be the principal contaminant of concern with respect to disposal or reuse options of sediments from Colorado Lagoon (Kinnetic Laboratories/Moffatt & Nichol, 2006). In addition to being the principal contaminant of concern, lead was found to be an effective indicator of the presence of other anthropogenic contaminants of concern in the Lagoon. Sediments with elevated concentrations of lead also had elevated concentrations of other metals and various organochlorine pesticides. Correspondingly, sediments with low concentrations of lead were typified by low background levels of other metals and organic contaminants.

In 1993, the Bay Protection and Toxic Cleanup Program (BPTCP) reported a lead concentration of 510 mg/kg-dry weight in surface sediments (upper 10 cm) sampled in the western arm of the Lagoon. Seven years later, Tetra Tech (2000) sampled surficial sediments in the same region and reported a lead concentration of 390 mg/kg-dry weight.

Kinnetic Laboratories resampled in 2004 using a vibracore to obtain sediment cores of 2.5 to 4.5 feet in length. Three cores from the western arm were composited and analyzed for total lead. The composite sample contained lead at a concentration of 409 mg/kg-dry weight. A California WET extraction conducted on the composite indicated soluble lead was 11 mg/L which exceeded the Soluble Toxics Limit Concentration (STLC) of 5 mg/L and classified the material as hazardous per California Title 22 criteria.

The overall Colorado Lagoon restoration plan includes removal of the contaminated material in Colorado Lagoon. Treatment of the removed/dredged material to render it non-hazardous would allow for cost effective disposal of these sediments. In 2001, the U.S. Army Corps of Engineers

(USACE), Los Angeles District, initiated the Los Angeles County Regional Dredged Material Management Plan Pilot Studies to evaluate the feasibility of managing contaminated sediments in the Los Angeles County region through disposal or treatment (USACE 2002). The evaluated treatment methods were: a) Aquatic Capping, b) Cement Stabilization, c) Sediment Washing and d) Sediment Blending. Based on this USACE study, previous EPA studies (USEPA 1989), and experience with treatment of metal contaminants on other projects, cement stabilization was considered the most promising method for application on the Colorado Lagoon project. A bench scale study for cement stabilization treatment of Colorado Lagoon sediments was thus performed and is the subject of this report.

Large-scale stabilization of the sediments using Portland cement is one of the options to render the lead mostly inert. Portland cement has been found previously to undergo a physical-chemical change that will reduce the mobility of lead (USEPA 1989). Stabilization is the process of chemically changing hazardous sediments into a less soluble or less toxic form. Portland cement can typically accomplish this by raising the pH of the sediments. Lead has been found to have its lowest solubility at elevated pH levels and is therefore less likely to leach out (Kemron, 2008). Lead is also amphoteric such that solubility can increase under either extreme basic or acidic conditions.

Recent sediment testing at Colorado Lagoon was designed to address two objectives. The first objective was to assess the efficacy of adding varied portions of cement, using sediments representative of three areas of the western arm. A series of laboratory bench tests were conducted in order to evaluate appropriate concentrations of Portland cement for reducing the soluble concentration of lead to a level below 2.5 mg/L (nonhazardous target level) and still meet geotechnical characteristics desired for material to be used as fill at the Port of Long Beach. The second objective was to provide improved resolution as to the vertical and horizontal distribution of lead in the western arm (and other areas) of Colorado Lagoon. (The distribution for other areas of Colorado Lagoon, i.e. the central basin and north arm, are discussed in separate reports).

3.0 METHODS

This section identifies the specific locations and methods used to obtain, process, and analyze sediments from western arm of Colorado Lagoon.

3.1 SAMPLING

The western arm of Colorado Lagoon was divided into three areas as shown in Figure 1. Three sediment core samples, six foot in length, were taken from within each area, i.e. a total of nine cores. The use of six foot cores was based upon previous surveys in Colorado Lagoon that provided evidence that sediment contamination was limited to depths of less than six feet throughout the Lagoon and is representative of the non-native material depositional layer. A vibracore was used to obtain these samples. Each core was evaluated visually and logged based upon sediment type in accordance with the Standard or Unified Soil Classification System (ASTM D2488). Cores were then processed as outlined in Section 3.4.

3.2 SAMPLING LOCATIONS

Nine samples were collected from the western basin of Colorado Lagoon. The sampling sites extended from the north end of the western arm to the foot bridge. Two of the coring sites were relatively close to major storm drain inlets. Exact core locations are depicted on Figure 1 and sampling coordinates are presented in Table 1.

Table 1. Sampling Sites and Coordinates - Western Arm Colorado Lagoon

Core ID	NAD 83	
	Latitude	Longitude
A1	33.77251	118.13630
A2	33.77217	118.13637
A3	33.77229	118.13613
B1	33.77201	118.13590
B2	33.77166	118.13595
B3	33.77174	118.13558
C1	33.77131	118.13537
C2	33.77130	118.13501
C3	33.77102	118.13492

Figure 1. Composite Areas and Sampling Locations – Western Arm.

3.3 VIBRACORE SAMPLING

A KLI vibracore was used to collect the nine sediment cores. Vibracore sampling was carried out from a custom built, site assembled sampling platform (pontoon barge). This platform was equipped with fixed quadrapod rigging and a winch suitable for handling the coring equipment. The vibracore consists of a 4-inch diameter aluminum coring tube, a stainless-steel cutting tip, and a stainless-steel core catcher. Vibracore tubes were lined with FDA approved virgin-grade clear polyethylene core liners. The vibrating unit has two counter-rotating motors encased in a waterproof aluminum housing and is powered by a three-phase, 240 volt generator

Sample location and horizontal positioning was established with a Garmin 76 series Differential GPS navigation system. The barge was held stationary over the sampling sites using two diagonally positioned spuds. Once in position, the vibracore head and tube were lowered through a moon pool in the sampling platform from the quadrapod frame. The vibracore head was vibrated to a depth of six feet below the mud line. A check valve, located on top of the core tube was used to reduce the loss of sediment during extraction. Once on board, the core cutter and catcher were removed and the polyethylene-encased sediment cores were removed from the core tubing. The polyethylene-encased cores were then sealed and transported to a shore-side core processing facility.

With the exception of the core tube liners, all sampling surfaces and tools were stainless steel. The equipment was cleaned before and after sampling proceedures. The cleaning protocol consisted of a site water rinse followed by a Micro-90® soap wash, a de-ionized water triple rinse, a 2 N acid triple rinse, and a final triple rinse with de-ionized water.

3.4 CORE PROCESSING

The polyethylene-encased core samples were placed on pre-cleaned PVC core racks, and the polyethylene core tube liners were split lengthwise. Once the sediment was exposed, the material that comes in contact with the polyethylene core tube liners was removed with a protocol cleaned stainless steel spoon. Cores were measured, photographed, and detailed stratigraphic observations were noted and logged. Lithological descriptions were made in accordance with the Unified Soil Classification System (USCS) as outlined in ASTM Standard D-2488 (Visual-Manual Procedure).

Core processing included identification by lithology of recently accumulated sediments (i.e. those accumulated since the initial 1935 dredging of Colorado Lagoon) as well as presumably unaltered “virgin” sediments *in-situ* prior to the 1935 excavation of Colorado Lagoon. Prior to further processing, sediment subsamples were taken from the top two feet of each core and then for each subsequent two foot interval down to a maximum depth of six feet. The 27 samples (nine coring sites times three depth intervals) representing the two foot intervals were placed in certified pre-cleaned sampling containers for laboratory analysis of percent solids and total lead (Table 2).

The top part of each core (recently accumulated sediments) was separated for further analysis, while the bottom portion was discarded. A separate protocol cleaned compositing vessel was used to homogenize the top portion of each core prior to sub-sampling. All homogenization was performed manually with a protocol cleaned tool. Following homogenization, the nine core composite samples (Table 2) were transferred into appropriate certified pre-cleaned sample containers.

Additional material from the vertical core composites was composited into three area composites (each containing material from three cores) representing Areas A, B and C (Table 2). Subsamples were taken from each area composite sample and tested for total lead, percent solids, grain size, pH and soluble lead using the Cal WET protocol. These data provided baseline information for the bench tests being conducted for cement stabilization/solidification.

After the samples for baseline chemical analyses were removed, the remaining portions of the cores representing the depositional layer of sediments from each composite area were placed in polyethylene-lined protocol cleaned 3.5 gallon buckets and transported to KLI's Carlsbad facility for completion of the stabilization treatability tests.

All sediment samples for chemical analysis were placed on ice immediately following collection and maintained at 2 to 4ºC until analyzed.

Table 2. Summary of Sample Counts and Analyses Performed on Each Sample.

Sample ID	Type of Sample	Total Lead	Cal WET	% Moisture	Grain Size	pH	Unconfined Compressive Strength	Number of Samples
A(1-3),B(1-3), C(1-3)	Core 2 foot strata	27	-	27	-	-		**27**
A(1-3),B(1-3), C(1-3)	Core Vertical Composites[1]	9	-	9	-	-		**9**
A, B, C	Area Composites	3	3	3	3	3		**3**
A101,B201,C301	5% Cement Mix	3	3	3	3	3	3	**3**
A102,B202,C302	8% Cement Mix	3	3	3	3	3	3	**3**
A103,B203,C303	11% Cement Mix	3	3	3	3	3	3	**3**
D404	Blind Duplicate	1	1	1	1	1	1	**1**
	TOTAL ANALYSES	**49**	**13**	**49**	**13**	**13**	**10**	

1. Core vertical composites will represent the entire extent of sediments accumulated since initial excavation of the Lagoon. The delineation of these depositional sediments was assessed by evaluation of structure of each core.

3.5 DOCUMENTATION

All samples were handled under Chain of Custody documentation. Samples were marked with pre-printed, self-adhering labels containing unique alphanumeric identifications. Duplicate information was recorded on the Chain of Custody form, which also includes sampling information such as matrix, analysis; analytical methods and detection limits were included on separate pages and submitted to the analytical laboratories with the Chain of Custody forms. Completed Chain of Custody forms are included with analytical reports in the final report Appendices.

Detailed core logs were prepared for each core sampled. The following information is included on each log: date and time of boring, boring coordinates, core identification, depth penetrated, core length recovered, water depth at the sample site, sediment lithology, and sample intervals. Completed core logs for each sampling location are included in Appendix A.

3.6 CHEMICAL ANALYSIS OF SEDIMENT

All chemical and physical analyses were performed by Soil Control Lab, Inc., (Cal-ELAP No. 1494). Soil Control Lab is State-Certified testing laboratory using USEPA, USACE, and CRWQCB approved methodologies.

Untreated sediments were analyzed for percent solids, particle size, pH, and lead using the methods listed in Table 3. Percent solids, particle size and pH were considered important ancillary data for interpretation of any differential effects of treatment. They were also considered important in assessing treatability of sediments in Colorado Lagoon that might be outside of the specific test area. Treated sediments were analyzed for these same parameters, as well as unconfined compressive strength (Table 2). All sampling and analysis was conducted in a manner consistent with guidelines for dredge material testing methods in the USEPA/USACE Inland Testing Manual (USEPA/USACE, 1998). Samples were extracted and analyzed within specified holding times. All sample analyses utilized method-specified Quality Control procedures.

The California Waste Extraction Test (WET) was only applied to samples that were to be used for the sediment stabilization/solidification bench tests. Bulk sediments with concentrations greater than the Title 22 Total Threshold Limiting Concentration (TTLC) criterion are automatically classified as hazardous waste if the material is to be removed. If bulk concentrations of a Title 22 constituent are greater than 10 times the STLC but less than the TTLC, further testing with WET procedure is used to determine if the constituent has the potential to solubilize. If this soluble fraction exceeds the STLC, the sediment would also be classified as hazardous waste.

The trigger value of 10 times the STLC is attributable to the fact that there is a 1:10 ratio of sediment to extractant in the WET test protocols. The 5 mg/L STLC criterion translates to a total lead value of greater or equal to 50 mg/kg-wet. This approach assumes that 100 percent of the constituent of concern would become soluble when subjected to the test conditions and that the density of the sediment is close to 1 kg/L. The WET involves extracting the material for 48 hours at a ratio of one part sediment to ten parts extractant. The extractant is a solution of 0.2 M sodium citrate adjusted to pH 5.0 +/- 0.1 with sodium hydroxide. These conditions were initially selected to simulate acid rain and the ability to mobilize contaminants within a landfill situation.

The sediments used in this study were assumed to meet the criteria of a Title 22, Type i solid waste that can pass a No. 10 (2 mm) standard sieve. This type of waste is defined by being comprised of a single, solid phase (i.e. water cannot be easily separated by filtration through a 0.45 micron filter). After extraction, the solution was filtered through a 0.45 micron filter prior to analysis. Analytical results are reported as milligrams of lead per liter of extractant.

Table 3. Target Analytes, Analytical Methods, Reporting Limits, Storage and Holding Times.

Analyte	Analytical Method	Reporting Limits	Container	Storage and Transport Temperature	Recommended Holding Time
Percent Solids	SM 2540	0.10%	500 ml HDPE	4° ± 2°C	14 days
Particle Size Distribution	SM 2560D	NA	500 ml HDPE	4° ± 2°C	6 months
Total Organic Carbon	EPA 9060	0.10%	500 ml HDPE	4° ± 2°C	28 days
pH	EPA 150.1	Range: 1-14 units Res.: 0.1 unit	500 ml HDPE	4° ± 2°C	ASAP
Metals -Lead	EPA 6020	0.1 mg/kg wet	500 ml HDPE	4° ± 2°C	6 months

3.7 SEDIMENT STABILIZATION BENCH TESTS

Several rounds of testing were necessary to determine appropriate protocol for stabilizing the soluble lead present in sediment from the western arm of the Lagoon. Initial testing was conducted with cement as outlined in the initial scope of work. Two additional rounds of testing were conducted with a range of stabilization methods to investigate alternatives that would be more effective for Colorado Lagoon sediments.

3.7.1 INITIAL CEMENT STABILIZATION TESTING – ROUND ONE

Initial testing was conducted using Portland cement as a stabilizing agent for sediments, using composite samples A, B, and C. Each composite sample was tested with three different cement mixture ratios (Table 4) to help determine the most appropriate ratio of cement to sediment for both reducing soluble lead concentrations to less than or equal to the target value and still meet geotechnical guidelines goals. Use of higher cement concentrations would likely result in sediment not meeting the goal of having a maximum unconfined compressive strength of 10 psi, as well as it would be more expensive for full-scale application. The target level for soluble lead in treated sediment was set at 2.5 mg/L, (50% of the Title 22 STLC criterion of 5.0 mg/L.

Table 4. Cement Treatments for each Composite Sample.

Composite Sample	Cement Concentration (%)
A	5.0
A	8.0
A	11.0
B	5.0
B	8.0
B	11.0
C	5.0
C	8.0
C	11.0

Percentages based on total weight of sediment to weight of cement.

Cement/sediment mixtures were prepared by manually mixing cement and sediment until samples were fully blended. Mixtures were formed on a cement dry weight to sediment dry weight basis. Once mixed, each of the samples was placed into a sample container and sent to the laboratory. Samples were then tested for total lead, percent moisture, pH and soluble lead using the Cal WET protocol. Large volumes of excess sediment from each composite area were maintained under refrigeration to allow bench tests to be repeated or conducted with extended ranges of test mixtures.

3.7.2 SEDIMENT STABILIZATION TESTING - ROUND TWO.

Based upon the initial results, a second round of testing was performed using alternative media to solidify and stabilize the sediment. Sediment from area composite B was selected for this screening round since concentrations of lead in this region were the highest encountered in Colorado Lagoon.

Screening was conducted using six different treatments. These included two products: Free Flow-100 and Free Flow 200, formulated and provided by Free Flow Technologies in Machesney Park, Illinois. Other treatments utilized Triple Super Phosphate (two treatment tests), hydrated lime, and a retest with cement. These treatment products were selected based on a literature review and inputs from various experts in soil and sediment remediation. Details of each treatment are discussed further below.

- **Free Flow-100 (FF-100)**

  FF-100 is a stabilizing reagent that fixates heavy metals in sediment across a wide range of pH values using a combination of sulfate, phosphate, and hydroxide fixation chemistry. This material was expected to ultimately convert the lead into insoluble salt of phosphate. It was also expected to have a moderate dewatering effect on the sediment.

This material was tested at a concentration equivalent to five percent of the sediment on a dry weight basis.

- **Free Flow-200 (FF-200)**

  FF-200 is another stabilizing reagent primarily comprised of lime, sulfur, aluminum oxide and iron oxide. This treatment was expected to bind the lead in the sediment using a combination of sulfate and hydroxyl anion fixation chemistry. As with the FF-100 reagent, testing was conducted using a five percent concentration on a dry weight basis. This material was also expected have a moderate dewatering effect due to the lime.

- **Triple Super Phosphate 0-45-0 (TSP) $Ca(H_2PO_4)_2 \cdot H2O$**

  This is a common fertilizer for both commercial and private use. The phosphate was expected to convert the lead to a more stable lead phosphate mineral which should not be affected by acid leaching. Unlike the first two products, this material was not expected to a have a dewatering effect. Cement was needed to assist in dewatering the sediment. TSP was used for two tests. Both utilized a five percent concentration on a dry weight basis. The first test added cement 24 hours after first mixing the sediment and TSP. The second test incorporated cement together with the TSP at the same time. Both treatments used a cement concentration of two percent dry-weight.

- **Hydrated Lime**

  Hydrated lime was used as the fifth treatment. Lime was expected to bind the lead in the sediment in a manner similar to the cement. Lime, however, was expected to react directly with organic compounds in the sediment in contrast to the cement which needs components present within the cement formulation to bind material. This product was expected to have a substantial dewatering effect on the sediment. As with the other treatments, lime was added at a five percent concentration.

- **Cement**

  Cement was used as the sixth treatment to provide a control and comparison with the first round of testing. Cement was used at a five percent concentration which was the lowest concentration used during the initial tests.

3.7.3 SEDIMENT STABILIZATION TESTING - ROUND THREE.

Due to results from the first two rounds, it became necessary to explore further alternatives. ADT Environmental Solutions, a remediation firm located in Canby, Oregon was recommended by several other contacts on the basis of their past work with recalcitrant materials. This firm specializes in the development and application of custom formulations for remediation of metal contamination. They use a number of alternative treatment technologies for stabilizing toxic heavy metals in soils and production waste streams. Their proprietary stabilization systems have been effective in rendering high levels of lead and other heavy metals into safe, non-leachable forms suitable for on-site disposition, off-site disposal in Class II or III landfills. ADT Environmental Solutions offered to conduct further bench tests with sediments from Colorado Lagoon.

ADT's sediment stabilization approach is referred to as the Synthetic Metals Mineralization System (SMMS). ADT's SMMS stabilizing reagents are generally comprised of sulfates, sulfides, calcium compounds, and pH-adjusting materials in various combinations and additive rates depending upon the characteristics of the sediment. This treatment binds the lead in the sediment using a combination of mineral forms and hydroxyl anion fixation chemistry which lowers the leachability of the lead and similar metals present in the sediments. Reagent testing was conducted using various percent concentrations on a wet weight basis. Without introducing cement or hydrated lime to the mix, the SMMS reagents were not expected to a have a substantial dewatering effect.

After reviewing results from the first two rounds of testing, ADT Environmental Solutions conducted preliminary tests with a suite of alternative formulations. ADT conducted two rounds of preliminary tests designed to screen for formulations that warranted further investigation. ADT initially had the original (untreated) and treated sediments analyzed locally by an Oregon lab, Specialty Analytical. Analyses provided by Specialty Analytical were simply used as guidance for a rough assessment of the initial formulations. One formulation associated with the second round of ADT testing showed promise of being effective. In order to verify this, samples of both the original untreated sediment and the treated sediment were sent to Soil Control Lab (California lab used for previous test rounds) for analysis of pH, total lead, and soluble lead using the Waste Extraction Test. Based upon very positive results from this treatment, additional testing was implemented to confirm the initial ADT test, refine estimates of the quantities of reagents necessary to achieve the desired end result, and, finally, verify geotechnical characteristics of the end product.

Sediment from both composite areas A and B had soluble lead concentrations exceeding the STLC. Therefore composite sediments from both areas were used for this additional ADT testing (Table 5). The untreated, baseline sediments were once again tested for STLC lead, total lead and pH. All treated sediments from each composite area were analyzed for STLC lead, total lead, pH and the paint filter test. The paint filter test was added to the suite of tests to address the need for the material to be solid enough for transport.

Table 5. Summary Testing using ADT Environmental Solutions Treatment

	Sample Treatments[2]	STLC Lead	Total Lead	pH	Grain Size	Paint Filter	Sample # A&B
1	Untreated	X	X	X			2
2	Initial Treatment (~6% SMMS)	X	X	X	X	X	2
3	~4% SMMS	X	X	X	X	X	2
4	~2% SMMS	X	X	X	X	X	2
5	~2% SMMS with 9% hydrated lime[1]	X	X	X	X	X	2
6	~2% SMMS with 9% hydrated lime[1]	X	X	X	X	X	2
	Total						12

1. Quantities of hydrated lime were based upon best professional judgment. Additives were reported on a dry weight-basis relative to the wet weight of the sediment.

4.0 RESULTS AND DISCUSSION

4.1 SAMPLING DATA - CORE DEPTHS AND SEGMENT INTERVALS

Complete documentation of core lengths and lithology is provided on boring logs in Appendix A. A summary of penetration depths and sampling intervals is provided in Table 6 below.

Table 6. Core Penetration and Recovery

Sampling Area/Core	Core Penetration Depth (ft)	Core Recovery Depth (ft)
A1	8.0	7.4
A2	8.0	6.6
A3	8.0	7.4
B1	8.0	6.0
B2	8.0	6.6
B3	8.0	6.0
C1	8.0	6.0
C2	8.0	5.4
C3	8.0	6.7

Cores were taken to a depth of eight feet to ensure recovery of at least six feet of sediment. The upper six feet of each core was divided into three two foot depth intervals corresponding to the top, middle and bottom. In addition, samples were taken that represented the full depth of recently deposited sediment as determined from visual examination of the cores. Details of the core processing are provided in Section 3.4.

4.2 DISTRIBUTION AND CHARACTERIZATION OF CONTAMINANTS

The results of sediment testing are reported both on a wet and dry weight basis. Analytical results reported on a wet weight basis are used to assess whether the sediments would be considered as hazardous waste under California's Title 22 criteria. Analytical results reported on a dry weight basis are used to provide comparisons with various ecological criteria as well as with previous testing conducted in Colorado Lagoon.

4.2.1 COMPARISON TO TITLE 22 CRITERIA

Title 22 criteria were used to determine if any of the sediments sampled from Colorado Lagoon contained contaminants at concentrations that were high enough to be considered hazardous waste. For this purpose, the results of all lead analyses (mg/kg-wet weight) are compared with the Total Threshold Limit Concentrations (TTLC – 1000 mg/kg -wet) and based on the Waste Extraction Test cited in Title 22.

Chemical bulk testing was performed on each of the interval segments within each of the cores (Table 7) and each of the nine core composites (Table 8). Results of this testing indicate that

none of the cores exceeded the TTLC for lead. However, many of the sediment samples exceeded levels that require further testing for soluble lead. This survey was not intended to evaluate small scale differences in soluble lead. Previous testing conducted in Colorado Lagoon, however, suggests that soluble lead limits would not be exceeded unless concentrations of total lead were in the range of 100 mg/kg – wet or greater.

Higher concentrations of lead were generally limited to the upper four feet of sediment, however, cores that were closest to the County No. 452 and Termino Avenue storm drains (cores A1 and B2) had elevated concentrations of lead extending into the four to six foot (deeper) segment as well. There was also a greater depth of recently deposited sediments at these two sites than at the other sites in the western arm, (Table 8), further indicating that these sites are impacted by storm drain discharges. Accumulated sediment at these two sites ranged from 4.5 to 4.8 feet while all other coring sites had 2.7 to 3.8 feet of recently deposited sediment.

The three area composites (bottom of Table 8) were subjected to further testing with the California Waste Extraction Test (WET) since these composited sediments were to be used for the pilot cement stabilization bench tests. These area composites also triggered the general guidance of 10 times the STLC criteria for performing a WET. The results of these tests (Table 9) indicated that soluble lead exceeded the STLC of 5 mg/L in composite sediment from both areas A (17 mg/L) and B (15 mg/L). WET results for depositional sediments from composite area C (4.1 mg/L) indicated that soluble lead was below the STLC. Sediment in area C exhibited substantial variability with highest total lead concentrations found in the deepest layer at C1 and top layer at C3. Core C2 had low levels of lead in all layers.

Table 7. Concentrations of Lead Compared to Title 22 Criteria.

COLORADO LAGOON SEDIMENT RESULTS			
SITE	**SEGMENT**	**PERCENT SOLIDS**	**LEAD[1] (mg/kg – wet wt)**
A1	Top (0-2 feet)	31	**64**
	Middle (2-4 feet)	48	**390**
	Bottom (4-6 feet)	72	**110**
A2	Top (0-2 feet)	49	**350**
	Middle (2-4 feet)	58	43
	Bottom (4-6 feet)	71	6
A3	Top (0-2 feet)	47	**440**
	Middle (2-4 feet)	59	**73**
	Bottom (4-6 feet)	68	9
B1	Top (0-2 feet)	52	**450**
	Middle (2-4 feet)	57	**160**
	Bottom (4-6 feet)	62	8
B2	Top (0-2 feet)	41	**420**
	Middle (2-4 feet)	59	**720**
	Bottom (4-6 feet)	61	**370**
B3	Top (0-2 feet)	53	**520**
	Middle (2-4 feet)	57	**51**
	Bottom (4-6 feet)	59	9
C1	Top (0-2 feet)	80	16
	Middle (2-4 feet)	83	19
	Bottom (4-6 feet)	76	**160**
C2	Top (0-2 feet)	79	37
	Middle (2-4 feet)	81	**52**
	Bottom (4-6 feet)	61	49
C3	Top (0-2 feet)	54	**200**
	Middle (2-4 feet)	60	16
	Bottom (4-6 feet)	58	12

Title 22 Criteria[2]		
Analyte	**TTLC (mg/kg)**	**STLC[1] (mg/L)**
Lead	1000	5

1. Bold, shaded values indicate lead concentrations exceeding 50 mg/kg on a wet weight basis. Values exceeding this concentration are considered to have potential to exceed the STLC threshold of 5 mg/L. This is based upon application of the 1:10 dilution associated with the Waste Extraction Test as well as assumptions that sediment density is equivalent to 1 kg/L and 100% of the lead is soluble.
2. TTLC = Total Threshold Limiting Concentration; STLC = Soluble Threshold Limiting Concentration

Table 8. Concentrations of Lead in Full Depositional Layers of Each Core and Area Composites.

COLORADO LAGOON SEDIMENT TEST RESULTS			
SITE	DEPOSITION ALLAYER	PERCENT SOLIDS	LEAD[1] (mg/kg wet wt)
A1	0.0-4.8 ft	50	**530**
A2	0.0-3.0 ft	53	**240**
A3	0.0-3.3 ft	49	**370**
B1	0.0-3.8 ft	52	**300**
B2	0.0-4.5 ft	49	**460**
B3	0.0-3.2 ft	54	**320**
C1	0.0-3.9 ft	81	24
C2	0.0-3.8 ft	80	**200**
C3	0.0-2.7 ft	54	**170**
Area A Composite		49	**300**
Area B Composite		53	**340**
Area C Composite		77	**60**

Title 22 Criteria		
Analytes	TTLC (mg/kg)	STLC[1] (mg/L)
Lead	1000	5

1. Bold, shaded values indicate concentrations of lead exceeding 50 mg/kg on a wet weight basis which are considered to have the potential to exceed the STLC threshold of 5 mg/L. This is based upon application of the 1:10 dilution associated with the Waste Extraction Test (WET) as well as assumptions that sediment density is equivalent to 1 kg/L and 100% of the lead is soluble.
2. TTLC = Total Threshold Limiting Concentration; STLC = Soluble Threshold Limiting Concentration

Table 9. Results and Comparison of Waste Extraction Test (WET) Lead Elutriates with Title 22 Criteria.

TEST RESULTS	
COMPOSITE AREA	Soluble Lead[1] (mg/L)
A	**17**
B	**15**
C	4.1

Title 22 Criterion	
Analyte	STLC (mg/L)
Lead	5.0

1. Concentrations of soluble lead measured by use of the California Waste Extraction Test. Bold, shaded values indicate concentrations exceeding the Soluble Threshold Limiting Concentration (STLC) for dissolved lead.

4.2.2 COMPARISON TO NOAA CRITERIA

To further aid in the evaluation of sediment test data, chemical concentrations of contaminants found within the sediments were compared to sediment quality guidelines (Long et. al., 1995) developed by NOAA (Table 10). These guidelines were used to screen sediments for contaminant concentrations that might be expected to cause biological effects and to identify sediments for further toxicity testing. For any given contaminant, the Effects Range Low (ERL)

guideline represents the 10th percentile concentration value in the NOAA database that might be expected to cause adverse biological effects and the Effects Range Medium (ERM) reflects the 50th percentile value in the database.

The core interval segments comparison to ERL and ERM criteria is shown in Table 10 and Figure 2. Seven of the nine sites had ERM exceedances. The other two sites both exceeded ERL criteria. With one exception, exceedances of the ERM for lead were restricted to the upper four feet of the cores (Figure 4). As discussed in the previous section, cores taken in the vicinity of storm drains tended to have elevated concentrations of lead extending into the four to six foot depth range. Deeper sediments associated with B2 were the only sediments from this depth range that exceeded the ERM but lead was also elevated in the deeper layer of the A1 core. The C1 core is notable because the upper four feet of sediment were clean (below ERL), but the 4-6 foot segment exceeded ERL.

The data generally suggest that removal of material from the upper four feet of the western arm would mostly result in a new sediment surface that would be less than the ERL. Exceptions would include portions of the western arm located near major storm drains (A1 and B2) and the sites C1 and C2). Lead contamination in sediments from the vicinity of composite area C is highly variable (Figure 2 and Figure 3; Table 10 and Table 11) but data still indicate that removal of the upper four feet may improve conditions. Concentrations of lead in the core vertical composites taken at C2 (0 to 3.8 feet) and C3 (0 to 2.7 feet) both exceeded the ERM. The influence of imported beach sand was evident in both the reduced concentrations of lead and coarser grain sizes found in this area (Table 12; Section 4.3.1). Mixing of clean beach sands with finer sediments had a dilution-effect on concentrations of contaminants.

Table 11 and Figure 3 show the ERL and ERM comparisons for vertical sediment composites sampled at each of the nine core sites. These composites represent sediments deposited since the original dredging of the Lagoon in 1935. The depth of the depositional layer within each core was determined by visual examination and classification of each core. The full vertical composites of depositional sediment from all sites, except C1, exceeded the lead ERM.

Table 10. Concentrations of Lead in each Two-Foot Strata compared to NOAA ERL and ERM.

COLORADO LAGOON TEST RESULTS		
SITE	SEGMENT	LEAD (mg/kg dry)
A1	Top (0-2 feet)	206
	Middle (2-4 feet)	813
	Bottom (4-6 feet)	153
A2	Top (0-2 feet)	714
	Middle (2-4 feet)	74
	Bottom (4-6 feet)	9
A3	Top (0-2 feet)	936
	Middle (2-4 feet)	124
	Bottom (4-6 feet)	13
B1	Top (0-2 feet)	865
	Middle (2-4 feet)	281
	Bottom (4-6 feet)	13
B2	Top (0-2 feet)	1024
	Middle (2-4 feet)	1220
	Bottom (4-6 feet)	607
B3	Top (0-2 feet)	981
	Middle (2-4 feet)	89
	Bottom (4-6 feet)	16
C1	Top (0-2 feet)	20
	Middle (2-4 feet)	23
	Bottom (4-6 feet)	211
C2	Top (0-2 feet)	47
	Middle (2-4 feet)	64
	Bottom (4-6 feet)	80
C3	Top (0-2 feet)	370
	Middle (2-4 feet)	27
	Bottom (4-6 feet)	21

NOAA TARGET LEVELS		
Analyte	ERL	ERM
Lead (mg/kg dry)	47	218

Red values indicate ERM exceedances. **Blue** values indicate ERL exceedances.

Table 11. Concentrations of Lead Measured in the Full Depositional Layer[1] of each Core Compared with NOAA ERL and ERM Guidelines.

COLORADO LAGOON TEST RESULTS		
SITE	DEPOSITIONAL LAYER	LEAD (mg/kg dry)
A1	0.0-4.8 ft	1060
A2	0.0-3.0 ft	453
A3	0.0-3.3 ft	755
B1	0.0-3.8 ft	577
B2	0.0-4.5 ft	939
B3	0.0-3.2 ft	593
C1	0.0-3.9 ft	30
C2	0.0-3.8 ft	250
C3	0.0-2.7 ft	315

NOAA TARGET LEVELS		
Analyte	ERL	ERM
Lead (mg/kg dry)	47	218

Red values indicate ERM exceedances. **Blue** values indicate ERL exceedances.

1. Full Depositional Layer was defined as sediment deposited since the original excavation of the Lagoon in 1935. The lower limit of this layer was determined by visual examination and characterization of cores to identify stratigraphic changes at the interface with the the underlying native material.

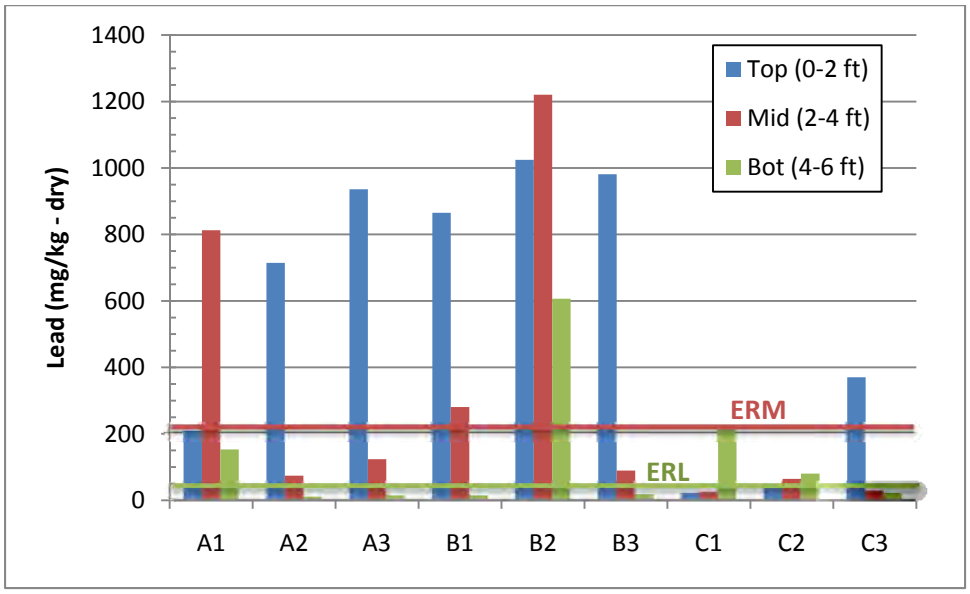
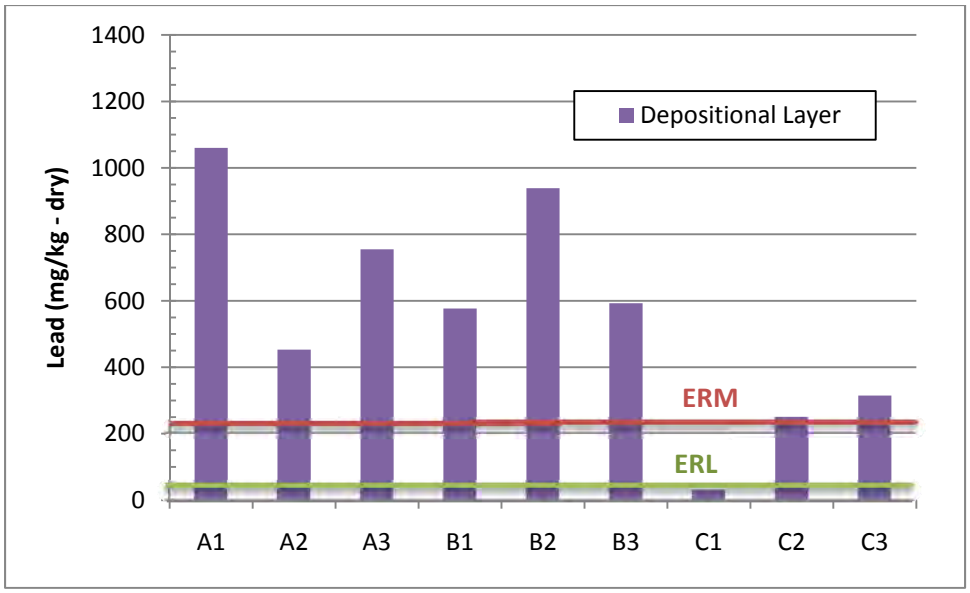


Figure 2. Vertical Distribution of Total Lead Compared with NOAA ERL and ERM Guidelines.



Full Depositional Layer was defined by visual examination and characterization of cores to determine the boundary between sediments deposited since the initial dredging of the Lagoon and the underlying native material.

Figure 3. Concentrations of Lead Measured in the Depositional Layer of each Core.

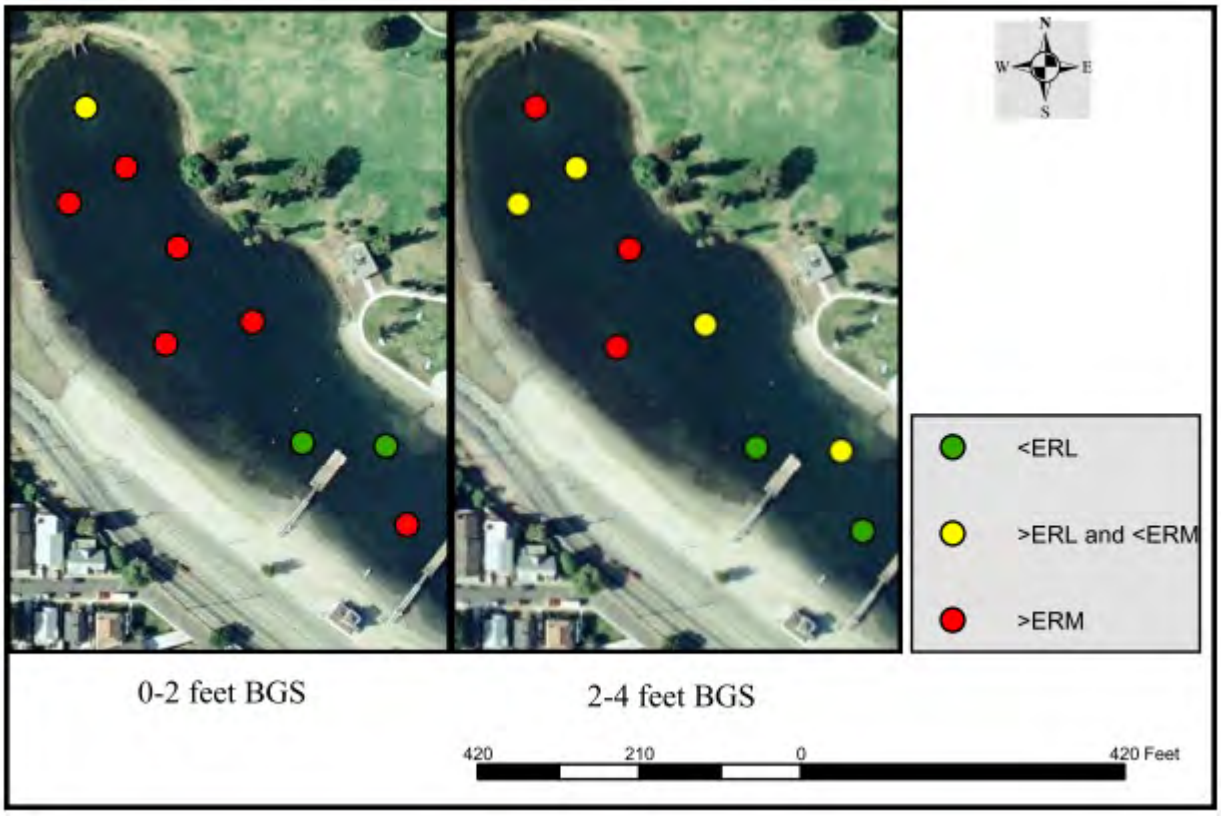


Figure 4. Lead Concentrations in the 0-2 and 2-4 Feet Depth Intervals with Respect to NOAA ERLs and ERMs.

4.3 SEDIMENT STABILIZATION TESTS – ROUND ONE

Initial bench-scale testing was performed with three mixtures of cement in accordance with the work plan. This section provides a summary of the physical and chemical characteristics of both the baseline (untreated) and treated sediments.

4.3.1 PHYSICAL CHARACTERIZATION - GRAIN SIZE

Particle size composition was analyzed in each area composite sample to establish a baseline for the bench tests (Table 12). Particle size was then analyzed for each of the three cement mixture ratios applied to this material (Figure 5). Sediments from both composite areas A and B contained high percentages (68.8 to 71.5 %) of fines. The percentage of fines in the composite sediment from area C was only 18.4%. This segment of the Lagoon and the area just east of the footbridge appear to be strongly influenced by sand that has been imported to provide a more suitable beach substrate. Sloughing of this imported material into the Lagoon tends to create layers of sand and finer material in deeper waters.

None of the cement stabilization treatments had significant impacts on the ultimate particle size composition of the treated products (Figure 5). The amount of cement added also seemed to have little impact on the final particle size composition. The percent sand and silt/clay in the samples remained relatively unchanged with increasing amounts of added cement.

Table 12. Particle Size Composition (% sand and % silt/clay) of Area Composites used for Stabilization/Solidification Bench Tests.

AREA COMPOSITES	Sand >0.063 mm	Silt/Clay <0.063 mm
A	28.5	71.5
B	31.2	68.8
C	81.6	18.4

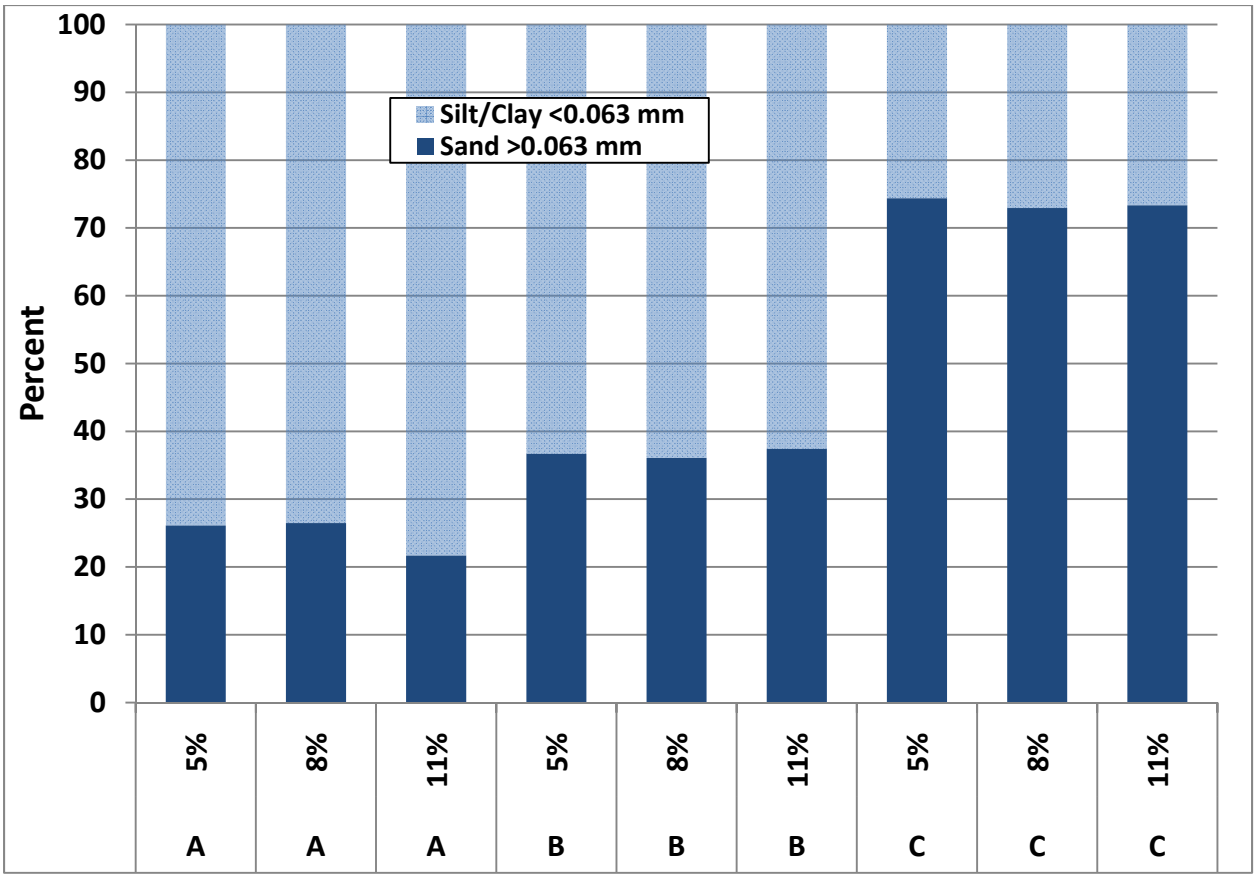


Figure 5. Comparison of Sand and Silt/Clay Fractions after Treatment with Three Different Concentrations of Cement.

4.3.2 PHYSICAL CHARACTERIZATION – COMPRESSIVE STRENGTH

A 28-day unconfined compressive (UC) strength test (ASTM D 2166) was conducted on each combination of sediment and cement used for the bench tests (Table 13; Figure 6). Data were compared against a preliminary goal of less than 10 psi (1,440 psf) for the sediment/cement mixed material.

All mixtures were found to exceed (did not meet) the 10 psi goal, even with the lowest cement concentration. The impact of adding cement was notably greater in the coarser sediment from area C. Area C sediments were comprised of less than 20 percent fine material. Sediments from areas A and B contained roughly 70 percent fines. Sediment from areas A and B that were treated with 5% cement came closest to meeting the UC strength goals. Based upon the results, meeting the preliminary goal at all sites would likely limit the amount of cement used to treat the sediments to less than three percent.

Table 13. Unconfined Compression Test Results

Area Composite	Cement Content (%)	Unconfined Compressive Strength (ksf)	Unconfined Compressive Strength (psi)	Dry Density (pcf)	Moisture Content (%)
A	5	2.08	14.4	54.9	52.5
A	8	3.39	23.5	54.4	52.1
A	11	4.95	34.4	61.5	61.5
B	5	2.42	16.8	52.5	66.1
B	8	5.14	35.7	54.1	56.9
B	11	5.89	40.9	58.8	47.5
C	5	4.41	30.6	84.3	25.0
C	8	7.90	54.9	85.1	23.9
C	11	16.76	116.4	88.4	21.7

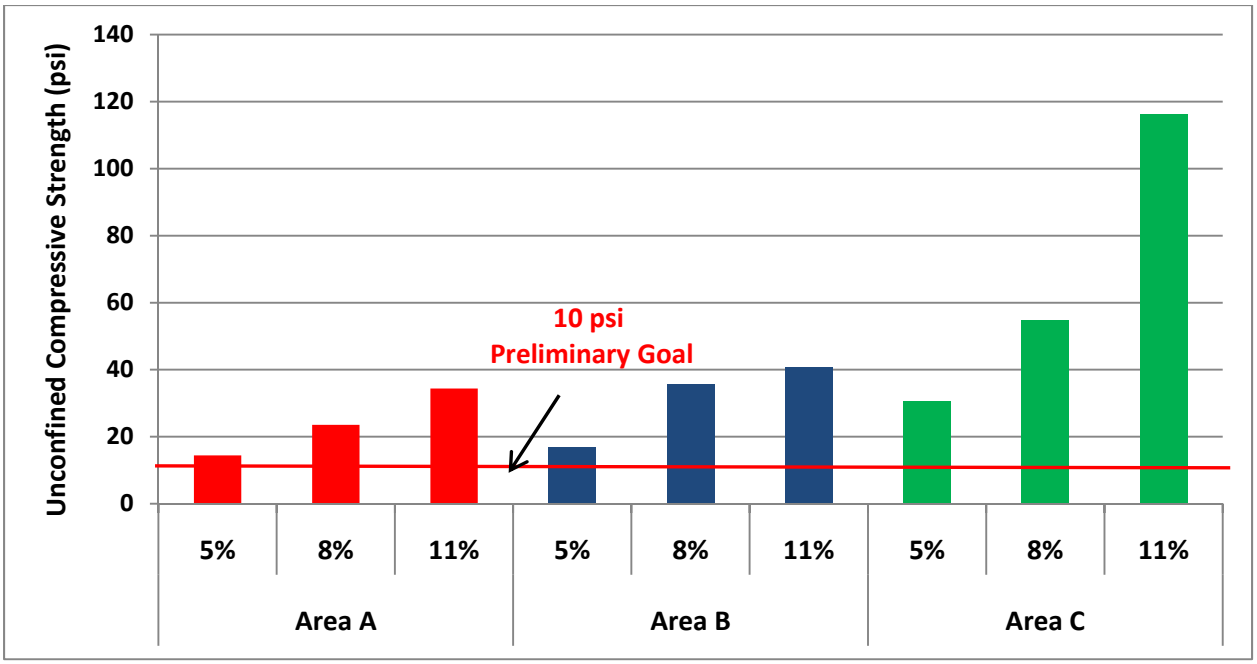


Figure 6. Unconfined Compressive Strength of Colorado Lagoon Sediments Treated with Three Concentrations of Cement.

4.3.3 Cement Stabilization Waste Extraction Test (WET) Results

The results of the initial sediment stabilization tests using cement are summarized in Table 14 and Figure 7. The "baseline" is the untreated sediment from the same composite batch used for the treated sediment. Treatment with varied concentrations of cement had the desired impact of increasing the pH. As more cement was added, the pH of the final product increased to levels between 12 and 12.5 with the strongest impact on pH occurring in association with the coarser sediment from area C. However, none of the treatments caused significant reductions in soluble lead. Subsequent testing suggests that sediments were not well buffered, sediment pH changed rapidly with addition of stabilization material, despite coming from a marine environment, which typically would be well buffered.

Table 14. Summary of Cement Stabilization Test Results.

Sample	% Solids	pH	Total Lead (mg/Kg-wet)	WET Lead (mg/L)
Area A Baseline	**49**	**7.6**	**300**	**17.0**
5% cement	51	10.8	290	17.8
8% cement	51	11.3	310	17.4
8% cement (blind dup)	51	11.3	290	17.0
11% cement	52	12.0	270	15.3
Area B Baseline	**53**	**8.0**	**340**	**15.0**
5% cement	55	10.9	340	18.7
8% cement	56	11.5	320	19.0
11% cement	57	12.1	310	20.1
Area C Baseline	**77**	**7.3**	**60**	**4.1**
5% cement	74	12.3	65	2.0
8% cement	75	12.4	61	4.1
11% cement	76	12.5	60	3.2

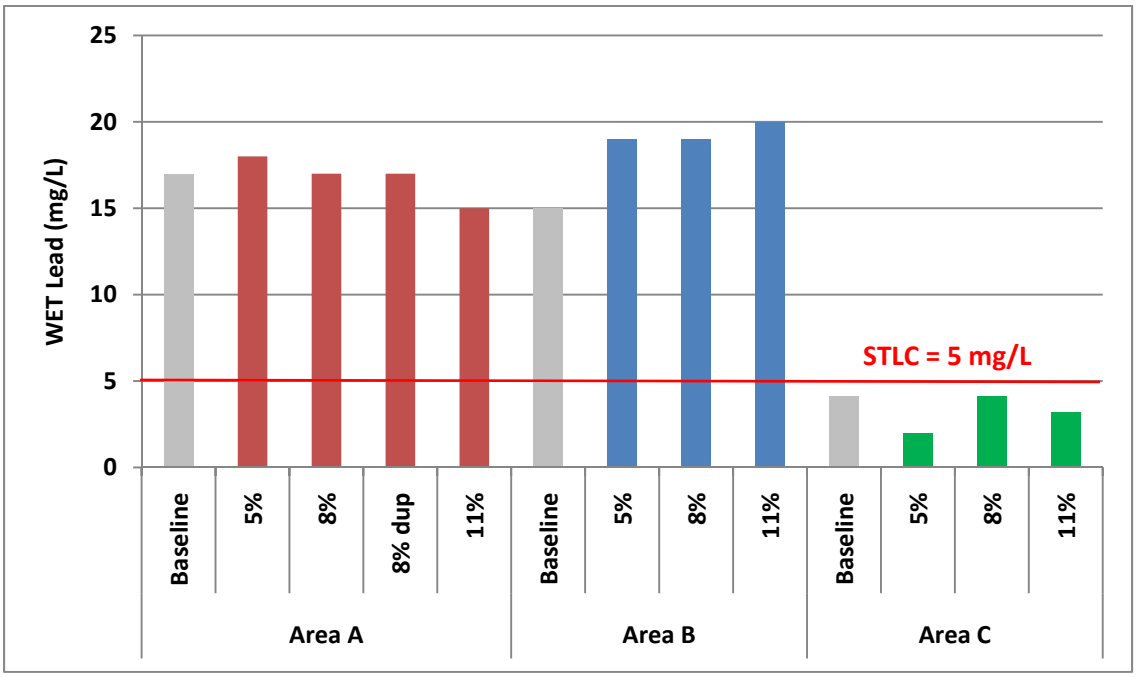


Figure 7. WET Lead Results of Baseline and Cement Treatments.

4.4 SEDIMENT STABILIZATION TESTS – ROUND TWO

The second round of testing emphasized chemical binding and elimination of potential factors that might inhibit stabilization such as the chemical nature of the lead found in Colorado Lagoon. The six selected treatments were compared to the initial baseline measurement associated with area B. All six treatments failed to reduce the soluble lead content below the target of 2.5 mg lead/L (Figure 8, Table 15). Although the pH levels varied for each of the treated samples, the WET results were generally the same for all treatments, possibly indicating that pH was not adequately buffered in these treatments.

Table 15. Summary of WET Results using Alternative Sediment Stabilization Strategies.

Sample	% Solids	pH	WET Lead (mg/L)
Area B Baseline	**53**	**8.0**	**15.0**
FF-100		9.6	19
FF-200		10.3	19
TSP/24 cement		7.5	19
TSP/cement		7.5	19
Lime (5%)		12.2	18
Cement (5%)		10.5	19

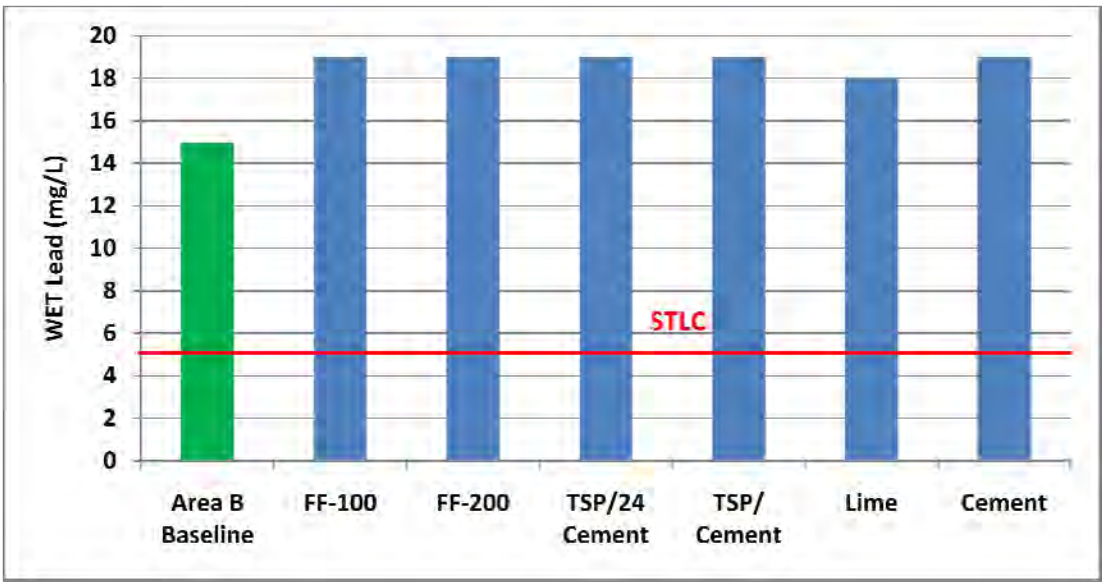


Figure 8. Concentrations of Lead in WET Elutriates Developed from Alternative Stabilization Tests.

4.5 SEDIMENT STABILIZATION TESTS – ROUND THREE

A final round of testing was initiated to evaluate treatment options available from ADT Environmental Solutions. Sediment from composite area B was sent to ADT's facility in Oregon. Since testing was being conducted over an extended period of time, additional tests were conducted to re-analyze the untreated baseline sediment. The following sections summarize the results of repeated tests of the composite sediments and results of WET tests on sediment treated by ADT.

4.5.1 INTER-LABORATORY COMPARISON

Soil Control Laboratory (SCL) in California was the primary analytical laboratory used to analyze the baseline (untreated) and treated sediment. The original sample from Area A was tested on three different occasions and the original sample from Area B was tested four times. One set of samples from both composite areas A and B were sent blind to both SCL and Enviromatrix Laboratories (EML) in California. Both laboratories routinely analyze sediments/soil for evaluation against California's Title 22 criteria for assessment of hazardous waste. A third laboratory, Specialty Analytical (SA) in Oregon, was initially used by ADT to assist in determining whether various treatments were effective. Although this laboratory routinely uses the federal TCLP test procedures, they had not previously used the California WET procedure.

Results of testing conducted on baseline sediment composites from areas A and B are summarized in Table 16. Substantial variability was evident in analytical results reported by the three laboratories. The two samples analyzed by EML were reported to have substantially lower concentrations of total lead and WET lead than reported by SCL. The results of the WET tests provided by SA were not considered valid due to both the variability in the two runs and recognized lack of experience performing the test. However, total lead measured in the samples was found to be very consistent with concentrations reported in repeated, blind measurements by SCL.

Although the variability between laboratories is concerning, the consistency of data provided by SCL on blind samples provides evidence of both precision in the measurements and chemical stability of the sediments. When combined with sound quality control data provided by SCL, there is a high level of confidence in the test data.

Table 16. Repeated Measurements of pH, Total Lead, and WET on the Same Sample.

		Area A			Area B		
Lab	Date	pH	Total Lead (mg/kg-wet)	WET Lead (mg/L)	pH	Total Lead (mg/kg-wet)	WET Lead (mg/L)
SCL[2]	3-Nov-09	7.6	300	17	8.0	340	15
SCL	23-Feb-10	7.4	280	14	7.6	370	16
SCL	10-Mar-10	-	-	-	7.1	340	12
SCL	20-Apr-10	7.4	320	16	7.6	370	18
SA[3]	3-Feb-10	-	-	-	8.3	380	3.0[1]
SA	12-Feb-10	-	-	-	8.4	340	0.16[1]
EML[3]	22-Feb-10	8.2	209	5.3	8.1	285	7.0

1. WET results were not considered valid due to the lack of experience and varied results.
2. SCL = Soil Control Laboratories.
3. SA = Specialty Analytical Laboratories
4. EML = Enviromatrix Laboratories

4.5.2 ADT Environmental Solutions Media Tests

Preliminary testing by ADT provided indications that one reagent mixture was capable of binding chemically stabilizing lead in the test sediments. This initial dry reagent mixture was added at a rate of six percent of the wet weight of the sediment. Samples of both the untreated sediment and the treated sediment were sent to Soil Control Lab for verification. Laboratory results (Table 18) verified that the initial mixture was highly effective at stabilizing the lead. WET tests conducted with the untreated sediment from area B yielded 12 mg/L soluble lead. After the addition of the six percent reagent mix, additional WET tests indicated that concentration of soluble lead was below detection limits (<0.025 mg/L).

Subsequent testing was conducted to determine if sediments could be: 1) stabilized with lower quantities of reagents and 2) effectively dewatered. Five treatments were used with reagent additions ranging from two to eleven percent of the wet weight of the sediment. Table 17 provides a summary of the quantities of reagents added to each sediment sample and converts the treatments to dry weight to dry weight basis for direct comparison with previous rounds of testing.

All five treatments (Table 18, Figure 9) effectively stabilized the lead in area composites A and B. The initial treatment (15-Mar-10) resulted in no detectable soluble lead. Minimal concentrations of soluble lead were measured in sediments treated with each of the four other treatments. Differences in the effectiveness of these four treatments were, for all practical purposes, inconsequential. Measured concentrations of total lead in baseline and treated sediment from each area were also consistent (Table 18, Figure 10). The six treatments also resulted in similar elevation of pH. Treatment 3, which used the least amount of reagents, resulted in pH values of 11 in sediments from both composite areas A and B. All other treatments were measured at a pH of 12.

Despite water content as high as 50%, none of the treatments failed the Paint Filter Test. This test determines if there is any free standing water in the material which would require special handling procedures when transporting the sediments. Various methods of removing sediment from the Lagoon may result in very different water content that may require varying quantities of

dewatering agents (cement or hydrated lime) to be added. Fortunately, the treatment tests indicated that increasing amounts of dewatering agents did not influence chemical stabilization of the lead. Hydrated lime was selected for the dewatering agent during ADT testing because cement has shown to increase UC strength over the initial goal of being less than10 psi.

Table 17. Percentages of Reagents used in each Sediment Treatment

Treatment	Sediment Composite	Percent Reagent (dry wt. / wet wt.)	Percent Reagent (dry wt. / dry wt.)
1	A	6	11.3
	B	6	10.0
2	A	4	7.7
	B	4	6.9
3	A	2	4.0
	B	2	3.5
4	A	11	20.8
	B	11	18.6
5	A	6	11.3
	B	6	10.3

1. Treatment based upon dry weight of reagents to wet weight of sediment
2. Treatment converted to a dry weight of reagents to dry weight of sediment

Table 18. Summary of Testing with ADT SMMS[1] Reagents.

Sample	% Solids	pH	Total Lead (mg/kg-wet)	WET Lead (mg/L)	Paint Filter Test
15 – Mar-10					
Area B Baseline	**55**	**7.1**	**340**	**12**	
ADT – 6%	59	12	350	ND[2]	
8-Apr-10					
Area A Baseline	48	7.4	320	16	NA[2]
Treatments					
1. ADT – 6%	53	12	280	ND[2]	No Free Liquid
2. ADT – 4%	52	12	290	0.076	No Free Liquid
3. ADT – 2%	50	11	290	0.070	No Free Liquid
4. ADT – 2%+9% hydrated lime	53	12	300	0.072	No Free Liquid
5. ADT – 2%+4% Hydrated lime	53	12	300	0.055	No Free Liquid
Area B Baseline	53	7.6	370	18	NA[2]
Treatments					
1. ADT – 6%	60	12	350	ND[2]	No Free Liquid
2. ADT – 4%	58	12	330	0.077	No Free Liquid
3. ADT – 2%	57	11	340	0.054	No Free Liquid
4. ADT – 2%+9% hydrated lime	59	12	360	0.140	No Free Liquid
5. ADT – 2%+4% hydrated lime	58	12	350	0.078	No Free Liquid

1. SMMS - Synthetic Metals Mineralization System
2. Not Detected – Detection Limit = 0.025 mg/L

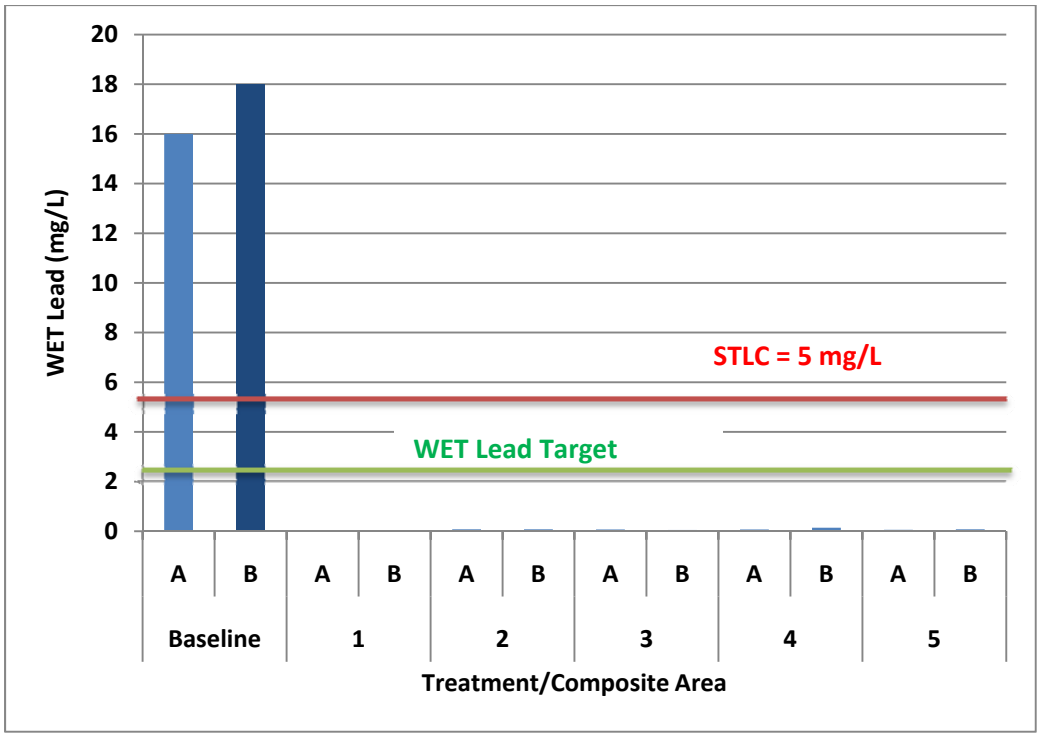


Figure 9. Summary of WET Test Results with Baseline and Treated Sediment.

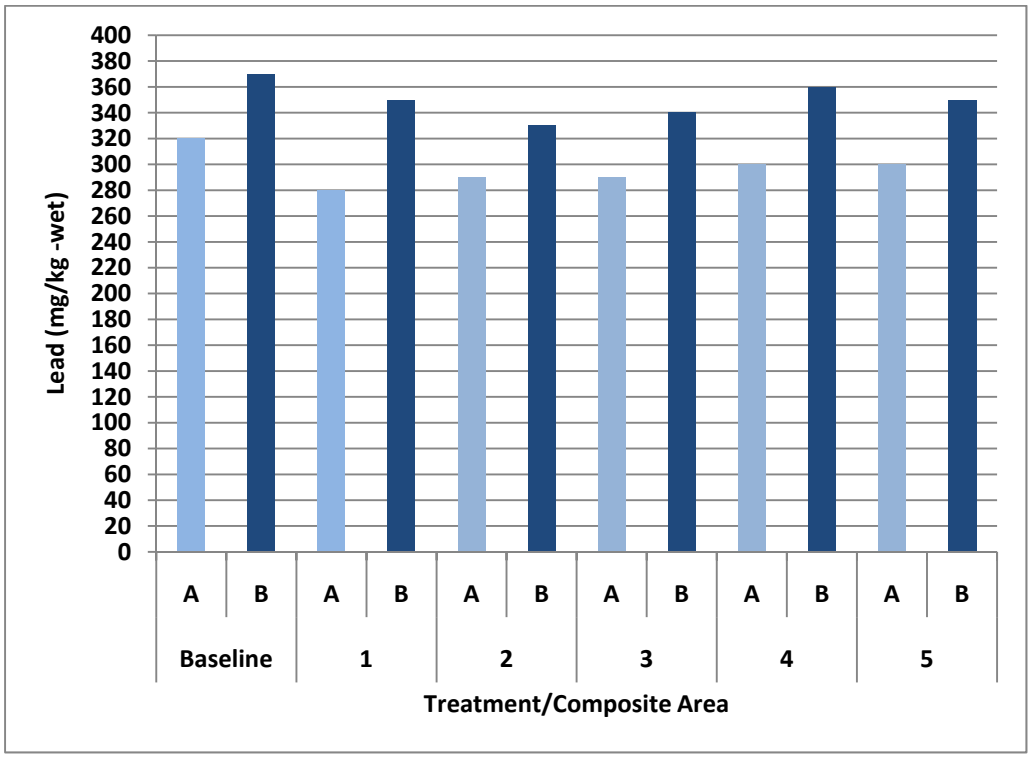


Figure 10. Summary of Total Lead Measured in Baseline and Treated Sediments.

5.0 CONCLUSIONS

Sediment contamination issues in the western arm of Colorado Lagoon are largely limited to the top four feet of sediment and are most substantial in areas A and B (farthest from the walk bridge). Composites from areas A and B exceeded California Title 22 criteria, thus classifying the sediment as hazardous. Lead contamination is generally lower in area C (closer to the walk bridge), but area C also exhibited more vertical variability and inconsistent spatial patterns. Top sediments in area C also have higher sand content which would correlate with the lower lead levels.

Elevated levels of lead extend into the deeper sediments (four to six feet) in the vicinity of the two major storm drains which discharge into the Lagoon's west arm. Removal of the top four feet of sediment throughout the western arm of Colorado Lagoon and selective removal of deeper sediment in the vicinity of the major storm drains would be expected to result in sediments that meet ERL levels.

Bench tests using three different concentrations of cement with sediment from each of the three composite areas failed to show any substantial improvements in soluble lead. In addition, sediment treated with the lowest of the three cement concentrations (5%) did not meet preliminary goals for unconfined compressive (UC) strength of less than 10 psi. Area composite samples A and B would also exceed the goal of containing less than 50% fines, but with area C (low fines content) included may result in an average value which approaches the 50% goal. Screening tests with alternative treatment media (FS-100, FS-200, TSP, lime and cement) also failed to provide the desired chemical stabilization of the lead.

Final tests using a customized reagent mixture developed by ADT proved to be highly successful in reducing the solubility of lead to non-hazardous levels. The initial ADT screening test indicated that the SMMS treatment effectively stabilized the lead. WET tests conducted on the treated sediment indicated that soluble lead had been reduced to levels below the analytical detection limit of 0.025 mg/L.

Further testing was conducted with the SMMS treatment to determine if sediments could be: 1) stabilized with lower quantities of reagents and 2) effectively dewatered. WET tests demonstrated that the SMMS reagents were still highly effective at stabilizing the lead even when treated at 50 percent of the initial strength. The highest concentration of soluble lead associated with treatment of sediments from areas A and B was 0.14 mg/L. This compared to the target level of 2.5 mg/L that was selected to provide a conservative margin of safety. The efficacy of the SMMS treatment at the lowest loading rates suggests that treatment with even lower quantities of reagents may be possible to improve the overall cost effectiveness of this approach.

The conclusion of this study is that the SMMS treatment, or similar treatments that provide suitable reagents and pH-control, would allow for disposal of Colorado Lagoon dredge sediment at a confined disposal facility or at an upland Class II or III landfill such as either the Olinda Alpha Landfill in Brea, California or the Puente Hills Landfill in the City of Industry.

6.0 REFERENCES

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APPENDIX E:

CORRESPONDENCE AND RESPONSES TO PUBLIC COMMENTS

PUBLIC REVIEW
EA COMMENTS/RESPONSES

LONG BEACH UNIFIED SCHOOL DISTRICT (LBUSD)

Comment #1: This comment introduces the Long Beach Unified School District's (LBUSD) comments and includes a description of the Army Corps of Engineer's (Corps) proposed federal action under consideration, including the dredge, treatment, transport, and disposal of approximately 32,500 cubic yards of sediment from the Colorado Lagoon.

Response: This comment is introductory to comments that follow. The comment is incorrect in stating that the federal action includes the dredging of approximately 32,500 cubic yards of sediment. Please see clarifications included in Final Environmental Assessment (EA) sections 1.1, 1.4, and 2.1.

Comment #2: LBUSD requests that the Final EA evaluate potential impacts of the federal action on LBUSD facilities, including Will Rogers Middle School, Lowell Elementary School, and Wilson High School.

Response: Will Rogers Middle School and Lowell Elementary School are located approximately **960** and **1,620** feet from the Lagoon, and approximately **320** and **925** feet from the possible dredge treatment/loading areas within Marine Stadium. Wilson High School is located approximately **1,175** feet from the Lagoon, and approximately **2,940** feet from the possible dredge treatment/loading areas within Marine Stadium.

Please see the discussion below for more information regarding potential noise and traffic effects of the proposed federal action on nearby schools.

Comment #3: LBUSD requests that the noise analysis and mitigation measures in the Final EA consider school hours of operation, which are Monday through Friday 7:00 a.m. to 4:00 p.m. and testing periods (specific dates to be identified) during the school year, to avoid noise and vibration impacts during these time periods.

Response: The potential construction noise impacts on the sensitive land uses adjacent to the proposed construction areas have been evaluated for both the dredge activity proposed to be funded by the Corps, and for the full project build out to be implemented by the City of Long Beach (City).

Noise from the Corps proposed action, would include noise from the operation of excavators and loaders at the Lagoon should the material be loaded on trucks for transport, and/or the operation of loading equipment at Marine Stadium, should the material be transported via barge to the Port of Long Beach (POLB). The Implementation of Environmental Commitments, listed in Section 8.4 of the EA and copied below, would reduce the noise from these sources.

- Haul trucks and construction equipment will be properly maintained and scheduled in order to minimize unsafe and nuisance noise effects to sensitive biological resources, residential areas, and the socioeconomic environment.
- The City Noise Control Officer shall ensure that the Construction Contractor limits construction activity that produces loud or unusual noise that annoys or disturbs a reasonable person of normal sensitivity to between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday and federal holidays, and between 9:00 a.m. and 6:00 p.m. on Saturdays, with no construction activities on Sundays in accordance with the City's Noise Ordinance.
- During all dredging activities, the Project Contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.
- The Project Contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site.
- The Construction Contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction.
- Prior to initiation of dredge activities, the Director of Parks, Recreation, and Marine shall hold a community pre-construction meeting, in concert with the Construction Contractor, to provide information regarding the construction schedule (which includes dredging activities). The construction schedule information shall include the duration, location, days, and frequency of the dredging activities.
- Noise Coordinator will be available to respond to public complaints about noise. Signs shall be posted at the construction site with the Noise Coordinator's name and a telephone number for individuals to report noise complaints.

There are four dredging options: three wet methods and one dry method. Three of the four options would require that material be hauled to Marine Stadium where it would be treated and loaded onto barges for transport. These options would require the use of heavy construction equipment at Marine Stadium. Sensitive receptors include those residences and schools that may be located within 315 feet of the equipment within Marine Stadium. Sensitive receptors within 315 feet would be exposed to noise levels in excess of the City's daytime exterior noise standard of 70 dBA Lmax. The City of Long Beach Municipal Code allows elevated construction-related noise levels as long as the construction activities are limited to the hours specified in the Noise Ordinance. Rogers Middle and Lowell Elementary Schools are estimated to be approximately **320** and **925** feet from the closest possible dredge treatment/loading areas within Marine Stadium, and would therefore not experience nose levels in excess of the City's daytime exterior noise standard.

The Corps and the City are not able to commit to a construction schedule that excludes construction activity during the school year because of specific environmental scheduling factors (for example, the dredging of the Lagoon and the excavation of the channel would need to be coordinated with the dry weather months and spring tides). However, the Corps and the City are committed to providing the LBUSD advance notice of construction activities. See response to Comment #5 below for more information.

Comment #4: LBUSD requests advanced notice, and an opportunity for input, prior to the Corps preparation of the Construction Traffic Management Plan (CTMP) for the project. The comment further states that the project will result in thousands of truck trips close to schools, which will generate high levels of noise in addition to impacts on the local circulation system. The CTMP must be prepared prior to the start of dredging activities.

Response: It is both the Corps' and the City's intention to include the LBUSD in the pre-construction meeting described in Section 8.4 of the EA, and to provide the LBUSD with formal advanced notice of construction schedules and construction traffic plans. Please see response to Comment #5 below for more information.

The comment notes that there will be a large number of truck trips associated with the Corps action. The haul routes are depicted in Figure 4.4-1 in the EA. The haul routes are near the existing schools. If trucks haul the dredge, they will go north on Park Avenue and make a right turn to go east on 7th Street, at the southeast corner of the Wilson High School site. If trucks (instead of hydraulic methods) are used to convey the dredge from the Lagoon to a barge in Marine Stadium, the trucks will pass by Rogers Middle School on Appian Way. The number of truck trips generally averages approximately 12 trips per day during the dredging activity. To put this number in context, there are currently approximately 15,000 vehicles of average daily traffic (ADT) on Park Avenue and approximately 10,000 ADT on Appian Way. The additional traffic as a result of the dredge activity is less than 1 percent of the total traffic on these roads and will not result in a substantive increase in traffic noise compared to existing conditions.

Comment #5: LBUSD requests formal advanced notice of construction schedules, traffic plan, and public meetings regarding the project.

Response: It is both the Corps' and the City's intention to include LBUSD in the pre-construction meeting described in Section 8.4 of the EA, and to provide the LBUSD with formal advanced notice of construction schedules and construction traffic plans. The Corps and the City are committed to providing the LBUSD advance notice of construction activities. Specifically, the Corps Project Manager and the City Director of Parks and Recreation (or designee) will work with LBUSD staff to inform the LBUSD of construction traffic plans and schedules for the transport of dredge material. The City of Long Beach will manage future public meetings regarding the project implementation.

Comment #6: LBUSD expresses appreciation for the opportunity to participate in the process and a desire to work collaboratively with the Corps and the City.

Response: The Corps looks forward to ongoing coordination with LBUSD, working through the City, with regard to schedules for the transport of dredge material as described in responses above.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

Comment #1: Mention of California sea lions (*Zalophus californianus*) and Pacific harbor seals (*Phoca vitulina*) is only referenced on page 116 of the EA. NOAA requests that additional text describing the nature of the potential impacts to these species be added to the EA or reference to the species be removed from the EA if no adverse impacts are anticipated.

Response: Comment noted. All discussion related to marine mammal species in this document will be deleted. Marine mammals are not present at the site; therefore, they will not be impacted by the proposed federal action.

Comment #2: Page 23 the EA identifies that the California least tern (*Sterna antillarum browni*) may be present on the site. This language needs to be consistent with the language provided on page 124 of the EA regarding presence of threatened and endangered species on the site.

Response: Comment noted. Text in the Final EA was revised so that the two sections are consistent. Section 10.4 Federal Endangered Species Act of 1972, Section 7(c), was correct to clearly state: "The only threatened and endangered species which may occur at the Colorado Lagoon during construction activities is the California lest tern (*Sterna antillarum browni*). However, based on the results of the study conducted by Keane, the Lagoon is considered to rarely support foraging least turns (Keane, 2004). Additionally, construction activities for the federal project (transportation and disposal of treated sediments) would have no effect on foraging by the California least tern at the Colorado Lagoon. The Corps has determined that no listed species will be affected by this project. Therefore, consultation with USFWS pursuant to Section 7(c) of the FESA is not required.

Finding of No Significant Impact
For the Colorado Lagoon Estuary Restoration Project

National Marine Fisheries Service

In compliance with the National Environmental Policy Act (NEPA), a memorandum for the Record has been prepared that adopts the Environmental Assessment (EA) for the Colorado Lagoon Estuary Restoration Project. The EA was prepared by the U.S. Army Corps of Engineers (USACOE) and finalized September 2, 2011. The National Oceanic and Atmospheric Administration (NOAA) is listed as a Cooperating Agency on the EA. The USACOE EA describes the overall proposed restoration actions and environmental consequences related to the restoration of the Colorado Lagoon Estuary to functional tidal wetlands. The Adoption Memorandum explains and incorporates the analysis developed in the USACOE EA as it relates to a proposed action by the NOAA Restoration Center (RC) and explains that NOAA RC is adopting that EA for its own action.

The NOAA RC proposed action is to provide funding through our partnership with the California Coastal Conservancy to the City of Long Beach to implement a portion of the Colorado Lagoon Habitat Restoration Project. The project involves restoring a former salt pond (identified as the Colorado Lagoon Estuary) to historic wetland function in Los Angeles County in the City of Long Beach, California. As explained in detail in the Adoption Memorandum, the action that NOAA RC proposes to fund is within the scope and scale of the project analyzed in the USACOE EA. Using the information and analysis of the adopted EA, NOAA RC has independently determined that its proposed action will not cause significant environmental impacts and consequently makes this Finding of No Significant Impact (FONSI).

NOAA Administrative Order 216-6 (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality regulations at 40 C.F.R. 1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant to making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ's context and intensity criteria. These include:

1) Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in FMPs?

> Response: The proposed action is not expected to cause substantial damage to the ocean and coastal habitats or designated essential fish habitat (EFH). The proposed action is to provide funding for a restoration program described in the USACOE EA. That overall restoration program will remove contaminated sediment and will support the City's efforts to restore the Lagoon by

implementing a key component of the City's comprehensive plan to restore the 11.7-acre Lagoon. More specifically, the project includes improvements to the Lagoon through cleaning of the culvert and removal of structural impedances at the culvert; dredging areas of the Lagoon; implementing storm drain upgrades; removal of the north parking lot, access road, and the restroom on the north shore of the Lagoon; recontouring side slopes; revegetating land areas; planting eelgrass in the Lagoon water body; and developing the walking trail at the Lagoon.

In compliance with the Magnuson-Stevens Fishery Conservation and Management Act, the National Marine Fisheries Service (NMFS) Southwest Regional Office Habitat Conservation Division was consulted regarding potential impacts to Essential Fish Habitat (EFH). NMFS determined that some aspects of the project would result in adverse effects to EFH. However, the impacts were determined to be minimal and short term only and NMFS determined that completion of the project would result in a substantial improvement to subtidal and intertidal fish habitat. Therefore, NMFS provided no additional EFH conservation recommendations. Although minimal, short-term adverse impacts would occur associated with dredging operations, NMFS believes the proposed project will result in a net long-term benefit to EFH.

2) Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?

Response: Long-term impact to biodiversity or ecosystem function will be beneficial and not significant. While there may be short-term adverse impacts to ecosystem function, the project will enhance biodiversity by restoring 11.7 acres of tidal estuary to full function. This project is expected to provide habitat for invertebrates, fish, bird, and plant life.

3) Can the proposed action reasonably be expected to have a substantial adverse impact on public health or safety?

Response: NOAA RC has reviewed the analyses of potential adverse impacts to public health or safety and has concluded that the project is unlikely to have adverse impacts to human health and safety. As explained in section 4 of the adopted USACOE EA, resources including air and water quality, hydrology, noise, land and recreation uses, aesthetics, and ground transportation were analyzed and were not expected to result in significant adverse impacts.

4) Can the proposed action reasonably be expected to adversely affect endangered or threatened species, their critical habitat, marine mammals, or other non-target species?

Response: As explained in the Adoption Memo, no significant impacts are expected to occur as a result of implementing this project. The California least

tern is known historically to use the project area but such use is considered rare. The California least tern is listed as State and federally endangered. Since the Lagoon is a poor quality foraging site, the species has rarely been seen at the site, and higher quality foraging sites are available short distances up or down the coast, USACOE, the lead agency, has determined that the action will have no effect on the species. Because no federally-listed species will be affected by project implementation, Section 7 consultation is not required pursuant to the Endangered Species Act of 1969, as amended.

5) Are significant social or economic impacts interrelated with natural or physical environmental effects?

Response: As described in Section 4.1 of the adoption USACOE EA, the Colorado Lagoon Estuary Restoration Project is not expected to have adverse effects on the physical environment. In addition, Section 4.6 of the USACOE EA evaluates potential impacts to Land Use and Recreation. This section also concluded that no adverse impacts on Land Use and Recreation would occur.

6) Are the effects on the quality of the human environment likely to be highly controversial?

Response: The effects of the proposed action are not expected to generate any controversy or opposition. There is no substantial dispute regarding the project's size, nature, or effect. In addition, NOAA RC is not aware of any public comments raising substantial questions as to whether the project may cause significant degradation of some human environmental factor.

As described in the adoption memo, a Public Notice describing the project was issued on August 27, 2010, was sent to all interested parties including appropriate Federal and State agencies and closed September 17, 2010. All comments received on this action were reviewed by the USACOE and are summarized in the USACOE EA.

The public notice generated 1 comment letter from a Long Beach Unified School District (LBUSD) with concerns about how the project would impact noise levels during school hours. LSUSD also requested that ACOE coordinate with the school district during the project implementation to minimize impacts to students at nearby schools. ACOE modified the EA to address these concerns and included a detailed response to comments for the letter. Comments from NOAA on the Draft EA pointed out references to California Sea Lions and Harbor Seals with inadequate details provided and stated that there were minor inconsistencies with regard to the presence of ESA-listed species. ACOE eliminated references to California Sea Lions and Pacific Harbor Seals in the Final EA as these species do not occur at the site, and clarified the language regarding the

presence of ESA-listed species on the site. USACOE included detailed responses to each of NOAA's comments in the EA.

7) Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, essential fish habitat, or ecologically critical areas?

> Response: Impacts to historic or cultural resources are addressed in item 10 below, and impacts to EFH and ocean/coastal habitat are addressed in item 1 above. Other than the impacts discussed in item 1 and 10, there are no substaintial impacts to unique areas.

8) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

> Response: Potential effects are not likely to be highly uncertain or involve unique or unknown risks. As described in section 6.0 of the adopted USACOE EA, the proposed action would not be expected to result in unavoidable adverse environmental effects. Where the potential for such effects has been identified, appropriate mitigation measures (described in Section 8.0 of the USACOE EA) have been incorporated into the project scope to minimize the potential for adverse impacts.

9) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

> Response: As described in section 7.2 of the adopted USACOE EA the Corps concludes and NMFS agrees that the project will not result in any long-term cumulative impacts. All cumulative impacts associated with the project will be temporary or short-term and associated with construction activities.

10) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

> Response: Potential impacts to Cultural or Historical resources are evaluated in section 4.9 of the USACOE EA. The Lagoon will continue to operate as public parks after project implementation. Therefore, this discussion is limited to potential impacts to archaeological resources during construction. The proposed project would not involve any activities that would disturb or destroy underlying archaeological or paleontological remains or other cultural/scientific resources. The USACOE EA evaluation did not identify any culturally or historically important resources that could be affected by construction.

11) Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?

Response: This project is not expected to introduce or spread any non-native species. However, to minimize the likelihood of the spread of non-native species Section 8.1 of the USACOE EA describes a field survey to investigate the presence of the invasive algae Caulerpa taxifolia that will be conducted 30 to 60 days prior to commencement of construction by qualified divers certified by the CDFG and NMFS to conduct such surveys. The preconstruction caulerpa surveys will be conducted according to the accepted criteria of the Southern California Caulerpa Action Team (SCCAT) for conducting surveys for the invasive algae and in accordance with the NMFS and CDFG caulerpa survey protocols. Surveys will be conducted at a Surveillance level for Caulerpa-free Systems

12) Is the proposed action likely to establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration?

Response: The proposed action is limited to restoration of the Colorado Lagoon Estuary and it would not establish a precedent for future actions with significant effects or establish a decision in principle for future consideration.. Approval and implementation of this project will not compel NOAA to approve a follow-on phase. Any follow-on project would be reviewed through a separate agency decision-making process and environmental impacts analysis prior to approval of funding.

13) Can the proposed action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

Response: The proposed project is not expected to threaten a violation of any environmental protection laws. The project has undergone environmental reviews and will include required mitigation measures detailed in the USACOE EA to minimize any adverse effects to protected resources and other species and their habitats, and to minimize adverse impacts to humans and cultural resources as discussed in the Adoption Memo and USACOE EA.

14) Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

Response: No cumulative adverse effects having substantial effects on species are anticipated. As described in the Adoption Memo and USACOE EA, the project will proceed in compliance with required mitigation measures included in the USACOE EA to minimize any potential adverse impacts to protected resources and other species and their habitats. Overall, this project will have beneficial impacts on living marine resources and their habitats.

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment prepared for the Colorado Lagoon Estuary Restoration Project by USACOE and the NOAA Adoption Memorandum, it is hereby determined that NOAA RC's funding of the restoration of the Colorado Lagoon Estuary will not significantly impact the quality of the human environment. Furthermore, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an EIS for this action is not necessary.

Dean Z. Smehil — 10-18-2011 — OCT 18 2011

for Patricia A. Montanio — Date
Director, Office of Habitat Conservation