# APPENDIX K3

## *Cudahy CHRMP*

# MISSION BAY PARK IMPROVEMENTS PROGRAM

# Cudahy Creek Wetlands
# Conceptual Habitat Restoration and Monitoring Plan
# San Diego, California

*Prepared for:*

The City of SAN DIEGO

**Engineering and Capital Projects**
8525 Gibbs Dr, MS 912
San Diego, California 92123
Contact: Nancy Graham

*Prepared by:*

DUDEK

2280 Historic Decatur Road
Suite 200
San Diego, California 92106
*Contact: Erin McKinney*
*760.479.4189*

## NOVEMBER 2025

Printed on 30% post-consumer recycled material.

# CONTRIBUTORS

The following staff performed services and/or contributed to the restoration design and/or preparation of the Conceptual Habitat Restoration and Monitoring Plan.

| Name | Title | Role | Address | Phone Number | Email Address |
|---|---|---|---|---|---|
| Erin McKinney | Senior Habitat Restoration Specialist | Principal Author | 2280 Historic Decatur Road, Suite 200 San Diego, California 92106 | 760.479.4189 | emckinney@dudek.com |
| Michael Sweesy | Restoration Ecologist | Contributor, lead restoration designer | 687 S. Coast Highway, Suite 110, Encinitas, California 92024 | 760.479.4253 | msweesy@dudek.com |
| Laurie Monarres | Biological Senior Project Manager | Contributor | 1630 San Pablo Avenue, Suite 300 Oakland, California 94612 | 510.601.2515 | lmonarres@dudek.com |

INTENTIONALLY LEFT BLANK

# TABLE OF CONTENTS

**SECTION** **PAGE NO.**

## APPENDICES

## FIGURES



## TABLES

# ACRONYMS/ABBREVIATIONS

| Acronym/Abbreviation | Meaning |
|---|---|
| BMP | best management practice |
| CCC | California Coastal Conservancy |
| CDFW | California Department of Fish and Wildlife |
| City | City of San Diego |
| HTL | high tide line |
| Improvement Zone | Mission Bay Improvement Zone |
| PEIR | Programmatic Environmental Impact Report |
| PEP | plant establishment period |
| Plan | Conceptual Habitat Restoration and Monitoring Plan |
| Program | Mission Bay Park Improvements Program |
| Project | Cudahy Creek Wetlands Restoration Project |
| RWQCB | Regional Water Quality Control Board |
| SDBG | San Diego Biology Guidelines |
| USACE | U.S. Army Corps of Engineers |

INTENTIONALLY LEFT BLANK

# SUMMARY

This Conceptual Habitat Restoration and Monitoring Plan (Plan) for the Cudahy Creek Wetlands Restoration Project (Project) provides design parameters to create a tidal saltmarsh that would improve the water quality and expand aquatic wetlands resources and wildlife habitat within Mission Bay. The Plan includes approximately 6.51 acres of subtidal channels, low saltmarsh (including a 0.5-acre berm), transitional marsh, and mid saltmarsh components. The Project design incorporates a 2.93-acre outer slope (rising from the bay floor to the top edge of the outer berm) to increase water quality and stabilize the integrity of the saltmarsh, and approximately 0.3 acres of riprap to stabilize the subtidal channels at three specific points of anticipated high-velocity water flow. In addition, there is an approximately 0.2-acre area within the Project footprint that would remain part of the Mission Bay Park developed area. Overall, the Project encompasses an approximate 9.9-acre footprint.

The Mission Bay Park Master Plan Update identifies Cudahy Creek as one of three locations for restoration of tidal wetlands (City of San Diego 2021). The Project is part of a bay-wide improvement plan that is analyzed in the Mission Bay Park Improvements Programmatic Environmental Impact Report (PEIR) for multiple prioritized improvement projects within the Mission Bay Improvement Zone (Improvement Zone). The overall Improvement Zone includes portions of Tecolote Creek, Cudahy Creek, and the San Diego River as it passes through the boundaries of Mission Bay Park.

The Project site is located along the eastern shoreline of Mission Bay, north of Leisure Lagoon, south of the old Information/Visitor's Center, and west of East Mission Bay Drive. A total of three existing habitats and land cover types were mapped within the wetland restoration area including beach, open water, and developed land. Approximately 8.1 acres of open water, considered a wetlands under the jurisdiction of the U.S. Army Corps of Engineers, the Regional Water Quality Control Board, and the California Coastal Conservancy, and approximately 0.60 acres of beach is considered wetlands per the City of San Diego's Biology Guidelines (City of San Diego 2018). Approximately 8.1 acres of open water is considered a non-wetland water under the jurisdiction of the U.S. Army Corps of Engineers, the Regional Water Quality Control Board, and the California Coastal Conservancy, and approximately 0.60 acres of beach is considered a non-wetland water under the jurisdiction of the California Coastal Conservancy. The restoration of saltmarsh would provide substantial functional lift and habitat value, resulting in a net increase of wetland function.

The proposed native plant communities and wildlife habitat are intended to become self-sustaining with a minimum of long-term management activities, in perpetuity. Portions of the Project area nearest the outfall structure of Cudahy Creek, approximately 0.3 acres, are designated for infrastructure access and maintenance.

The Plan outlined herein provides guidelines for the restoration of approximately 5.49 acres of saltmarsh, 1.2 acres of subtidal channels, a 0.5-acre berm (with a low saltmarsh plant palette), and 2.93 acres of submerged outer slope for an approximate total of 9.4 acres water quality improvement (within the approximately 9.9-acre development footprint)that would increase habitat and aquatic functions and values within Mission Bay.

This Plan presents information on baseline conditions, restoration and design grading approaches, installation procedures, maintenance, monitoring, reporting, and performance standards that are necessary for successful establishment of self-sustaining wetlands functions and values.

# 1 PROJECT DESCRIPTION

## 1.1 RESPONSIBLE PARTIES

**Applicant/Permittee**

City of San Diego
Engineering and Capital Projects
8525 Gibbs Drive, Suite 302

**San Diego, California 92123**

Park and Recreation Department
9485 Aero Dr.,
San Diego, California 92123

**Engineering Consultant**

Rick Engineering Company
5620 Friars Road
San Diego, California 92110
Phone: 619.291.0707

**Biological Consultant**

Dudek
2280 Historic Decatur Road
San Diego, California 92106
Phone: 760.479.4189

## 1.2 PROJECT BACKGROUND

Proposition C was approved on November 4, 2008, which amended the City of San Diego (City) Charter by adding Section 55.2. Proposition C created the Mission Bay Park Improvement Fund for projects identified within the approximately 4,387-acre Mission Bay Park Improvement Zone (Improvement Zone). The Improvement Zone includes portions of Tecolote Creek, Cudahy Creek, and the San Diego River as it passes through the boundaries of Mission Bay Park.

The Cudahy Creek Wetlands Restoration Project (Project) is a component of the Mission Bay Park Improvements Program (Program), which is analyzed in the Mission Bay Park Improvements

Programmatic Environmental Impact Report (PEIR); Cudahy Creek is one of several water quality and habitat projects that are planned within the Improvement Zone. The ultimate goal is to enhance the conditions of the Improvement Zone for the enjoyment of residents and visitors. As part of the PEIR, preliminary engineering reports are being prepared for North Fiesta Island, Tecolote Creek, Leisure Lagoon Marsh (i.e., Cudahy Creek), Shoreline Restoration, Habitat Preservation, Bike Ped Paths and Bridges, Seawall Restoration, and Deferred Maintenance. The preliminary engineering reports provide the basis of design for the restoration projects.

The Mission Bay Park Master Plan Update identifies the Cudahy Creek wetland area (Figure 1, Project Location, and Figure 2, Project Site) as one of three locations for restoration of tidal wetlands where the ultimate wetland area should be derived by balancing water quality, flood control, aquatic restoration, and public safety (City of San Diego 2002). A preliminary analysis of the constraints and opportunities to provide wetland treatment at Cudahy Creek was prepared by Merkel & Associates Inc. (Merkel 2003), which included the preparation of a cursory level, conceptual design for saltmarsh within the cove. In March 2021, Rick Engineering prepared a preliminary engineering report for Cudahy Creek that provides updated hydraulic analysis to estimate water quality improvement performance at the proposed wetland area during storm events, and to provide engineering and design parameters; this report is included as Appendix A of this Conceptual Habitat Restoration and Monitoring Plan (Plan).

The following sections of this Plan outline the restoration workplan of the Project, including the restoration of coastal tidal saltmarsh habitat (Figure 3, Conceptual Site Plan). This restoration effort supports the zonation of aquatic resources that benefit all trophic levels from macroinvertebrate species on the low end of the food chain to diverse avian species that preferentially feed within specific habitat types. The grading design provides for a gentle transition from the wetland restoration area into adjacent restoration areas around the Project fringe. The gentle transition creates space for the expression of mid and high saltmarsh species within the Project footprint.

# 2 REGULATORY SETTING

Federal, state, and local agencies enforce jurisdiction over portions of proposed restoration sites of in areas immediately adjacent to restoration sites, In addition, some sites support populations of listed species thar are regulated by federal and/or state agencies. In some cases, these species are covered under the City's MSCP. Where coverage is not provided, an informal consultation would be required with the potential for permit applications and permit acquisition prior to project implementation.

## 2.1 FEDERAL

### 2.1.1 FEDERAL ENDANGERED SPECIES ACT

The federal Endangered Species Act (FESA) of 1973 (16 USC 1531 et seq.), as amended, is administered by the U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration, and National Marine Fisheries Service. This legislation is intended to provide a means to conserve the ecosystems upon which endangered and threatened species depend and provide programs for the conservation of those species, thus preventing extinction of plants and wildlife. Under provisions of Section 9(a)(1)(B) of FESA, it is unlawful to "take" any listed species. "Take" is defined in Section 3(19) of FESA as, "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." FESA provides for designation of critical habitat for species designated as endangered, defined in Section 3(5)(A) as specific areas within the geographical range occupied by a species where physical or biological features "essential to the conservation of the species" are found and "which may require special management considerations or protection." Critical Habitat may also include areas outside the current geographical area occupied by the species that are nonetheless "essential for the conservation of the species."

The FESA allows for the issuance of "incidental take" permits for listed species under Section 7, which is generally available for components that also require other federal agency permits or other approvals, and under Section 10, which provides for the approval of habitat conservation plans on private property without any other federal agency involvement. Incidental take is defined as "take that results from, but is not the purpose of, carrying out an otherwise lawful activity" (50 CFR, Parts 17.22 and 17.32).

### 2.1.2 MIGRATORY BIRD TREATY ACT

The Migratory Bird Treaty Act (MBTA) prohibits the take of any migratory bird or any part, nest, or eggs of any such bird. Under the MBTA, "take" is defined as pursue, hunt, shoot, wound, kill trap, capture, or collect, or any attempt to carry out these activities (16 USC 703 et seq.). The number of bird species covered by the MBTA is extensive; the species are listed in Title 50 of the Code of Federal Regulations, Part 10.13. The regulatory definition of "migratory bird" is broad and includes any mutation or hybrid of a listed species, and also includes any part, egg, or nest of such birds (50 CFR 10.12). The MBTA, which is enforced by USFWS, makes it unlawful "by any means or in any manner, to pursue, hunt, take, capture, [or] kill" any

migratory bird or attempt such actions, except as permitted by regulation. The applicable regulations prohibit the take, possession, import, export, transport, sale, purchase, barter, or offering of these activities, except under a valid permit or as permitted in the implementing regulations (50 CFR 21.11). Additionally, Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds," requires that any component with federal involvement address impacts of federal actions on migratory birds with the purpose of promoting conservation of migratory bird populations (66 FR 3853–3856). The Executive Order requires federal agencies to work with USFWS to develop a memorandum of understanding. USFWS reviews actions that might affect these species.

Currently, birds are considered to be nesting under the MBTA only when there are viable eggs or chicks, which are dependent on the nest.

Local implementation of the MBTA typically involves a qualified biologist conducting a nesting bird survey prior to construction activities between February 1 and September 15. Such surveys are required in all construction areas where natural or ornamental trees, shrubs, and ground cover may provide suitable nesting habitat for protected species. A nest avoidance buffer, as determined by the qualified biologist, would be established and serve to protect active nests from direct and indirect disturbance until breeding activities have been completed.

### 2.1.3 COASTAL ZONE MANAGEMENT ACT OF 1972

The Coastal Zone Management Act of 1972 (16 USC Sections 1451–1464, Chapter 33) is administered by the National Oceanic and Atmospheric Administration's Office of Ocean and Resource Management and was established as a national policy to preserve, protect, develop, and – where possible – enhance or restore the coastal zone in the United States. The federal consistency provision, Section 307 of the Coastal Zone Management Act, encourages states to join the Coastal Zone Management Program, which takes a comprehensive approach to coastal resource management by balancing the competing and/or conflicting demands of coastal resource use, economic development, and conservation and allows states to issue the applicable permits. California has a federally approved Coastal Zone Management Program, and the Coastal Zone Management Act is administered by the California Coastal Commission (CCC). Therefore, the Coastal Zone Management Program and permit requirements are discussed further in the California Coastal Act section below.

## 2.2 STATE

### 2.2.1 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act (CEQA) requires identification of a project's potentially significant impacts on biological resources and feasible restoration measures and alternatives that could avoid or reduce significant impacts. CEQA Guidelines Section 15380(b)(1) defines endangered animals or plants as species or subspecies whose "survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors" (14 CCR 15000 et seq.). A rare animal or plant is defined in CEQA Guidelines Section

15380(b)(2) as a species that, although not presently threatened with extinction, exists "in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens; or … [t]he species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered 'threatened' as that term is used in the federal Endangered Species Act." Additionally, an animal or plant may be presumed to be endangered, rare, or threatened if it meets the criteria for listing, as defined further in CEQA Guidelines Section 15380(c). CEQA also requires identification of a project's potentially significant impacts on riparian habitats (such as wetlands, bays, estuaries, and marshes) and other sensitive natural communities, including habitats occupied by endangered, rare, and threatened species.

### 2.2.2 CALIFORNIA COASTAL ACT

The CCC was established by voter initiative in 1972 and was made permanent by the California Legislature through the adoption of the California Coastal Act of 1976 (CCA; California Public Resources Code Section 30000 et seq.). The CCC, in partnership with coastal cities and counties, plans and regulates the use of land and water in the coastal zone. Under the CCA, cities and counties are responsible for preparing local coastal programs in order to obtain authority to issue coastal development permits for projects within their jurisdiction. Local coastal programs consist of land use plans, zoning ordinances, zoning maps, and other implementing actions that conform to the policies of the CCA. Until an agency has a fully certified local coastal program, the CCC is responsible for issuing coastal development permits.

Under the CCA, Section 30107.5, environmentally sensitive habitat areas are areas within the coastal zone that are "designated based on the presence of rare habitats or areas that support populations of rare, sensitive, or especially valuable species or habitats." In addition, the CCC regulates impacts to coastal wetlands defined in Section 30121 of the CCA as, "lands within the coastal zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens." The CCA requires that most development avoid and buffer coastal wetland resources in accordance with Sections 301231 and 30233, including limiting the filling of wetlands to certain allowable uses.

The Biological Study Area (BSA) is located entirely within the coastal zone.

### 2.2.3 CALIFORNIA ENDANGERED SPECIES ACT

The California Department of Fish and Wildlife (CDFW) administers the California Endangered Species Act (CESA; California Fish and Game Code [CFGC], Section 2050 et seq.), which prohibits the "take" of plant and animal species designated by the Fish and Game Commission as endangered or threatened in the State of California. Under CESA Section 86, "take" is defined as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA Section 2053 stipulates that state agencies may not approve projects that would "jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available consistent with conserving the species or its habitat which would prevent jeopardy."

CESA Sections 2080 through 2085 address the taking of threatened, endangered, or candidate species by stating, "No person shall import into this state, export out of this state, or take, possess, purchase, or sell within this state, any species, or any part or product thereof, that the Commission determines to be an endangered species or a threatened species, or attempt any of those acts, except as otherwise provided in this chapter, the Native Plant Protection Act (CFGC, Sections 1900–1913), or the California Desert Native Plants Act (Food and Agricultural Code, Section 80001)." Take authorization for otherwise lawful activities may be obtained from CDFW under Section 2081 of the CFGC.

### 2.2.4 CALIFORNIA FISH AND GAME CODE

According to Sections 3511, 4700, 5050, and 5515 of the CFGC, which regulate birds, mammals, reptiles and amphibian, and fish, respectively, a "fully protected" species may not be taken or possessed without a permit from the CFGC, and, with few exceptions, take of these species is prohibited.

According to Section 3503, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Section 3503.5 states that it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto. Section 3513 states that it is unlawful to take or possess any migratory nongame bird as designated in the MBTA.

The Native Plant Protection Act of 1977 (CFGC, Section 1900 et seq.) gives CDFW authority to designate state endangered, threatened, and rare plants, and provides specific protection measures for identified populations.

## 2.3 LOCAL REGULATIONS AND CONSERVATION PLANS

### 2.3.1 SAN DIEGO MULTIPLE SPECIES CONSERVATION PROGRAM

The City is a participant in the San Diego Multiple Species Conservation Program (MSCP), a comprehensive, regional long-term habitat conservation program designed to provide permit issuance authority for take of covered species to the local regulatory agencies. The MSCP addresses habitat and species conservation within approximately 900 square miles in the southwestern portion of San Diego County. It serves as an approved habitat conservation plan pursuant to an approved Natural Communities Conservation Plan in accordance with the state Natural Communities Conservation Planning Act.

The MSCP establishes a preserve system designed to conserve large blocks of interconnected habitat having high biological value that are delineated in Multi-Habitat Planning Areas (MHPAs). The City MHPA is a "hard line" preserve developed by the City in cooperation with the wildlife agencies, property owners, developers, and environmental groups. The MHPA identifies biological core resource areas and corridors targeted for conservation, in which only limited development may occur (City of San Diego 1997).

The MSCP identifies 85 plants and animals to be "covered" under the plan (termed Covered Species). Many of these Covered Species are subject to one or more protective designations under state and/or federal law and some are endemic to San Diego. The MSCP seeks to provide adequate habitat in the preserve to maintain ecosystem functions and persistence of extant populations of the 85 Covered Species while also allowing participating landowners "take" of Covered Species on lands located outside of the preserve. The purpose of the MSCP is to address species conservation on a regional level and thereby avoid component-by-component biological restoration, which tends to fragment habitat.

### 2.3.2 CITY OF SAN DIEGO MSCP SUBAREA PLAN

The City of San Diego MSCP Subarea Plan (Subarea Plan) (City of San Diego 1997) encompasses 206,124 acres within the MSCP Subregional Plan area. The proposed study area is located within the Urban areas of the Subarea Plan. The Urban habitat areas within the MHPA include existing designated open space such as Mission Bay, Tecolote Canyon, Marian Bear Memorial Park, Rose Canyon, San Diego River, the southern slopes along Mission Valley, Carroll and Rattlesnake Canyons, Florida Canyon, Chollas Creek, and a variety of smaller canyon systems. The Southern area includes Otay Mesa, Otay River Valley, and Tijuana Estuary and Tijuana River Valley. The Eastern area includes East Elliott and Mission Trails Regional Park.

The Subarea Plan is characterized by urban land uses with approximately three-quarters either built out or retained as open space/park system. Portions of the BSA are located within and adjacent to MHPA boundaries (City of San Diego 1997, Figure 33, City of San Diego MSCP Subarea and MHPA). The MHPA is considered an urban preserve that is constrained by existing or approved development and is comprised of habitat linkages connecting several large core areas of habitat. The criteria used to define core and linkage areas involves maintaining ecosystem function and processes, including large animal movement. Each core area is connected to other core areas or to habitat areas outside of the MSCP either through common boundaries or through linkages. Core areas have multiple connections to help ensure that the balance in the ecosystem would be maintained (City of San Diego 1997). Critical habitat linkages between core areas are conserved in a functional manner with a minimum of 75% of the habitat within identified linkages conserved (City of San Diego 1997).

### 2.3.3 CITY OF SAN DIEGO LAND DEVELOPMENT CODE – ENVIRONMENTALLY SENSITIVE LANDS REGULATION AND BIOLOGY GUIDELINES

The City of San Diego Development Services Department (DSD) developed the City of San Diego Biology Guidelines (SDBG) presented in the Land Development Manual "to aid in the implementation and interpretation of ESL [Environmentally Sensitive Lands] Regulations, San Diego LDC [Land Development Code], Chapter 14, Division 1, Section 143.0101 et seq., and the Open Space Residential (OR-1-2) Zone, Chapter 13, Division 2, Section 131.0201 et seq." (City of San Diego 2018a). The guidelines also provide standards for the determination of impact and mitigation under CEQA and the CCA. Sensitive biological resources, as defined by ESL Regulations, include lands within the MHPA, as discussed in Section 1.3.3 of this report, as well as other lands outside of the MHPA that contain wetlands; vegetation communities classifiable as Tier I, II, IIIA, or IIIB; habitat for rare, endangered, or threatened species; or narrow endemic species. The San Diego Municipal Code ranks upland habitat values by rarity and sensitivity. The most

sensitive habitats are Tier I, and the least sensitive are Tier IV. The varying restoration ratios and requirements that restoration be either in-tier or in-kind are based on the sensitivity of the habitat being affected.

The City's definition of wetlands is broader than the definition applied by the U.S. Army Corps of Engineers (USACE). According to the SDBG (City of San Diego 2018a), City wetlands include areas characterized by one or more of the following conditions:

1. All areas persistently or periodically containing naturally occurring wetland vegetation communities characteristically dominated by hydrophytic vegetation, including but not limited to salt marsh, brackish marsh, freshwater marsh, riparian forest, oak riparian forest, riparian woodlands, riparian scrub, and vernal pools;
2. Areas that have hydric soils or wetland hydrology and lack naturally occurring wetland vegetation communities because human activities have removed the historic wetland vegetation or catastrophic or recurring natural events or processes have acted to preclude the establishment of wetland vegetation as in the case of salt pannes and mudflats;
3. Areas lacking wetland vegetation communities, hydric soils, and wetland hydrology due to non-permitted filling of previously existing wetlands; or
4. Areas mapped as wetlands on Map C-713 as shown in Chapter 13, Article 2, Division 6 (Sensitive Coastal Overlay Zone).

Per the SDBG, areas that contain wetland vegetation, soils, or hydrology created by human activities in historically non-wetland areas do not qualify as wetlands under the City's definition unless they have been delineated as wetlands by the USACE and/or CDFW (City of San Diego 2018a). Artificially created wetlands consist of the following: wetland vegetation growing in brow ditches and similar drainage structures outside of natural drainage courses; wastewater treatment ponds; stock watering, desiltation, and retention basins; water ponding on landfill surfaces and road ruts created by vehicles; and artificially irrigated areas that would revert to uplands if the irrigation ceased. Previously dredged tidal areas, such as Mission Bay, should be considered wetlands under ESL Regulations (City of San Diego 2018a).

Guidelines that supplement the development regulation requirements described in this section are provided in the SDBG (City of San Diego 2018a). The Program is located entirely within the Coastal Overlay Zone (COZ), and therefore wetlands within the BSA would require adherence to the COZ wetland buffer regulations (City of San Diego 2018a). According to the SDBG, a wetland buffer is an area surrounding a wetland that helps protect the function and value of the adjacent wetland by reducing physical disturbance, provides a transition zone where one habitat phases into another, and acts to slow flood waters for flood and erosion control, sediment filtration, water purification, and groundwater recharge (City of San Diego 2018a). Within the COZ, wetland buffers should be provided at a minimum of 100 feet wide adjacent to all identified wetlands within the COZ. The width of the buffer may be either increased or decreased as determined on a case-by-case basis, in consultation with the CDFW, USFWS, and the USACE The width of the buffer is determined by factors such as type and size of development, sensitivity of the wetland resource

to edge effects, topography, and the need for upland transition (City of San Diego 2018a). Per ESL Regulations, uses permitted in wetlands within the COZ are limited to aquaculture, wetlands-related scientific research and wetlands-related educational uses; wetland restoration components where the primary purpose is restoration of the habitat; and incidental public service components, where it has been demonstrated that there is no feasible less environmentally damaging location or alternative, and where restoration measures have been provided to minimize adverse environmental effects. Also per ESL Regulations, permitted uses in wetland buffer areas shall be limited to public access paths, fences, restoration and enhancement activities, and other improvements necessary to protect wetlands. ESL Regulations also lists permitted uses and developmental regulations for steep hillsides, coastal bluffs, coastal beaches, and special flood hazard areas.

### 2.3.4 CITY OF SAN DIEGO GENERAL PLAN

The proposed component is located in the City of San Diego and therefore is subject to the goals and policies in the City's General Plan. The General Plan was adopted in March 2008, and was most recently amended in July 2024. The General Plan provides policy guidance to balance the needs of a growing city while enhancing the quality of life for current and future San Diegans. It includes the City of Villages strategy which outlines how the City can enhance its many communities and neighborhoods as growth occurs over time. The General Plan contains 11 elements that provide a comprehensive "blueprint" for the City's growth over the next 20 plus years. As shown in the General Plan land use map (City of San Diego 2024a, Figure LU-2), the component site is located in an area that is designated as Park, Open Space, and Recreation.

### 2.3.5 MISSION BAY PARK MASTER PLAN

The component site falls within the boundaries of Mission Bay Park—a regional park that serves the residents of and visitors to San Diego. The MBPMP was adopted on August 2, 1994, and was most recently updated on November 23, 2021 (City of San Diego 2021. The MBPMP serves as the local coastal program for this area of the City. The proposed component is subject to the goals and recommendations established in the MBPMP, and the proposed component would be incorporated into the MBPMP as an amendment. The MBPMP recommends that the proposed study area should serve regional recreation needs, including guest housing (recreational vehicles and other low cost camping facilities); improve the park's water quality, including creating additional wetlands; facilitate hydrologic improvements to safeguard the viability of marsh areas; provide a waterfront trail, viewing areas, and other passive recreational features to enhance public use of the component area; ensure leaseholds support the Mission Bay recreation use; improve access to recreational uses; and improve play areas for regional recreational needs.

### 2.3.6 THE "WHITEBOOK"

The City of San Diego published *The "Whitebook" Standard Specifications for Public Works Construction* (City of San Diego 2021b), which includes many standard practices that result in minimization of impacts to biological resources, including biological monitoring, materials suitability, safe construction methods, avian nest protection, tree protection, landscape standards, and stormwater protection measures. The "Whitebook" prescribed measures and standards are incorporated into the Program as Environmental Protocols.

INTENTIONALLY LEFT BLANK

# 3 RESTORATION PROGRAM

The following are overall goals for the Mission Bay Park Improvements Program, which are based, in part, on the goals of Section 55.2 of Article V of the City of San Diego City Charter:

1 Restoration of navigable waters within Mission Bay Park and elimination of navigational hazards. When depth conditions no longer support and ensure safe navigation, those areas that pose a danger or impede the passage of watercraft would be dredged in accordance with the Mission Bay Baseline Chart.

2 Wetland expansion and water quality improvements and the protection and expansion of eelgrass beds as identified in the Mission Bay Park Master Plan.

3 Restoration of shoreline treatments within the Mission Bay Park Improvement Zone including restoration of beach sand and stabilization of erosion control features.

4 Expansion of endangered or threatened species preserves and upland habitats on North Fiesta Island and along the levee of the San Diego River floodway as identified in the Mission Bay Park Master Plan.

5 Completion of bicycle and pedestrian paths and bridges as identified in the Mission Bay Park Master Plan, installation of sustainable lighting in the Mission Bay Park Improvement Zone, installation of signage and landscaping at points of entry to Mission Bay Park and the South Shores, and the repair, resurfacing and restriping of parking lots within the Mission Bay Park Improvement Zone.

6 Deferred maintenance that are also Capital Improvements hereunder on existing assets within the Mission Bay Improvement Zone as may be recommended by the Mission Bay Park Improvement Fund

The Project is designed with the primary goal of complying with the Mission Bay Park Improvements Program. The Mission Bay Park Master Plan includes the following key recommendation for water quality (San Diego 2021a):

> "It is broadly recognized that the Park's economic and recreational future depends on the quality of the Bay's water. In response to fluctuating quality of the Bay waters, this Plan proposes a comprehensive set of measures involving state-of-the-art biological, mechanical, public education and recreation management programs. Biological measures include the establishment of salt-water marshes that can naturally filter pollutants as they enter the Bay through the creeks that drain the Bay's watershed…"

More precisely, the objectives for the Project are to:

- Create multi-gradient saltmarsh to include subtidal channels, low-level (low) saltmarsh, mid-level (mid) saltmarsh, high-level (high) saltmarsh, and transitional habitat.
- Create a berm that would serve to contain water within the wetland area and promote biological filtration of stormwater runoff before entering Mission Bay open waters to improve water quality.
- Provide increased habitat functions and aquatic functions that benefit all trophic levels from macroinvertebrate species on the low end of the food chain to diverse avian species that preferentially feed within specific upland habitat types.
- Create a slope that connects to the existing elevations of the seafloor and utilize oyster bags, oyster panels, or similar product to promote the growth of the oysters providing slope stabilization and improved water quality.
- Provide appropriate upland erosion control on all upland areas surrounding the Project.
- Prevent any impacts to threatened or endangered native wildlife species through appropriate minimization measures.
- Restore self-sustaining native saltmarsh communities in a wetland configuration that reduces the need for maintenance except at localized infrastructure features (e.g., the outfall of Cudahy Creek) while creating sustainable storm drain conveyance through the wetland habitat to the open water area of Mission Bay.

## 3.1 TARGET HABITAT TYPES TO BE ESTABLISHED

The Project would create 5.49 acres of tidal saltmarsh habitat including gradated areas of low, mid and high marsh vegetation communities, 0.5 acres of berm that would include mid saltmarsh habitat, 1.2 acre of subtidal channel, and 2.93 acres of submerged outer slope consisting of reef and oyster bed matrix that is suitable for fish forage habitat. Plant palettes and installation details are presented in Section 6.3 for each vegetation community. An Eelgrass Conceptual Habitat Restoration and Monitoring Plan for the Improvement Zone provides the approach for all eelgrass restoration that would implemented for this Project.

## 3.2 PROJECT IMPACTS TO AQUATIC RESOURCES

The purpose of the Project is to restore approximately 9.4 acres of wetland by modifying existing open water, beach, and developed areas within the Project site. Modifications would include creating tidal saltmarsh, subtidal channels, an outer slope, and berm. Potential adverse effects such as temporal loss, type conversion, and risk/uncertainty would be replaced and overall watershed

ecological function would be improved, resulting in no net loss of aquatic functions. Although the overall area of existing open water would be reduced through Project implementation, the resulting habitat area combines open water channels with various saltmarsh habitat types in a matrix that would produce higher productivity than is currently achieved by open water habitat alone, as well as water quality benefits.

## 3.2.1 JURISDICTIONAL DELINEATION

A jurisdictional delineation was conducted within the approximately 4,387-acre Improvement Zone. A desktop analysis was performed, followed by field analysis at 21 sampling sites. The sites were selected based on vegetation communities and aquatic resources provided from available geographic information system data and were chosen to coincide with the projects outlined in the Improvement Zone. The sampling sites were surveyed to determine the presence or absence of wetland field indicators and jurisdictional resources were mapped within the Improvement Zone (SES 2025).

### 3.2.1.1 Wetland Waters

The City's Land Development Manual Biological Guidelines specifically state that previously dredged tidal areas such as Mission Bay should be considered wetlands under Environmentally Sensitive Lands Regulations (City of San Diego 2018). Therefore, approximately 0.60 acres of beach and 8.1 acres of open water are considered wetland waters under the jurisdiction of the City.

For tidal waters associated with Mission Bay, tidal elevation data provided by the nearest National Oceanic and Atmospheric Administration tidal station (San Diego, Station ID 9410170, located on Broadway Pier/San Diego Bay) was used, along with topographic mapping (NOAA 2024). The extent of waters of the United States, as defined by Section 10 of the Rivers and Harbors Act, was determined to extend up to the mean high water (+4.56 feet above mean sea level, North American Vertical Datum 88). The extent of waters of the United States/state, as defined by Clean Water Act Section 404, the State Porter–Cologne Water Quality Act, and the California Coastal Act, was determined to include all Section 10 waters and additional land up to the highest astronomical tide (+7.19 feet above mean sea level, North American Vertical Datum 88). In some locations there are walls or other vertical features, which resulted in the estimated mean high watermark and high tide line (HTL) being co-located.

Historically, the California Department of Fish and Wildlife (CDFW) has not taken jurisdiction over tidally influenced/marine waters. CDFW has indicated that in general, a line can be drawn around a bay, and the point where a river intersects the bay is where CDFW jurisdiction ends and the resource is considered marine (Weightman, pers. comm. 2017).

#### 3.2.1.2 Non-Wetland Waters

According to the jurisdictional delineation, the Project includes open water and beach. There are approximately 8.1 acres of open water, considered non-wetland waters under the jurisdiction of the U.S. Army Corps of Engineers (USACE), the Regional Water Quality Control Board (RWQCB), and the California Coastal Conservancy (CCC); approximately 0.60 acres of beach, considered non-wetland waters under the jurisdiction of the USACE, RWQCB, and CCC. There is an additional 0.91 acres of developed land and 0.33 acres of beach considered non-jurisdictional. The Project would affect a total of 8.70 acres of jurisdictional resources (Dudek 2025; SES 2025).

The jurisdictional resources within the Project area, identified as part of the jurisdictional delineation, are presented in Table 1 and shown in Figure 4, Impacts to Jurisdictional Resources.

**Table 1**
**Jurisdictional Resources within the Cudahy Creek Project Area**

| Existing Habitat | SDBG Wetland Vegetation Community | Agency Jurisdiction | Jurisdictional Acreage |
|---|---|---|---|
| *Wetlands Waters*[1] | | | |
| **Beach** | Marine Habitats | City of San Diego | 0.60 |
| **Open Water** | Marine Habitats | City of San Diego | 8.1 |
| | | *Subtotal* | *8.70* |
| *Non-Wetland Waters*[1] | | | |
| **Beach** | Marine Habitats | USACE, RWQCB, CCC | 0.60 |
| **Open Water** | Marine Habitats | USACE, RWQCB, CCC | 8.1 |
| | | *Subtotal* | *8.70* |
| | | **Total Jurisdictional Area** | **8.70** |

**Notes**: SDBG = San Diego Biology Guidelines (City of San Diego 2018); CCC = California Coastal Conservancy; USACE = U.S. Army Corps of Engineers; RWQCB = Regional Water Quality Control Board.
[1] The wetland waters, as defined by the City, and the non-wetland waters, as defined by USACE, RWQCB, and CCC, overlap.

### 3.2.2 PROJECT IMPACTS

The Project is one of several component projects within the Mission Bay Improvements Program which may be constructed independently or in association with other projects in accordance with a programmatic Implementation Plan. The analysis of impacts to biological resources is based primarily on the construction footprint identified in this CHRMP. The footprint is based on the total area of proposed improvements including grading, infrastructure, staging areas, and maintenance

areas. Existing biological resources within the footprint is assumed to be directly impacted by the construction of the Project; these impacts to biological resources are identified in this section. A precise comparison of impacts and habitat restoration is not included at this stage due to lack of information regarding the timing of impacts relative to habitat restoration, the precise areas of infrastructure improvements, maintenance areas that would be excluded from mitigation credit, and any mitigation agreements with the resource agencies. These additional details are expected to be included in subsequent approvals, as identified in the programmatic Implementation Plan.

The Project is a restoration project providing 9.44 acres of wetland restoration, approximately 5.49 acres of saltmarsh habitat; 1.02 acre of subtidal channels; 0.5 acres of berm, a portion of which would include saltmarsh habitat and a portion of which would include outer slope; 2.93 acres of submerged outer slope, and 0.3 acres of riprap for a total of 9.74 acres of Project area and a 0.2-acre disturbed upland/developed area (for a total development footprint of 9.94 acres). Jurisdictional wetland waters and non-wetland waters overlap; therefore, there are a total of 8.70 acres of overall effects to jurisdictional resources (8.70 acres of City wetlands, and 8.70 acres of USACE, RWQCB, and CCC non-wetland waters). There are 0.91 acres of effects to developed land and 0.33 acres of effects to beach that are considered non-jurisdictional.

The restoration area would be constructed by filling the open water with approximately 58,000 cubic yards of soil sourced from the other restoration projects within Mission Bay. The open water would be displaced by the fill and contour grading for the saltmarsh habitat. Fill and grading activities would displace invertebrates, fish, and alter avian species' foraging areas. Some biochemical reactions may be impacted in the photic zone of open water where sufficient light penetration allows for photosynthesis. In addition, there may be some minimal indirect impacts to fish, shorebirds, and other wildlife species because of this construction.

The beach would be converted to saltmarsh, which would alter sediment storage and transport, organic material breakdown, macroinvertebrates and other wildlife species, and recreational activities in these areas. Table 2, Proposed Pre-Construction and Post-Construction Jurisdictional Resources, summarizes Project impacts and Figures 2 through 4 depict the location, conceptual site plan, and the Project impacts, respectively.

**Table 2**
**Proposed Pre-Construction and Post-Construction Jurisdictional Resources**

| **Pre-Construction Condition** | | **Post-Construction Conditions** | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Habitat/Land Cover Types* | *Acres* | *Habitat/Land Cover Types* | *Vegetation Communities* | *Mitigation Type*[1] | *Acres* | *Linear Feet* | *Cowardin*[2] | *HGM* |
| *City of San Diego Wetland Waters*[3] | | | | | | | | |
| Beach | 0.60 | Tidal Marsh | Low, transitional, and mid saltmarsh | Restoration | 0.60 | | E2EM1N | Tidal Flat |
| | | Subtidal Channels | N/A | Restoration | >0.01 | | E1UBL | N/A – Open Water |
| Open Water | 8.1 | Tidal Marsh | Low, transitional, and mid saltmarsh | Restoration | 3.86 | | E2 EM1N | Tidal Flat |
| | | Subtidal Channels | N/A | Restoration | 1.02 | | E1UBL | N/A – Open Water |
| | | Outer Slope | N/A | Restoration | 2.92 | | E1RFL | N/A – Vegetated Shallow |
| | | Riprap | N/A | N/A | 0.3 | | N/A | N/A |
| **Total**[4] | **8.7** | | | | **8.7** | | | |

**Table 2**
**Proposed Pre-Construction and Post-Construction Jurisdictional Resources**

| **Pre-Construction Condition** | | **Post-Construction Conditions** | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Habitat/Land Cover Types* | *Acres* | *Habitat/Land Cover Types* | *Vegetation Communities* | *Mitigation Type*[1] | *Acres* | *Linear Feet* | *Cowardin*[2] | *HGM* |
| *USACE, RWQCB, CCC Non-Wetland Waters*[3] | | | | | | | | |
| Beach | 0.60 | Tidal Marsh | Low, transitional, and mid saltmarsh | Rehabilitation/ Restoration | 0.60 | | E2EM1N | Tidal Flat |
| | | Subtidal Channels | N/A | Rehabilitation/ Restoration | >0.01 | | E1UBL | N/A – Open Water |
| Open Water | 8.1 | Tidal Marsh | Low, transitional, and mid saltmarsh | Rehabilitation/ Restoration | 3.86 | | E2 EM1N | Tidal Flat |
| | | Subtidal Channels | N/A | Rehabilitation/ Restoration | 1.02 | | E1UBL | N/A – Open Water |
| | | Outer Slope | N/A | Rehabilitation/ Restoration | 2.92 | | E1RFL | Tidal Fringe |
| | | Riprap | N/A | N/A | 0.3 | | N/A | N/A |
| **Total**[4] | **8.7** | | | | **8.7** | | | |
| *Non-Jurisdictional* | | | | | | | | |
| Beach | 0.33 | Tidal Marsh | Low, transitional, and mid saltmarsh | Re-establishment/ Restoration | 0.33 | | E2EM1N | Tidal Flat |

**Table 2**
**Proposed Pre-Construction and Post-Construction Jurisdictional Resources**

| **Pre-Construction Condition** | | **Post-Construction Conditions** | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Habitat/Land Cover Types* | *Acres* | *Habitat/Land Cover Types* | *Vegetation Communities* | *Mitigation Type*[1] | *Acres* | *Linear Feet* | *Cowardin*[2] | *HGM* |
| Developed | 0.91 | Tidal Marsh | Low, transitional, and mid saltmarsh | Re-establishment/ Restoration | 0.70 | | E2EM1N | Tidal Flat |
| | | Outer Slope | N/A | Re-establishment/ Restoration | 0.01 | | E1RFL | N/A – Vegetated Shallows |
| | | Disturbed Upland/ | N/A | N/A | 0.20 | | N/A | N/A |
| **Total**[4] | **1.24** | | | | **1.24** | | | |
| **Overall Total**[4] | **9.94** | | | | **9.94** | | | |

**Notes**: HGM = Hydrogeomorphic Method; USACE = U.S. Army Corps of Engineers; RWQCB = Regional Water Quality Control Board; CCC = California Coastal Commission; N/A = not applicable.

1 USACE and RWQCB define the mitigation type as rehabilitation or re-establishment (a form of restoration), and CCC and City of San Diego define the mitigation type as restoration.

2 Source: Cowardin et al. 1979.

3 Note the wetland waters and the non-wetland waters overlap.

4 Acreage amounts may not match total due to rounding.

# 4 SITE SELECTION CRITERIA

Mission Bay is an important resource within coastal San Diego, providing low-cost public recreation to San Diego County residents. Past emphasis on recreation has degraded environmental conditions associated with water quality and wildlife habitat that are equally essential functions of the bay. Selection of the Project location is keyed to incoming waters from former tributaries of the San Diego River, including Tecolote Creek and Cudahy Creek. These entry points are considered the optimal locations where water quality improvements are possible using biological filtration from restored self-sustaining native saltmarsh vegetation communities, and mudflats that support macro-benthic invertebrate populations.

Cudahy Creek is located within the Smiley Lagoon–Mission Bay subwatershed, encompassing 67 square kilometers of highly-urbanized area within San Diego, primarily located in the Clairemont Neighborhood. Land use within the subwatershed consists of single-family residential with some multifamily residential, commercial businesses, recreational and park, and natural land uses. Streets and a well-maintained stormwater conveyance system collect runoff from approximately 864 acres and convey the stormwater to Mission Bay under Interstate 5 to two pipe outfalls within the Project area.

INTENTIONALLY LEFT BLANK

# 5 BASELINE CONDITIONS

Baseline conditions are included in this section and are used to help determine the appropriate success criteria, as well as guide restoration design, installation, and maintenance.

## 5.1 LOCATION

Mission Bay is a resource-based park with public recreational areas with access to open water with beaches for swimming, wading, and water sports. Cudahy Creek is located along the eastern shoreline of Mission Bay, north of Leisure Lagoon and south of the old Information/Visitor's Center, west of East Mission Bay Drive (see Figure 1 and Figure 2). Fiesta Bay surrounds the Project site to the west and developed land to the east. The Project site is located within the coastal zone on the U.S. Geological Survey 7.5-minute La Jolla quadrangle map in Township 16 South, and Range 3 West Section 17.

## 5.2 TOPOGRAPHY AND BATHYMETRY

Topographic data was obtained from the U.S. Geological Survey 2014 Light Detection and Ranging survey. Bathymetry data was obtained from the Mission Bay Park 2013 Bathymetry and Eelgrass Inventory (Merkel 2013). The on-site elevation ranges from 5 to 0 feet above sea level on land and 0 (at sea level) to 10 feet below sea level under water (Figure 7, Topography). The developed land to the east is relatively flat for about 0.5 miles and then the terrain transitions to hills and canyons. Runoff from the canyons is directed into storm drains that outlet into Mission Bay.

## 5.3 HYDROLOGY

Cudahy Creek is within the San Diego watershed Hydrologic Unit Code 8 18070304, a sub-watershed of Mission Bay, Smiley Lagoon–Mission Bay Hydrologic Unit Code 12- 180703041102 (Figure 8, Hydrologic Setting). Cudahy Creek is surrounded by development to the east and open water to the west. The site receives water by Pacific Ocean tides, and receives additional water from precipitation that flows through the surrounding canyons and urbanized areas of the San Diego area and enter Mission Bay through two main outfalls, on the north and south ends of the site (Figure 9, Project Area Outfalls and Storm Drain System).

Two storm drain networks connect to the Cudahy Creek Cove area. The first, Cudahy Creek, outlets though a triple-reinforced concrete box (6 feet wide by 5 feet high). This southern storm drain extends east beneath Interstate 5 and continues in an easterly direction, collecting runoff from approximately 415 acres (see Figure 9). The outfall discharges onto a riprap pad before flowing into Mission Bay open waters within the Project area. The second network, the northern outfall, is a

dual-reinforced 72-inch concrete pipe. The drainage area extends northeast beneath Interstate 5 and continues in a northeasterly direction, collecting runoff from approximately 449 acres. The outfall discharges directly into Mission Bay open water within the Project area. Figure 9 displays the approximate Project area and the location of the two main storm drain outlets.

There are sand bar areas present in the vicinity of Cudahy Creek during periods of low tide. Similarly, a small sand bar area is located adjacent to and northwest of the dual-reinforced concrete pipe outlet (Figure 9). The upland areas adjacent to these discharge pipe outfalls are turf covered and, in some cases, there are asphalt parking areas used by day visitors. All facilities are maintained by the City Parks and Recreation Department.

The remainder of the Project area consists of an approximately 8.1-acre portion of Mission Bay open water and the adjacent shoreline that is subject to tidal influence and the tidal flow patterns of Mission Bay.

Four pressure gauges were placed at subtidal locations to collect tide measurements as part of the Mission Bay PEIR Hydrology Study (Moffat & Nichol 2019a). These measurements were used to assess the tidal behavior of Mission Bay at the Project site. No anomalous behavior of Mission Bay tides was identified in comparison with tidal measurements from the La Jolla, California Station 9410230 (NOAA 2019). There is virtually no measurable difference between bay tides and those of the ocean (Appendix A.)

### 5.3.1 HYDROLOGIC ANALYSIS

A hydrologic analysis (Appendix A) was performed to determine hydraulic characteristics for the Project design, including water surface elevations and channel velocities for the 10-year storm event and the 100-year storm event. Different models were created with varying downstream water surface elevations to account for full range of expected tide levels.

The hydraulic modeling revealed that stormwater flow would travel at high velocities when it enters the restoration area from the two outfall locations. Riprap revetment would be placed at the base of each outfall to stabilize the subtidal channels at these locations and prevent the need for continuous maintenance for erosion and degradation within the channels. Additionally, tidal ebb and flood into and out of the restoration area at the connection point to Mission Bay would have varying velocities depending on the stage of the tide. Riprap revetment would also be placed at this location to prevent the need for continuous maintenance for erosion and degradation of the berm and subtidal channels. For more information on the hydraulic measurements, performance, and results, see the preliminary engineering report prepared for the Project (Appendix A).

An analysis of tidal mixing was performed to determine areas of Mission Bay where erosive tidal flow occurs (Moffatt & Nichol 2019a). The study also revealed areas of Mission Bay where tidal mixing and water replacement is lacking or absent. The area known as the Northeast Inlet corresponding to the east side of Fiesta Island is one where tidal circulation is limited. Water exchange within the area is very limited, requiring 27.1 days for complete water exchange (Moffatt & Nichol 2019b). The limited tidal circulation in the Project area further compounds water quality issues and the need for water quality improvements in the Project area.

### 5.3.2 SEA-LEVEL RISE

Sea-level rise would result in the migration of existing Mission Bay wetland habitats upward and/or in the landward direction because of the elevated tidal prism. For the purposes of wetland planning, sea water levels under sea-level rise scenarios are projected to approximate tidal elevations that are important to habitat sustainability and public use. Existing sea water level elevations and future elevations by the year 2100, based on the two chosen sea-level rise scenarios (3.6 feet and 7 feet), are provided in Table 3 and summarized below (see also Appendix A).

- **Sea-Level Rise – 3.6 Feet**. Most of the Project site would be subject to tidal inundation during high tides. Under this scenario, the restored saltmarsh habitat would likely transform with less low marsh, and more mudflat, with subtidal habitat. Without raising the elevation of the site by filling or implementing adaptation measures, the site would effectively become mudflat with tidal channels. The exception is the transitional marsh and mid saltmarsh habitat areas that becomes low marsh (Appendix A).
- **Sea-Level Rise – 7.0 Feet**. Under this scenario, the wetlands would be nearly all subtidal and mudflat habitat area. Without raising the elevation of the site by filling or implementing adaptation measures, the site would effectively become mudflat with tidal channels (Appendix A).

**Table 3**
**Change to Habitat Areas in Acres with 3.6 and 7.0 Feet of Sea-Level Rise**

| Proposed Habitats | Designed Acreage | Sea-Level Rise - 3.6 feet | Sea-Level Rise - 7 feet |
|---|---|---|---|
| Subtidal | 4.0 | 4.0 | 4.0 |
| Mudflat | 0 | 3.7 | 5.7 |
| Low Saltmarsh | 3.7 | 2.0 | 0 |
| Mid Saltmarsh | 1.5 | 0 | 0 |
| Transitional marsh | 0.3 | 0 | 0 |

**Table 3**
**Change to Habitat Areas in Acres with 3.6 and 7.0 Feet of Sea-Level Rise**

| Proposed Habitats | Designed Acreage | Sea-Level Rise - 3.6 feet | Sea-Level Rise - 7 feet |
|---|---|---|---|
| Disturbed Habitat/Upland | 0.2 | 0 | 0 |
| Riprap | 0.2 | 0.2 | 0.2 |
| **Total** | **9.9** | **9.9** | **9.9** |

**Source:** Appendix A.

## 5.4 SOIL CONDITIONS

Soils within the restoration site are mapped as "made land" for the areas above the water line, and "lagoon water" within the open water portions of the site (USDA 2021) (Figure 10, Soils). Made land consists of smooth, level areas that have been filled with dredged soils from Mission Bay. The fertility is medium, the permeability is rapid, and the runoff is slow to moderate (NRCS 2021). Considering that Mission Bay is a dredged feature, it is likely that soils at the bay bottom are relatively intact soils from the historic San Diego River estuary.

## 5.5 EXISTING HABITATS AND LAND COVER TYPES

The City's Biology Guidelines categorize existing habitats and land cover types by tier levels to represent the sensitivity of these communities. Three land cover types were mapped within the Project, including beach, open water, and developed land. Beach and open water existing habitats are considered sensitive, per the City's Biology Guidelines (City of San Diego 2018). The existing habitats and land cover types are summarized in Table 4 and the following subsections and depicted on Figure 6.

**Table 4**
**Existing Habitats and Land Cover Types Occurring within Cudahy Creek**

| Existing Habitats and Land Cover Types | City of San Diego Tier Level | Total (acres) |
|---|---|---|
| *Riparian and Wetlands* | | |
| Beach | Wetland | 0.60 |
| Open Water | Wetland | 8.10 |
| *Other Cover Types* | | |
| Beach | N/A | 0.33 |
| Developed | N/A | 0.91 |
| | **Total** | **9.94** |

**Note**: N/A = not applicable.

### 5.5.1 BEACH (WETLAND COMMUNITY, HOLLAND CODE 64400)

Beach habitat is classified as sandy and/or cobbly, mainly unvegetated habitat on coastal strands, lagoons, or lakes (Oberbauer et al. 2008). Beach habitat occurs along most of the shoreline of Mission Bay and along 0.93 acres of the Project footprint. While primarily unvegetated, some species such as woolly seablite (*Suaeda taxifolia*), occur on the beach area at the Cudahy Creek restoration area. Approximately 0.33 acres of beach is considered a Tier IV upland above the HTL, and approximately 0.60 acres of beach is considered a USACE, RWQCB, and City wetland below the HTL.

### 5.5.2 OPEN WATER (WETLAND COMMUNITY, HOLLAND CODE 64110)

Open water occurs away from the shoreline within Mission Bay and consists of a soft bottom that may be vegetated with eelgrass (*Zostera marina*), or unvegetated. Open water occupies approximately 8.1 acres within the Project footprint. According to the biological technical report prepared for the Project, there is no eelgrass located within the footprint of the Cudahy Creek restoration area (Dudek 2025).

### 5.5.3 DEVELOPED LAND (HOLLAND CODE 12000)

Developed land is the primary terrestrial land cover occurring within the Improvement Zone. Developed areas consist of residential areas, shopping centers, businesses, paved roads, parking lots, and landscaped area and areas with ornamental plantings. Approximately 0.91 acres of developed land occur within the Cudahy Creek restoration area footprint.

Refer to the biological technical report prepared for the Project for more information (Dudek 2025).

## 5.6 SPECIAL-STATUS PLANT SPECIES

One special-status plant species, woolly seablite, was observed within the Cudahy Creek restoration area footprint (Figure 6). This species has a California Rare Plant Rank of category 4.2, indicating that it is a plant of limited distribution and fairly threatened in California, and blooms between January and December. This perennial evergreen shrub occurs in coastal bluff scrub, coastal dunes, and coastal saltmarshes.

## 5.7 WILDLIFE EVALUATION

A total of 142 wildlife species were observed and documented within the Improvement Zone during vegetation mapping surveys, special-status plant surveys, and focused surveys for special-status species. Refer to the biological technical report for more information and a complete list of wildlife

species detected. No special-status wildlife species were observed within the Cudahy Creek wetland restoration area.

According to the Biological Resources Technical Report, there is suitable habitat within and directly adjacent to the wetland restoration area for the federally listed western snowy plover (*Charadrius nivosus nivosus*) and the federally and state-listed California least tern (*Sternula antillarum browni*) (Figure 11, Special-Status Wildlife Species). However, beach areas experience intense public recreational use on weekends and holidays throughout the year and it is doubtful that the existing sand beaches within the Project area are actually suitable for these species. Refer to the biological technical report (Dudek 2025) for additional information.

# 6 SITE PROTECTION MEASURES

Prior to the initiation of restoration activities, fencing and signage would be installed around the perimeters of the site, which would delineate the work areas and prevent unauthorized impacts by the contractor during the installation process. Additionally, this fence would serve to discourage unauthorized pedestrian traffic from entering the wetland restoration area.

During the installation process, work would be monitored by the Project Biologist to ensure compliance with the wetland restoration area boundaries. The Project Biologist would also review the signage and fencing to verify that they are in good repair and functioning as intended. The Project Biologist would make recommendations to the installation contractor if repairs, additions, or other modifications need to be made to the wetland restoration area protection fence, as needed.

During the 5-year maintenance and monitoring period, the wetland restoration area would be restricted from public access and would be delineated with temporary fencing and signage stating the nature of the work within the area and access restrictions, as appropriate.

INTENTIONALLY LEFT BLANK

# 7 RESTORATION PROJECT WORK PLAN

This section describes in detail who would be responsible for each implementation task and how the proposed restoration program would be accomplished.

## 7.1 PROJECT IMPLEMENTATION PERSONNEL

### 7.1.1 PERMITTEE/PROJECT MANAGER

The City of San Diego is the owner/permittee of the Cudahy Creek property. The City would be responsible for restoration installation and would be responsible for the successful implementation of this Plan. The City (or subsequent legal owners) would be financially responsible for the implementation and management of this Project.

### 7.1.2 PROJECT BIOLOGIST

The City would select a qualified Project Biologist who would review the environmental permits, documents, final Plan, and restoration construction documents; and help to ensure that all protective fencing, pre-work bird surveys, and any other required items are adequately performed prior to beginning restoration work.

The Project Biologist would perform site monitoring during restoration implementation and throughout the 5-year maintenance and monitoring period. The Project Biologist would prepare restoration annual reports with required biological data and submit them to the City and the regulatory agencies. The Project Biologist would have a degree in biology, ecology, or related field and be able to demonstrate experience with similar restoration projects in San Diego County. The Project Biologist would possess at least 5 years' habitat restoration experience in Southern California and meet all the requirements as listed in the City's Biology Guidelines.

### 7.1.3 RESTORATION CONTRACTOR

The City would select a qualified Restoration Contractor to implement the restoration installation work and provide subsequent wetland restoration area maintenance. Installation and wetland restoration work would be performed by a contractor possessing a valid California landscape contractor's license (Class C-27), who has previous experience with native habitat restoration in San Diego County, and who can demonstrate at least three successful similar restoration projects in Southern California. The contractor must be able to field implementation crews that can identify San Diego County native plants and common weed species, and demonstrate knowledge of habitat restoration techniques.

The Restoration Contractor would be responsible for conformance to (1) this Plan, and (2) regulatory agency permit requirements. The Restoration Contractor's responsibility for installation would continue until successful completion and final acceptance by the City and the Project Biologist. The Restoration Contractor would not be released from contractual obligations for installation until written notification is received from the City that all required installation tasks as defined in the installation contract, final plans and specifications, this Plan, and the Project permits have been successfully completed.

After initial installation and completion of implementation, the City would contract for 5 years of maintenance services performed by a qualified maintenance contractor that specializes in the maintenance/management of habitat restoration/natural lands. Maintenance work would be performed as indicated herein and per the Project Biologist's recommendations. The City may choose to hire a maintenance contractor that is separate from the Restoration Contractor or replace a contractor that fails to perform work satisfactorily.

### 7.1.4 SEED SUPPLIER

The seed supplier should be a qualified commercial native plant seed supplier, having 2 years' experience collecting seed, experience collecting sources from within the San Diego area, and must have experience collecting seeds from native areas appropriate for this Project. The seed supplier would also meet all the requirements as listed in Bio Guidelines, Land Development Code, and Whitebook (City of San Diego, 2021b).

Conditions for seed collection should follow sound ecological restoration practices. The Project Biologist may substitute plant species should the species listed in this Plan not be available at the time of collection or purchase. Seed collection would comply with all resource agency permits and requirements.

## 7.2 PRELIMINARY DESIGN AND ENGINEERING

### 7.2.1 PROJECT COMPONENTS

The Project includes the restoration of approximately 9.7 acres consisting of low saltmarsh, a transitional marsh, mid saltmarsh, subtidal channels, berm with low saltmarsh, oyster bags, and riprap revetment within Cudahy Creek (see Tables 4 and 7). Saltmarsh vegetation would provide water quality treatment of stormwater and bay water, as well as provide wildlife habitat. A subtidal channel is proposed to convey flows from the existing storm drain outfalls to the open bay water. Riprap revetment is proposed to prevent erosion at the existing outfalls and at the connection of the subtidal channels with the open water in the bay. A berm is proposed along the wetland limits at the open water of the bay to impound freshwater flow and provide a longer residence time for the incoming water to filter through the saltmarsh vegetation before entering the bay. Oyster bag

stabilization is proposed on the outer riprap slope of the Project area where oysters would serve to improve water quality by filtration (an Eelgrass and Oyster Restoration Plan is in progress).

Preliminary 30% design level construction drawings can be found in Appendix A. The drawings are currently in draft phase and are not finalized for construction but provide an understanding of the Project components and layout.

### 7.2.2 PRELIMINARY ACCESS

Land-based construction equipment would access the site from East Mission Bay Drive. Water-based construction equipment would access the site from Fiesta Island. Equipment and materials could be staged in the adjacent parking lot to the north of the site, and a daily staging area adjacent to the site could be located to the west of the concrete pedestrian path to decrease conflicts between pedestrians and construction activities (Appendix A).

### 7.2.3 PRELIMINARY PROJECT SCHEDULE

The City has a beach area construction moratorium for which non-emergency construction activities would not be scheduled. This includes the days preceding and immediately following the Memorial Day, Fourth of July, and Labor Day holidays. This may affect scheduling of the overall Project; however, it is anticipated that it would have minimal affect. The Project construction should be planned around the Construction Moratorium and during the dry season of the year when rain events and discharges at the existing outfall should be at a minimum.

The Project is estimated to be constructed within a total timeframe of 4.5 months if certain conditions are met. Most of the construction is anticipated to occur on dry land using conventional earthmoving equipment. Working in dry conditions can be more efficient and require shorter time periods as compared to working in wet conditions using a dredge. However, when constructing the berm area and connecting confluence of the subtidal channels, work would need to be conducted within Mission Bay utilizing barges. This work, taking place in the wet environment, may take longer than anticipated, depending on the weather and tidal conditions at the time of construction. The construction schedule is shown Appendix A.

## 7.3 SITE PREPARATION AND PLANT INSTALLATION

Site preparation would be conducted under direction from the City and the Project Biologist. Specific site preparation tasks are outlined below. Prior to site preparation, photo points would be identified, and pre-implementation photos taken to document site conditions prior to restoration implementation.

Prior to issuance of land development permits, including clearing, grubbing, grading, and/or construction permits, the Project Applicant or its designee would provide written confirmation that a biological monitor, approved by the City of San Diego, has been retained. To prevent disturbance to areas outside the limits of grading, all grading activities would be monitored by the Project Biologist, including any clearing, grubbing, and/or grading activities within 100 feet of aquatic resources.

### 7.3.1 PLANT SALVAGE

Because of the limited amount of native plant cover, existing native vegetation on site would be salvaged to the greatest extent practicable. Native plant species to be salvaged on site include woolly seablite and any other native marsh species that would be incidentally impacted by grading activity, such as pickleweed. Other plant species as identified by the Project Biologist would be salvaged and reused on site. All native plants intended for salvage would be kept on site in a location agreed upon by the Project Biologist and the Construction Manager, to prevent further damage during the vegetation removal and site preparation.

### 7.3.2 VEGETATION REMOVAL

All vegetation remaining within the Project footprint after plant salvage would be removed using a small backhoe and/or excavator. Additionally, dead thatch, deadwood, and other organic litter would be removed from the site.

### 7.3.3 SOIL IMPORT

Approximately 58,000 cubic yards of soil would be imported for the Project (Appendix A), and there is the potential for these soils to come from other wetland projects within Mission Bay. For example, North Fiesta Island Wetland Restoration Project has an anticipated surplus of excavated material that is suitable for the Cudahy Creek wetland restoration area. Earthmoving equipment would be able to efficiently remove material from a stockpile area on Fiesta Island, transport it the relatively short distance to the Cudahy Creek wetland restoration area, and return for another load. This is the lowest-cost option for material disposal/reuse (Moffatt & Nichol 2019b).

### 7.3.4 GRADING PLAN

Following vegetation removal and soil import, the overall site would be graded to create stratified elevations for the subtidal, low saltmarsh, transitional marsh, mid saltmarsh, berm, and outer slope areas. The grading is designed to allow the two subtidal channel water level elevations to rise with tide levels and allow bay water to inundate the saltmarsh wetland areas during flood tide conditions. During ebb tide conditions, the saltmarsh areas would drain into the subtidal channels and be

carried out through the berm connection into Mission Bay. This process of inundation and draining is necessary for the health of the saltmarsh areas and provides water quality benefits by circulating and filtering the water through the wetland vegetation prior to being returned to the bay.

Depending on the tide level during storm events, portions of stormwater runoff may exceed the capacity of the subtidal channel and flow into saltmarsh areas. The saltmarshes would provide water quality benefits to the stormwater runoff through nutrient retention, and sediment and toxicant trapping (Appendix A).

Contour grading includes microtopographic variances, as shown on the preliminary construction drawings (Appendix A). The grading is described in further detail in the following subsections. The preliminary engineering report is attached in Appendix A and a preliminary set of construction drawings are attached in Appendix A. The final grade would be reviewed and approved by the Project Biologist prior to removing grading equipment from the site. Exact elevations would be determined based on depth to saturated soil and groundwater. Ideal elevation and proposed (estimated) elevation ranges are provided in Table 5.

**Table 5**
**Saltmarsh Habitats, Planting Palette, and Elevations**

| Habitat and Landform Designations | Planting Palette | Ideal Elevation Range (feet) | Proposed (Estimated) Elevations (feet) |
|---|---|---|---|
| Developed[1] | TBD (turf or bare soil) | N/A | Above 4 |
| Mid saltmarsh | Mid saltmarsh plant palette | 1.3 to 3.0 [2,3] | 4 |
| Transitional marsh 4:1 slope | Mid saltmarsh plant palette | N/A | Varies along the 4:1 slope |
| Low saltmarsh | Low saltmarsh plant palette | 0.3 to 2.3[2,3] | 0.9 to 2.3 |
| Riprap | No planting | N/A | -1.0 to 0 in select locations |
| Subtidal 3:1 slope | No planting | N/A | -5 to 0.9 |
| Subtidal channels | No planting | Below -2.7'[2,3] | -5.5 to -1.0 |
| Berm | Low saltmarsh Plant Palette | N/A | 1.5 |
| 10:1 outer slope | Oyster bag culch | 0 to 2.3[4] | 0 to 1.5 |
| | Entire 10:1 Slope | N/A | -10 to 1.5 |

**Notes:** TBD = to be determined.
1 Not a part of restoration area, would be restored by San Diego Parks and Recreation.
2 Source: Everest 2018.
3 Tidal statistics derived from monitoring at the site using tide gages over a 1-year period (Moffatt & Nichol 2019a).
4 Source: Tronske et al. 2018.

#### 7.3.4.1 Subtidal Channels

The design geometry of the subtidal channels includes a bottom width of 11 feet at an elevation of 5.5 feet below sea level, which is lower than the lowest tide (lowest tide is 5.06 feet below sea level based on San Diego Regional Standard Drawing M-12). The side slopes of the subtidal channels are proposed at 3:1 (horizontal to vertical) with an elevation range of 5 feet to 0.9 feet below sea level. This geometry results in a total channel top width of approximately 50 feet through the low saltmarsh wetland area (Appendix A).

The results of the hydraulic modeling indicate that the subtidal channel would require stabilization at three locations, (1) the northern Cudahy storm drain outlet, (2) the southern Cudahy storm drain

outlet, and (3) the connecting area at the berm location between the subtidal channels and Mission Bay North Pacific Passage (Mission Bay). In the areas of the storm drain outlets, riprap would be at the elevation of the storm drain system (approximately 1.0 feet below sea level) for 30 to 40 feet, followed by a transition down to the subtidal channel geometry, which has a bottom depth of 5.5 feet below sea level (Appendix A).

Where the subtidal channel connects with Mission Bay, the two subtidal channels merge together resulting in greater flow and velocity in comparison to the individual channel reaches. Additionally, the flow velocities from tidal ebb and flood would vary depending on the tidal currents. Based on the results of the hydraulic modeling, a riprap class of 2 tons is required (Appendix A).

#### 7.3.4.2 Low-Level Saltmarsh

A low saltmarsh area of approximately 3.46 acres is proposed directly adjacent to each side of the subtidal channels and between the mid saltmarsh and the berm, and another 0.5 acres is proposed on the berm for a total of 3.9 acres of low saltmarsh. The proposed elevation of the low saltmarsh varies from approximately 0.9 feet to approximately 1.1 feet. The slight variation in elevations is proposed to promote drainage of the area during periods between inundations (Appendix A).

#### 7.3.4.3 Transitional Marsh

A 12-foot-wide approximately 0.18-acre transitional marsh is located between the low and mid saltmarsh areas. This area is designed at a slope of 4:1 (horizontal to vertical), which has an adequate grade for a quick transition while being flat enough to promote vegetation and reduce the risk of erosion (Appendix A).

#### 7.3.4.4 Mid-Level Saltmarsh

A mid saltmarsh area of approximately 1.4 acres is proposed between the transitional marsh and the development edge along the east side of the Project. The width of the mid saltmarsh varies slightly, but in general is approximately 50 feet. The mid saltmarsh wetland is proposed at an elevation of 4.0 feet (Appendix A).

#### 7.3.4.5 Berm Area

A 20-foot-wide berm is proposed between the saltmarsh wetland areas and Mission Bay running the entire length of the wetland except in the area where the subtidal channel is proposed to connect to Mission Bay. The proposed elevation of the berm is 1.5 feet. The berm area would also consist of low saltmarsh wetland habitat (approximately 0.5 acres included in the total amount described in

Section 6.3.4.2). During periods of tide levels above 1.5 feet, there would be a direct exchange of water between the wetland area and Mission Bay (Appendix A).

#### 7.3.4.6 Outer Slope

Along the west side of the berm is a sloped area that ranges in elevations from approximately 1.5 feet at the top of berm down to the bottom of Mission Bay, which is at an elevation of approximately -10 feet below sea level. The proposed slope is 10:1 (horizontal to vertical) and has been designed to make a near seamless connection to the existing elevations of Mission Bay to the north and south of the wetland restoration area (Appendix A).

### 7.3.5 Planting Plan

The wetland restoration area would be revegetated with native species that are appropriate to the site context and restoration goals. The intent of these plant palettes is to create a diverse assemblage of native species that would provide appropriate functions and services. The plant palettes have been designed to include a mixture of species adapted to the wetland restoration area's hydrology. Plants with different germination responses, wetland affinities, and growth forms have been chosen to provide plant growth under a wide range of conditions that may occur in the wetland restoration area.

#### 7.3.5.1 Container Plant Installation

Implementation of this Plan must be coordinated with the Restoration Contractor, Applicant, and the Project Biologist. If a Grading Contractor has been retained for any contour grading within the Project site, then this Plan must also be coordinated with the Grading Contractor. The wetland restoration area would be vegetated with native species that are appropriate to the saltmarsh vegetation community context and restoration goals. The target habitats to be established are low and mid saltmarsh with a transitional marsh in between. Low saltmarsh dominant species would include Parish's glasswort (*Arthrocnemum subterminale*), pickleweed (*Salicornia pacifica*), and saltwort (*Batis maritima*). Mid saltmarsh and the transitional marsh dominant species would include alkali heath (*Frankenia salina*), Parish's glasswort, pickleweed, saltgrass (*Distichlis spicata*), saltwort, and woolly seablite, a special-status species. The planting palettes for low saltmarsh, and transitional marsh and mid saltmarsh are provided in Tables 6 and 7, respectively. The intent of these plant palettes is to create a diverse assemblage of native species that would increase the functions and services, such as water quality and habitat value, of the area. The optimal timing for plant installation and seed application is in the fall after the first rain. However, for this Project, planting and seed installation would take place once the contour grading is completed. Container plants and seed mixes would be sourced from locations as close as possible to the wetland restoration area, at a minimum, from within the same wetland habitat type. Some species may not be available at the

time of initial Project installation. If species are not available, they would be obtained when available and applied at a later date under direction of the Project Biologist. Alternatively, a species may be substituted for unavailable species with the direction and approval of the Project Biologist and the City.

**Table 6**
**Cudahy Creek Low Saltmarsh Container Palette[1]**

| Scientific Name | Common Name | Size | Average Spacing (Feet on Center) | Quantity (per acre)[2] | Quantity (total)[2] |
|---|---|---|---|---|---|
| *Arthrocnemum subterminale* | Parish's glasswort | Rose pot/flats | 4 | 1,840 | 6,990 |
| *Batis maritima* | Saltwort | Rose pot/flats | 4 | 276 | 1,049 |
| *Jaumea carnosa* | Jaumea | Rose pot/flats | 4 | 184 | 699 |
| *Salicornia pacifica* | pickleweed | Rose pot/flats | 4 | 239 | 909 |
| *Spartina foliosa* | California cordgrass | Rose pot/flats | 4 | 184 | 699 |
| | | **Total** | | **2,723** | **10,346** |

**Note:**
1 The low salt marsh species palette would be adapted during installation based on nursery availability and project budget.
2 Quantities are approximate and may be refined during development of the wetland restoration area's construction plans.

**Table 7**
**Cudahy Mid Saltmarsh and Transitional Marsh Container Palette[1]**

| Scientific Name | Common Name | *size* | *Average Spacing* (Feet on Center) | *Quantity (per acre)[2]* | *Quantity (total)[2]* |
|---|---|---|---|---|---|
| *Arthrocnemum subterminale* | Parish's glasswort | Rose pot/flats | 4 | 1,525 | 2,593 |
| *Atriplex leucophylla* | Beach saltbush | Rose pot/flats | 3 | 68 | 115 |
| *Batis maritima* | Saltwort | Rose pot/flats | 4 | 198 | 337 |

**Table 7**
**Cudahy Mid Saltmarsh and Transitional Marsh Container Palette[1]**

| Scientific Name | Common Name | *size* | *Average Spacing* (Feet on Center) | *Quantity (per acre)*[2] | *Quantity (total)*[2] |
|---|---|---|---|---|---|
| *Distichlis spicata* | Salt grass | Rose pot/flats | 4 | 198 | 337 |
| *Frankenia salina* | Alkali heath | Rose pot/flats | 4 | 267 | 454 |
| *Jaumea carnosa* | Jaumea | Rose pot/flats | 3 | 136 | 230 |
| *Salicornia pacifica* | pickleweed | Rose pot/flats | 4 | 198 | 337 |
| *Spartina foliosa* | California cordgrass | Rose pot/flats | 4 | 153 | 259 |
| *Suaeda taxifolia* | Woolly seablite | Rose pot/flats | 3 | 61 | 104 |
| *Triglochin maritima* | Arrowgrass | Rose pot/flats | 3 | 61 | 104 |
| | | **Total** | | **2,865** | **4,870** |

**Notes:**
1 The mid-salt marsh species palette would be adapted during installation based on nursery availability and project budget.
2 Quantities are approximate and may be refined during development of the wetland restoration area's construction plans.

All container plants would be checked for viability and general health upon arrival at the wetland restoration area by the Project Biologist. Plant materials not meeting acceptable standards of health as determined visually by the Project Biologist would be rejected. Reasons for rejection of plant material may include root-bound in the container, damaged foliage or stalks, diminutive stature, or signs of disease or pests.

Plant species and quantities would be confirmed after delivery by the Project Biologist. Container plants would be laid out by the Restoration Contractor, and their placement verified and adjusted by the Project Biologist.

Planting design and container plant layout would be randomly patterned (as opposed to rows), to create a natural patchiness that is typical within the target plant community. The Restoration

Contractor would lay out container plants in groupings by species, ranging from 3 to 6 plants per grouping. Plant species that require more water should go into the areas that are wetter and are located closer to the water table, while plant species that require less water would be placed in drier areas located further from the water table. The Project Biologist would inspect the locations and adjust placement of groupings, if necessary.

Standard planting procedures would be employed for installing container plants. Holes approximately twice the width of the rootball of the plant and the same depth. If insufficient soil moisture is present, holes would be filled with water and allowed to drain immediately prior to planting. Container plants would be installed so that the rootball is below grade with the crown 1 inch above grade. Plants would be thoroughly watered in to settle backfill around the plant rootball.

#### 7.3.5.2 Native Seed Application

The seed mix shown in Table 8 would be applied after initial container planting is complete. Labels for each seed delivered to the wetland restoration area would be inspected and approved by the Project Biologist prior to mixing and application. Seed application would consist of hand broadcast and raking into the soil. If some species are not available at the time of seeding, they may be acquired when available and hand broadcast later.

**Table 8**
**Cudahy Saltmarsh Seed Mix[1]**

| Scientific Name | Common Name | Rate (pounds/acre) | Minimum Percent Purity/ Germination[2] | Pure Live Seed (square foot) |
|---|---|---|---|---|
| *Arthrocnemum subterminale* | Parish's glasswort | 4 | TBD | $10^3$ |
| *Atriplex leucophylla* | Beach saltbush | 1 | 80/40 | 0.54 |
| *Batis maritima* | Saltwort | 2 | TBD | $10^3$ |
| *Cressa truxillensis* | Alkali weed | 2 | 10/70 | 0.16 |
| *Distichlis spicata* | Salt grass | 2 | 80/80 | 18.90 |
| *Frankenia salina* | Alkali heath | 3 | 3/70 | 73.25 |
| *Jaumea carnosa* | Jaumea | 2 | TBD | $10^3$ |
| *Salicornia pacifica* | pickleweed | 3 | TBD | $10^3$ |
| *Spartina foliosa* | California cordgrass | 1 | TBD | $10^3$ |
| *Suaeda taxifolia* | Woolly seablite | 1 | 30/20 | 2.96 |

**Table 8**
**Cudahy Saltmarsh Seed Mix[1]**

| Scientific Name | Common Name | Rate (pounds/acre) | Minimum Percent Purity/ Germination[2] | Pure Live Seed (square foot) |
|---|---|---|---|---|
| *Triglochin maritima* | Arrowgrass | 1 | TBD | 10[3] |
| | **Total Pounds/Acre** | **21.0** | TBD | 155.81 |

**Notes:**
1 The salt marsh species palette would be adapted during installation based on seed availability and project budget.
2 Seed purity and germination can vary across collections. The purity and germination rates shown are typical of each species.
3 Species are not currently available. Seed to be collected and tested to obtain minimum percent purity/germination. This information would be provided in the As-Built Report.

All seeds would be clearly labeled showing type of seed, test date, the name of the supplier, and percentages of the following: pure seed, crop seed, inert matter, weed seed, noxious weeds, and total germination content. All material would be delivered to the wetland restoration area in original, unopened containers bearing the manufacturer's guaranteed analysis. All seed mixes would be stored in a dark, cool place and not be allowed to become damp.

Installation between the months of October to the end of December is ideal for allowing establishment during the cooler and wetter time of the year. However, seed installation timing may be modified as directed by the Project Biologist to avoid loss in storm flow events, or to take advantage of predicted rain events.

### 7.3.6 INSTALLATION OF OYSTER CULTCH

Oyster bags, oyster panels, or similar product, can be placed along the slope to facilitate the colonization of the native Olympia oysters (*Ostrea lurida*). Bagged cultch uses aquaculture grade mesh to create bags filled with cultch material. These are often used in softer sediments, and they remain stable in areas with higher wave velocities (Brumbaugh and Coen 2009). Cultch cages are similar in design to crab traps which are filled with cultch. These can be easily anchored to the ground. This technique is especially beneficial in areas of high wave energy and has been used where shoreline protection is a Project goal (Brumbaugh and Coen 2009). It is recommended that the culch product used be anchored to the slope to withstand wave action and keep the cultch material in place (an Eelgrass and Oyster Restoration Plan is in progress).

Oysters provide water quality benefit through filter-feeding, which removes nutrients from the water by consuming and assimilating the nitrogen and phosphorus into their tissue and shells. All substrate, cultch materials, and construction materials, should be non-toxic and free of pollutants, contaminants, and non-indigenous flora and fauna (Brumbaugh et al. 2006).

### 7.3.7 IRRIGATION SOURCE

Long term, the wetland restoration area would receive hydrologic inputs from both tidal and surface waters flowing into the marsh from the storm drains. The initial need for temporary irrigation would be evaluated and determined upon review of site hydrology after site grading and establishment of the stormwater basin is complete. A temporary irrigation system may be installed within the upper portion of the Project site near the outfall of Cudahy Creek and along the transitional perimeter of the restoration site that does not receive regular tidal inundation and/or in the event there is insufficient rainfall during the winter/spring wet season to support plantings and developing native vegetation communities.

During the 5-year maintenance and monitoring period for the wetland restoration area, a temporary above ground irrigation system may be installed to water the plant installation locations and would be designed to supplement natural rainfall and tidal fluctuations to ensure survival of the container plantings. If a permanent water source is not available at the time the restoration plantings need to be implemented, then the irrigation system would be designed to be supplied by a water truck connected to an existing water source and pump water onto the wetland restoration area and/or to water the site with trucked-in water and watering by hose.

All irrigation would be installed by the Restoration Contractor in accordance with this plan and the final restoration construction documents. The irrigation system would be designed with above ground components to facilitate removal once the system is decommissioned. Water sources and points of connection would be from on-site locations and use potable water.

The goal is to create native, self-sustaining plant communities. All temporary irrigation would be carried out by the restoration contractor under direction of the Project Biologist. Irrigation frequency and duration would depend on weather and plant conditions. During typical summer seasons, any time the weather is hot and dry for an extended period (a month or more), irrigation would be utilized three times per week for 30 minutes through Year 3. During the fall and spring, Irrigation would be utilized twice a week for 30 minutes through Year 3. During a very dry rainy season (typically November through March), irrigation would be utilized three times per week for 30 minutes. During a typical rainy season, the irrigation would not be used unless the plants start to show stress, and then irrigation would be utilized in coordination with the biologist. The restoration

area would be non-irrigated for at least 2 years before the end of the 5-year maintenance and monitoring period. Habitat enhancement areas are not anticipated to be irrigated.

### 7.3.8 EROSION CONTROL BEST MANAGEMENT PRACTICES

Best management practices (BMPs) means schedules of activities, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce to the maximum extent practicable the discharge of pollutants directly or indirectly to receiving waters. It is the responsibility of the property owner or his/her designee (contractor) to select, install, and maintain appropriate construction BMPs. BMPs are used to effectively reduce the mobilization and transport of sediments from the wetland restoration area during initial implementation and during the maintenance and monitoring period. Suitable BMPs would be installed based on site conditions in accordance with most current City of San Diego Standards. Erosion Control notes would be included, and/or a Water Pollution Control Plan would be prepared based on the document approval requirements.

### 7.3.9 WEED CONTROL

The contractor would cut and/or control existing non-native vegetation. Initial removal of plant species for site preparation would take place before any soil disturbances. To the maximum extent practicable, this Project should begin in the fall after bird breeding season. Should any grading, grubbing, or removal of habitat take place during the breeding season, then a biological monitor would be required to ensure that impacts to nesting birds do not occur because of construction activities. As part of this site prep, dead thatch, deadwood, and other organic litter would be removed. It is assumed that there would not be any germination or growth of herbaceous weed species, but if there is, then weed control (hand, mowing, or herbicide) would be conducted.

Table 9 shows potential non-native plant species that would be targeted during maintenance, as well as potential methods for removal and control.

**Table 9**
**Weed Control Target Non-Native Plant Species and Treatments**

| **Weed Species** | | **Potential Control Methods** | | | | |
|---|---|---|---|---|---|---|
| *Botanical Name* | *Common Name* | *De-thatch* | *Herbicide* | *Hand Pull* | *Weed Whip/ Mowing* | *Cut and Treat* |
| *Atriplex semibaccata* | Australian saltbush | X | X | X | X | |
| *Avena barbata* | Slender oat grass | X | X | X | X | |
| *Avena fatua* | Wild oat | X | X | X | X | |

**Table 9**
**Weed Control Target Non-Native Plant Species and Treatments**

| Weed Species | | Potential Control Methods | | | | |
|---|---|---|---|---|---|---|
| *Botanical Name* | *Common Name* | *De-thatch* | *Herbicide* | *Hand Pull* | *Weed Whip/ Mowing* | *Cut and Treat* |
| *Brassica nigra* | Black mustard | X | X | X | X | |
| *Bromus hordeaceus* | Softchess brome | X | X | X | X | |
| *Bromus* sp., *madritensis rubens* | Brome grasses | X | X | X | X | |
| *Cakile maritima* | European sea rocket | | X | X | X | |
| *Carpobrotus chilensis* | Sea fig | X | X | X | X | |
| *Cortaderia selloana* | Pampas grass | | X | | X | X |
| *Cynodon dactylon* | Bermuda grass | X | X | X | X | |
| *Dittrichia graveolens* | stinkwort | | | X | | X |
| *Emex spinosa* | Devil's thorn | | X | X | X | |
| *Erodium botrys* | Broad leaf filaree | X | X | X | X | |
| *Erodium cicutarium* | Stork's bill filaree | X | X | X | X | |
| *Festuca perennis* | Italian rye grass | X | X | X | X | |
| *Helminthotheca echioides* | Bristly ox-tongue | X | X | X | X | |
| *Lactuca serriola* | Prickly lettuce | X | X | X | X | |
| *Mesembryanthemum crystallinum* | Crystalline ice plant | X | X | X | X | |
| *Mesembryanthemum nodiflorum* | Slender-leaf iceplant | X | X | X | | X |
| *Nicotiana glauca* | Tree tobacco | X | X | X | X | |
| *Parapholis incurva* | Sickle grass | X | X | X | X | |
| *Plantago coronopus* | Cut leaf plantain | X | X | X | X | |
| *Polypogon monspeliensis* | Rabbitsfoot grass | X | X | X | X | |
| *Raphanus sativus* | Wild radish | X | X | X | X | |
| *Rumex crispus* | Curly dock | X | X | X | X | |
| *Salsola tragus* | Russian thistle | X | X | X | X | |
| *Sonchus asper* | Spiny sowthistle | X | X | X | X | |
| *Tamarix ramosissima* | Tamarisk | | X | X | | X |

If weed seedlings are detected before planting and seeding occurs the Restoration Contractor would remove all weeds. Areas to be seeded would be completely free of weeds and have only bare mineral soil exposed at the time of seeding. Weed control would include hand-pulling of weeds, use of hand tools, weed whips, and/or foliar treatments of appropriate herbicides as determined by the Biological Monitor. Specific herbicide application rates and methods would be based on manufacturer specifications, and would follow the general guidelines summarized below:

- Application methods would follow manufacturer specifications regarding application and safety procedures. Herbicide application would comply with state and local regulations. All application tasks would be performed by or under supervision of a licensed applicator with the Pest Control Business License issued by the State of California Department of Parks and Recreation and registered with the County Agricultural Commissioner.
- Chemical herbicides must be approved for use within wetland areas.
- Herbicide Application would consist of (1) spot applications to individual plants where weed coverage is sparse and (2) broadcast applications to dense patches of weed species. Applications should be uniform and complete. Contact with native species must be avoided; in the event of gusty winds or winds more than 5 miles per hour (mph), application work would be temporarily discontinued to protect applicators and adjacent natural resources. Treatments should also be temporarily discontinued in the event of rainfall since rainfall reduces the effectiveness of the herbicide.
- Sprayed vegetation should be left undisturbed for 7 days to allow the herbicide to be distributed throughout the entire plant. Visible effects of herbicide application consist of wilted foliage, brown foliage, and disintegrated root material.
- Excessive dead weed materials would be removed from the soil surface and disposed of.

### 7.3.10 AVOIDANCE AND MINIMIZATION MEASURES

Temporary fencing (with silt barriers) would be required at the limits of work for the wetland restoration area (including around the diversion ditch, staging areas, and access routes) to prevent inadvertent impacts to areas outside of the wetland restoration footprint.

Impacts from fugitive dust that may occur during filling and grading activities for the berm and restoration area would be avoided to the maximum extent practicable and minimized through watering and other appropriate measures.

The Project Biologist would be on site to oversee installation of temporary fencing, any grading within 100 feet of existing waters of the United States to ensure permit compliance and educate contractors as needed on biological resources associated with the Project.

Equipment would be checked for leaks prior to operation and repaired as necessary. A spill kit for each piece of construction-related equipment should be on site and must be used in the event of a spill.

### 7.3.11 FENCING AND SIGNAGE

Perimeter fencing is proposed for this Project to restrict access and allow the site's vegetative community time to develop and mature post-construction. The fencing would reduce the risk of damage to the saltmarsh caused by either foot traffic, animals, or unauthorized vehicular traffic. A 6-ft-high chain link fence is assumed for this Project, although other exclusion fence types may be explored (e.g., split-rail); however, in accordance with the Mission Bay Park Master Plan Update fences would not exceed the height of 7 feet (City of San Diego 2002). The existing chain link fence that presently traverses the site would be removed during construction and a new one would be installed along the perimeter of the restored wetlands. Gates would be included to allow authorized access for monitoring and maintenance, and tours if desired.

Signage would be installed at the end of each side of the berm (where the berm connects with the developed area), along the fencing at each of the storm drain outfalls, and on the western side of the wetland restoration area closest to the sidewalk path. The signs would include language identifying the site as a habitat restoration project, and that trespassing and access from unauthorized personnel are prohibited beyond this point. In accordance with the Mission Bay Park Master Plan Update regulatory signs should look special to Mission Bay and be mounted on poles and bases particular to Mission Bay Park (City of San Diego 2002).

INTENTIONALLY LEFT BLANK

# 8 120-DAY PLANT ESTABLISHMENT PERIOD

During the first 120 days following completion of Project installation, the Restoration Contractor would be responsible for the health and mortality of the installed plant material. The Project Biologist would visit the wetland restoration area at 30, 60, 90, and 120 days during this plant establishment period (PEP). Any plant disease, insect infestations, or herbivory would be remedied by the Restoration Contractor in consultation with the Project Biologist/habitat restoration specialist and Project owner. If it is determined that protective plant cages or other protective measures are necessary, the Project proponent would coordinate with the Project Biologist/habitat restoration specialist and Restoration Contractor to find the most efficient and economical solution.

At the 90-day visit, the Project Biologist would observe site conditions and seed germination and would provide a punch-list of replacement plants for the Restoration Contractor. Generally, plants would be recommended for in-kind replacement; however, the Project Biologist may recommend alternative species if it is suspected that unsuitable growing conditions caused mortality.

Plants noted for replacement would be installed prior to the 120-day walk through with the Project Biologist. At the 120-day PEP, the Restoration Contractor is responsible for guaranteeing that the installed plant material would have a 100% survival rate. As a part of this period, the contractor who performs the installation is contractually obligated to guarantee their workmanship and perform remedial measures to fix any observed problems as necessary before the 120-day PEP is considered complete, and the Project transitions into the remainder of the 5-year maintenance and monitoring period. The following criteria must be met for the 120-day PEP to be considered successful:

1. Areas should be relatively free of weeds (CAL-IPC 0% and less that 10% cover of all other weed species).
2. Areas free of debris.
3. No erosion or trash.
4. 100% survivorship of container plants.

A PEP maintenance schedule is shown in Table 10.

**Table 10**
**Plant Establishment Period Maintenance Schedule**

| Work Task | 1–30 Days | 31–60 Days | 61–90 Days | 91–120 Days |
|---|---|---|---|---|
| Weed abatement | As-needed, dependent on biological monitoring findings | As-needed, dependent on biological monitoring findings | As-needed, dependent on biological monitoring findings | As-needed, dependent on biological monitoring findings |
| Plant replacement | As-needed, dependent on biological monitoring findings | As-needed, dependent on biological monitoring findings | As-needed, dependent on biological monitoring findings | As-needed, dependent on biological monitoring findings |
| Supplemental water | Once | Once | Once | Once |
| Erosion control | Once | Once | Once | Once |
| Non-weed pest control | Once | Once | Once | Once |
| Site cleanup and maintenance | Once | Once | Once | Once |

# 9 MAINTENANCE PLAN

Maintenance activities would begin upon completion and approval of installation work. The Restoration Contractor's maintenance activities would be performed as indicated herein and as necessary to meet the established performance standards.

Trash and debris would be removed from the marsh restoration area regularly during the 120-day PEP and warrantee period.

## 9.1 MAINTENANCE GUIDELINES

Following installation, site visits would be conducted monthly during Year 1 on the restoration monitoring program. During Years 2 and 3 site visits would be conducted monthly during the months of December through April, and quarterly thereafter; and Years 4 and 5 would be conducted quarterly monitoring. More frequent monitoring would be conducted as needed to meet the performance standards indicated herein. A schedule is shown in Table 11.

**Table 11**
**Maintenance Schedule**

| Task[1] | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|
| Weed and pest control[2] | Monthly | Monthly (Dec–April); Quarterly thereafter | Monthly (Dec–April); Quarterly thereafter | Quarterly | Quarterly |
| Plant replacement[3] | Annually, conducted in Oct–Dec | Annually, conducted in Oct–Dec | Annually, conducted in Oct–Dec | As needed; conducted in Oct-Dec | As needed; conducted in Oct–Dec |
| Supplemental water[4] | As needed | As needed | As needed | As needed | As needed |
| General site maintenance | Monthly | Monthly (Dec–April); Quarterly thereafter | Monthly (Dec–April); Quarterly thereafter | Quarterly | Quarterly |
| Erosion control and sedimentation | Monthly | Monthly (Dec–April); Quarterly thereafter | Monthly (Dec-–April); Quarterly thereafter | Quarterly | Quarterly |

**Table 11**
**Maintenance Schedule**

| Task[1] | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|
| Trash removal | Monthly | Monthly (Dec–April); Quarterly thereafter | Monthly (Dec–April); Quarterly thereafter | Quarterly | Quarterly |
| Fencing and signage maintenance | Monthly | Monthly (Dec–April); Quarterly thereafter | Monthly (Dec–April); Quarterly thereafter | Quarterly | Quarterly |

**Notes**:

1 Maintenance task schedule and frequency would be adjusted, as appropriate, depending on site conditions and in coordination with the Project Biologist. It is anticipated that more intensive maintenance would occur during the first few years of the Project, and taper down as the Project approaches Year 5. Note that should any construction type work be required to bring the wetland restoration area back to performance standards, any construction required would take place outside of the City's Beach Area Construction Moratorium (see Section 6.2.3).

2 Any maintenance performed during the bird nesting season (March 1 through September 15) would be conducted under direction of the Project Biologist.

3 Should extensive planting be required in Years 4 and 5, even due to unforeseen circumstances, the restoration and monitoring program may be required to be extended.

4 Performed as-needed during the first 3 years of the 5-year program, depending on site conditions. No supplemental watering would occur for the final 2 years of maintenance and monitoring period.

### 9.1.1 WEED AND PEST CONTROL

Non-native plant control measures would include the following: (1) hand pulling, hand cutting, (2) cutting with handheld mechanical devices, and (3) application of approved herbicides. Hand removal of non-natives is the most desirable method of control and would be used within seeded areas where feasible. Weeds would be pulled when they can be positively identified, and prior to the formation of seed heads (see Table 11 in Section 6.3.9).

The maintenance contractor would coordinate with the Project Biologist to identify weeds for removal as needed. Chemical herbicide control would be used for perennial species that are difficult to control by hand pulling. Herbicide treatments must be pre-approved by the Project Biologist and applied by a licensed or certified pest control applicator. The herbicide must be approved for use in wetland areas. Application of herbicide would be suspended should precipitation be expected to occur within 24 hours of application and/or if wind exceeds 6 miles per hour.

Plant pests would be controlled utilizing Integrated Pest Management Techniques (IPM). Pests control would be performed by the Restoration Contractor using the least toxic method available, such as washing pests off of plants with a strong stream of water, utilizing insecticidal soap, or installing plant protection devices.

### 9.1.2 GENERAL SITE MAINTENANCE

Trash would be removed from the wetland restoration area by the contractor on a regular basis. Trash consists of all anthropogenic materials, equipment, or debris dumped, thrown, washed, blown, and left within the wetland restoration area.

Pruning or clearing of native vegetation would generally not be allowed within the wetland restoration area, except as directed by the Project Biologist. Native dead biomass and plant litter would not be removed and would be left in place, unless its removal is required for a specific management objective. Native organic biomass and leaf litter provide valuable microhabitats for benthic and terrestrial invertebrates, reptiles, small mammals, and birds. In addition, the decomposition of plant material is essential for the replenishment of soil nutrients and minerals. Fertilizers would not be used unless deemed necessary by the Project Biologist to rectify a specific nutrient deficiency.

### 9.1.3 IRRIGATION SYSTEM MAINTENANCE

Contractor maintenance would include adjustment and repair to the temporary irrigation system. This may include repairing or replacement of broken or malfunctioning components. Adjustment of the irrigation heads may be required to achieve 100% coverage. Based on monitoring observations, the Project Biologist may make recommendations to the contractor to increase or decrease watering time or scheduling.

### 9.1.4 EROSION AND SEDIMENTATION

BMPs are not anticipated to be needed after vegetation has established in the wetland restoration area. However, temporary BMPs such as burlap fiber rolls, silt fence, and burlap gravel bags would be maintained as needed for proper function until the site has reached Year 3, or until the Project Biologist has deemed the BMP's unnecessary. Once the site is stabilized by native vegetation the contractor would remove and dispose of temporary BMPs. If after Year 3, there is active erosion or sedimentation within or directly adjacent to the Project, the Project Biologist would utilize the methods and protocol set forth under the Adaptive Management section of this plan.

### 9.1.5 FENCE AND SIGNAGE MAINTENANCE

The location of gates and signage, and the language for the signage are included in the grading plans. Maintenance would include repair of Project gates and signage, and replacement as needed. The contractor would confer with the Project Biologist if it appears that maintenance needs of the wetland restoration area indicate that changes in the specified location, materials, or methods of fencing need to be altered to meet their intent for this Project and provide appropriate site delineation and protection.

# 10 ECOLOGICAL PERFORMANCE STANDARDS

## 10.1 VEGETATION PERFORMANCE STANDARDS

Monitoring would be conducted qualitatively and quantitatively by the Project Biologist to determine if the wetland restoration area is meeting the established criteria. Table 12 summarizes the performance standards through Year 5. If the wetland restoration area fails to meet performance criteria in any given year, the Project Biologist would recommend remedial actions to bring the wetland restoration area into a level of satisfactory establishment.

Native absolute cover of the restoration area is expected to be 75% or greater of the reference site by the end of Year 5, with native species richness of 5 or more species, 1% or less absolute cover by general non-native species (such as annual weeds), and 0% absolute cover by perennial invasive species as shown in Table 14. All non-native weed species would be controlled as part of the maintenance effort, including the high-ranked California Invasive Plant Council (Cal-IPC) species. Quadrat data along the transects would be collected as absolute cover to capture density and strata overlap, which can also be converted to relative cover for overall vegetation composition comparison.

An Eelgrass Conceptual Habitat Restoration and Monitoring Plan provides the performance standards for benthic species that are common to eelgrass beds.

**Table 12**
**Target Vegetation Percent Cover**

| Year | Native Species Richness[1,3] | Native Container Plant Percent Survival[2] | Minimum Percent Native Plant Cover (Absolute Cover)[1,2] | Maximum Percent Total Non-native Cover[1] | Maximum Percent Perennial Invasive and Cal-IPC Species |
|---|---|---|---|---|---|
| 1 | 5 | 100 | 15 | 5 | 0 |
| 2 | 4 | 90 | 25 | 5 | 0 |
| 3 | 4 | 90 | 40 | 2 | 0 |
| 4 | 5 | 80 | 60 | 1 | 0 |
| 5 | 5 | 80 | 75 | 1 | 0 |

**Notes:** Cal-IPC = California Invasive Plant Council.

1 Average of all quadrat data.

2 In-kind natural recruitment of native vegetation through seedling germination can serve to compensate for container plant mortality.

[3] Species richness is the number of native plant species that must occur within the restoration site to meet the performance standard. Native species present may have been introduced and established from the restoration plant palette or species that have volunteered to the restoration site.

## 10.2 REFERENCE SITE

The Kendall-Frost Marsh Reserve would be utilized as the reference site (Figure 12) with which to compare with the wetland restoration area's site conditions. Kendall-Frost is a successfully restored marsh located within the same watershed, containing similar elevations for low saltmarsh and mid saltmarsh areas, and includes a similar plant palette to the Project. Available vegetation data from the Kendall-Frost Marsh Reserve were analyzed from three transects to inform the plant palettes, seed mix, and performance standards included in this Plan. Due to the wide variability of species composition within the reference site, performance standards are provided for overall native vegetative cover. Any limitations for comparisons to the reference site (relative not direct comparisons) would be provided in the annual monitoring reports. The reference site would be used to determine if progress of wetland restoration area is consistent with response of reference site to prevailing weather and environmental conditions including sea level rise.

## 10.3 CALIFORNIA RAPID ASSESSMENT METHOD

The purpose of the California Rapid Assessment Method (CRAM) surveys for the wetland restoration area is to evaluate the wetland function and value of the ephemeral drainages (washes and braided channels) and to quantify improvement of these functions and values over time. CRAM metrics would be compared to previous CRAM surveys from this site over time and used to inform management decisions. Adaptive management strategies, if necessary, would be identified, prioritized, and implemented.

Application of CRAM to measure improvement in wetland quality can be an effective tool, but it has limitations. CRAM considers a wide variety of factors that influence the health of a wetland, and some attributes cannot be improved within the confines of a 5-year wetland restoration area. A wetland may show a small change in total CRAM score over time despite great change in general appearance. For example, Attribute 1 is very difficult to change because it considers influences within 500 meters of the AA, most of which may be outside the Project footprint. However, Attributes 3 and 4 can be greatly affected by decisions made during the design phase of the Project. Table 13 provides a summary of CRAM attributes, associated metrics, and feasibility for improvement in the context of this Project.

**Table 13**
**Summary of CRAM Attributes and Metrics and Feasibility for Improvement**

| Attribute | Metric | What this Metric Measures | Anticipated Implementation Score | Ways to Improve the Score | Feasibility for this Project |
|---|---|---|---|---|---|
| Attribute 1: Buffer and Landscape Context | Aquatic Area Abundance | Spatial association with other areas of aquatic resources such as other wetlands, lakes, streams etc. | D | Increase the amount of wetland areas within 500 meters of the Project area. | Low. The wetland restoration area and restoration projects are all outside of 500 meters. |
| | Buffer | Size and natural quality of the area within 250 meters | D | Minimize proximity to pavement, closed fences, active restoration, and urbanized areas | Low. The wetland restoration area is within Mission Bay Park and restoration is one of the primary goals of the Improvement Zone. There is little opportunity to reduce infrastructure within 250 meters of the wetland area. |
| Attribute 2: Hydrology | Water Source | Natural quality of hydrologic inputs that affect the dry season condition of the AA 2 kilometers | C-D | Remove storm drains. | Low. It is not a goal of this wetland restoration area to remove the storm drains, but rather to improve the water quality of the runoff coming from the storm drains. |
| | Hydroperiod | The characteristic frequency and duration of | B-C | Remove the berm to remove the human-caused alterations | Low. It is not the intent of this wetland restoration area to remove the berm, but |

**Table 13**
**Summary of CRAM Attributes and Metrics and Feasibility for Improvement**

| Attribute | Metric | What this Metric Measures | Anticipated Implementation Score | Ways to Improve the Score | Feasibility for this Project |
|---|---|---|---|---|---|
| | | inundation or saturation of the wetland during a typical year. | | and/or modify the berm to allow for two daily tidal minima and maxima levels. | rather to build a berm in order to increase the residence time for water to drain in order to improve water quality. |
| | Hydrologic Connectivity | The ability for water to flow into or out of the wetland. | B | Allow for rising water in the wetland to have unrestricted access to adjacent areas. | Moderate at time of restoration. Low for change over 5-year restoration period. The design incorporates a sea-level rise analysis through the year 2100 (up to 7.0 feet) and a 100-year storm event. |
| Attribute 3: Physical Structure | Patch Richness | Diversity of physical surfaces and features | D | Add woody debris; shellfish beds, build in subtidal channels, pools or depressions within the subtidal channels; and pools or pannes within the wetland. | High at time of restoration. Moderate for change over 5-year restoration period. |

**Table 13**
**Summary of CRAM Attributes and Metrics and Feasibility for Improvement**

| Attribute | Metric | What this Metric Measures | Anticipated Implementation Score | Ways to Improve the Score | Feasibility for this Project |
|---|---|---|---|---|---|
| | Topographic Complexity | Quality and diversity of elevation changes | C-D | Construct subtidal channels with adjacent floodplain and upland bench; create an uneven gradient and include partially buried debris | High at time of restoration. Moderate for change over 5-year restoration period. |
| Attribute 4: Biotic Structure | Plant Composition | Diversity of native plant species and plant heights; low cover from non-native invasive species | D | Install/seed a wide variety of species of various heights; eliminate non-native invasive species | Moderate to High |
| | Horizontal Interspersion | Number and distribution of distinct plant groupings | D | Install/seed species in distinct associations; avoid uniform application | Moderate to High. |
| | Vertical Structure | Number of overlapping plant layers | D | Install/seed species of various heights | Moderate to High |

**Note**: CRAM = California Rapid Assessment Method.

CRAM scores would be used to evaluate form and function of the wetland restoration area and therefore general achievement of non-wetland waters and wetland restoration requirements. When compared to the baseline conditions, the results of Years 1, 3, and 5 CRAM surveys should show at a minimum the following:

- Physical form and structure that are suitable for tidal and stormwater flow and conveyance,
- Development of hydrologic features within the subtidal channels and greater wetland area that provide evidence of expected function
- Continued improvement in biotic structure (improved score in Attribute4),
- Overall trajectory toward improved rather than degraded condition (improved scores in attributes 3 and 4)
- Overall increase in CRAM score

## 10.4 JURISDICTIONAL EVALUATION AT THE END OF YEAR 5

At the end of Year 5, an evaluation of the dominance of wetland vegetation throughout the site would be conducted, utilizing the "Vegetation" portion of the Wetland Determination Data Form-Arid West Region. The results of this exercise must achieve a Prevalence Index Score of less than or equal to 3. Results would be included in the Year 5 Annual Report.

# 11 MONITORING AND REPORTING PLAN

The Project Biologist would perform wetland restoration area monitoring during Implementation through Year 5 to ensure the mitigation program requirements are adhered to, document the restoration effort and progress towards the annual performance standards, and that site maintenance is being adequately performed by the maintenance contractor.

Monitoring would consist of qualitative monitoring, a functional assessment using the California Rapid Assessment Method (CRAM), and quantitative (quadrat) monitoring. The monitoring methods for the wetland restoration area would be conducted as outlined above.

An Eelgrass and Oyster Restoration Plan is in progress and would inform the monitoring and reporting program for those species.

## 11.1 MONITORING AND REPORTING SCHEDULE

Monitoring would consist of monthly qualitative site visits for the 120-day PEP period and Year 1; Years 2 and 3 monthly for the months of December through April; and Years 4 and 5 quarterly. CRAM post implementation, and Years 1, 3, and 5 (Table 14). Qualitative monitoring would be conducted by the Project Biologist to determine if the site is on trajectory to meet the annual performance standards. If restoration efforts fail to meet the performance standards in any given year, the Project Biologist would recommend remedial actions to bring the site into alignment with the performance standards.

**Table 14**
**Monitoring and Reporting Schedule**

| Task | 120-day PEP | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|---|
| Qualitative Monitoring | At 30, 60, 90, and 120 day PEP; | Monthly | Monthly (Dec–April); Quarterly thereafter | Monthly (Dec–April); Quarterly thereafter | Quarterly | Quarterly |
| CRAM Monitoring | Post implementation (baseline conditions) | Year 1 in fall/winter | N/A | Once in fall/winter | N/A | Once in fall/winter |
| Quadrat Data | N/A | N/A | Annually in fall | Annually in fall | Annually in fall | Annually in fall |
| Reporting | As-built (implementation); Site Observation Reports (monthly); 120-day PEP | Site Observation Reports (Monthly) Annual Reports [a] | Site Observation Reports (Monthly (Dec–April); Quarterly thereafter) Annual Reports [a] | Site Observation Reports (Monthly (Dec–April); Quarterly thereafter) Annual Reports [a] | Site Observation Reports (Quarterly) Annual Reports [a] | Site Observation Reports (Quarterly) Annual Reports [a] |

**Note:**
[a] Timing would be based on the lead agency requirement once permits are obtained.

## 11.2 AS-BUILT REPORT

Prior to implementation, Photo stations would be selected, and photos of the Project and reference site taken. These photo stations would coincide with the transect sampling areas and serve as photographic evidence for the wetland restoration area.

Within 45 days of successful completion of the installation of the native container plants or hydroseed (whichever is later), the Project Biologist would submit a post-construction memorandum to the City and applicable resource agencies documenting the completion of the grading, plant and seed installation, weed removal, of the installation phase and describing the "as-built" conditions of the wetland restoration area. The report would include a copy of the reduced set of construction drawings and a figure showing the final "as-built" limits of the wetland restoration area. Photographs would be included in the "as-built" report to document the site at the completion of the initial phase of implementation. The post-construction memorandum would include the following:

- Date(s) work within waters of the United States and waters of the state was initiated and completed.
- Summary of compliance status for each resource agency permit condition as required.
- Color photographs (including maps of photo points) taken at the wetland restoration area before and after construction.
- One copy of the "as-built" drawings for the entire wetland restoration area.
- Schedule for future wetland restoration area monitoring and reporting.

## 11.3 120-DAY PLANT ESTABLISHMENT PERIOD AND REPORT

The initial survival of the native plants installed within the wetland restoration area would be evaluated after a 120-day PEP. This period would start after planting is completed and conclude after the 120-day period and upon the acceptance of successful establishment of the wetland restoration area by the City of San Diego.

The contractor would be responsible for the health and mortality of the installed plant material. The Project Biologist would visit the wetland restoration area at 30, 60, 90, and 120 days during this PEP. The Project Biologist would coordinate with the Restoration Contractor to replace any native plants that have died during the PEP. Generally, plants would be recommended for in-kind replacement; however, the Project Biologist may recommend alternative species if it is suspected that unsuitable growing conditions caused mortality. Plants noted for replacement would be installed prior to the 120-day walk through with the Project Biologist. Plants must be in the ground at least 30 days prior to completion of the PEP.

The following criteria must be met for the 120-day PDP to be considered successful and the results of which would be documented in the 120-day PEP report:

- All target exotics removed or killed in place.
- Areas free of debris and trash.
- Areas free of erosion.
- 100% survivorship of container plants.

The 5-year maintenance and monitoring program would begin after the 120-day PEP has been accepted. Maintenance activities would be conducted concurrent with the installation, would continue throughout the initial PEP, and would conclude at the end of the 5-year maintenance and monitoring period.

## 11.4 QUALITATIVE MONITORING

Qualitative monitoring would include the assessment of the overall conditions of the rehabilitated non-wetland waters and the wetland restoration area. The conditions to be assessed qualitatively would include visual evaluation of hydraulic functions and conditions if present, evidence of surface hydrology via active storm or post-storm flow if present, number and type of hydric soil indicators if present, plant health, need for replacement planting, plant pests, wildlife usage, level of non-native plant infestation, and need for trash removal. Any recommended remedial measures would be reported to the Project Proponent and maintenance contractor for immediate consideration and implementation.

Following each site visit, the Project Biologist would generate a brief Site Observation Report indicating the condition of the site and any maintenance and/or remedial actions needed to help ensure the Project meets its annual performance goals. While no focused wildlife surveys would be conducted, wildlife usage would be documented. Copies of the Site Observation Report would be provided to the City. and the Restoration Contractor. While no focused wildlife surveys would be conducted, wildlife usage would be documented.

## 11.5 QUANTITATIVE MONITORING

Quantitative data collection would occur once annually in the spring during Years 2–5. Data on percent native species cover, non-native species cover, and bare ground would be collected and summarized in the annual reports. Quadrat data collection locations would be established in the saltmarsh area along 5 permanent 50 meter transect lines (25 meter transect lines may be used if the areas are too small to allow for 50 meter transect lines). A 1-square-meter quadrat would be sampled at each 5-meter interval along each permanent transect line, alternating sides of the transect. At the start of each transect, the

quadrat would be placed on the right side of the transect at meter 0. Location within the marsh strata (low saltmarsh, transitional marsh, or mid saltmarsh) would be documented for each quadrat.

Overall count of native plant species present within the marsh restoration area would be documented to reflected species richness. Percent cover of all plant species, all non-native plant species present, and bare ground would be estimated to the nearest 1% cover for each quadrat. An overall average would be calculated for each transect. Transects would be photo-documented at the time of data collection and georeferenced using GPS. A total of 50 quadrat samples would be collected.

Permanent photo-documentation points would be established at key locations to visually document progress of the wetland restoration area. The Project Biologist would establish permanent photo points prior to Project implementation and provide them on a site map for future reference. Photos would be taken at milestone events during installation and annually through the long-term monitoring phase of the Project. Permanent photo-documentation stations would also be established along each transect to record the progress of quantitative data collection over the 5-year period. Additionally, photographs would be taken of any significant management issues or biological observations, including photographs of changing conditions within the wetland restoration area. Photos from photo-documentation points and mapped locations would be included in annual reports.

## 11.6 CALIFORNIA RAPID ASSESSMENT METHOD

A post implementation CRAM survey would be conducted after construction to document the baseline conditions of the wetland restoration area. All CRAM surveys would be conducted by trained CRAM practitioners and would follow the approved methodologies for the CRAM Estuarine Module (CWMW 2013; field book version 6.1or most current; datasheet version 6.1 or most current). Results of the CRAM surveys would be included in the Annual Reports for Years 1, 3, and 5 and entered into the CRAM online database.

CRAM surveys would be conducted for the as-built (baseline) condition, Year 3, and Year 5. The as-built survey would be conducted directly after construction of the drainages is complete and prior to the start of the 5-year restoration monitoring period. Subsequent surveys would be conducted during Years 3 and 5 of the restoration monitoring periods. Results of CRAM surveys would be reported in the As-Built Report and Year 3 and Year 5 annual reports. The CRAM scores in Years 3 and 5 would be compared to baseline scores to evaluate how the wetland functions and values improved during the restoration monitoring period.

Per CRAM protocol, each CRAM survey is conducted for one assessment area (AA) recommended to be a 56-meter (approximate) circle, but the shape can be non-circular, if necessary, to fit the wetland and meet hydromorphic criteria. The recommended minimum size is 30 meters by 30 meters.

Establishment of the AAs would occur during the initial survey (i.e., the pre-CRAM survey) per CRAM protocol. Subsequent surveys (Implementation and Years 3 and 5) would be conducted within these same AAs.

The Estuarine Module requires the collection of information on the AA that includes the surrounding landscape (Attribute 1: Buffer and Landscape Context), aquatic area abundance and buffer (Attribute 2: Hydrology), water source, hydroperiod, and hydrologic connectivity (Attribute 3: Physical Structure), structural patch richness and topographic complexity, and (Attribute 4: Biotic Structure) plant community compositions, horizontal interspersion, and vertical biotic structure. Each attribute is scored individually and then used to calculate the final CRAM score. Potential environmental "stressors" are noted for the AA, but do not factor into the total CRAM score.

## 11.7 ANNUAL RESTORATION MONITORING REPORTS

An annual biological monitoring report summarizing the progress of the wetland restoration area would be submitted to the City and applicable agencies annually following completion of all installation work. In the event that permits obtained by wildlife agencies (401/404/1602/BO, etc.) require additional monitoring or reporting tasks, then one report would include all of the required items of each agency. The submittal timing of the lead agency would take precedence. If no As-Built Report was required for this wetland restoration area, then the first annual report would include a discussion of the as-built conditions according to the grading plan and any minor changes that occurred to the grading plans would be redlined and included as an attachment. Each report would document the condition of the wetland restoration area with photographs taken from the same fixed points in the same directions. Annual reports would identify any shortcomings of the restoration program and recommend remedial measures, if necessary, for the successful completion of the wetland restoration area.

# 12 ADAPTIVE MANAGEMENT PLAN

Adaptive management is defined, for the purposes of this wetland restoration area, as a flexible, iterative approach to the long-term management of biological resources that is directed over time by the results of ongoing monitoring activities and direct observation of environmental stressors that are producing adverse results within the wetland restoration area.

An integral part of a successful wetland restoration area is early detection of problems determining the cause(s) of those problems and attempting to correct those problems so that the wetland restoration area achieves its objectives and ecological performance standards. If annual performance guidelines are not met for any given year in the 5-year restoration period and/or if the Project experiences a significant unexpected problem, the Project Biologist would prepare an analysis of the cause(s) of failure and would propose remedial actions in the annual report.

Adaptive management measures would include the utilization of qualitative data gathered in the field prior to and throughout the monitoring period to assess the aquatic functions and values, effects of weeding maintenance, and status of seed germination and cover within the wetland restoration area. Following an event that causes damage to all or part of the wetland restoration area, this data would be used in part to drive management considerations for the repair of the damaged areas. Achieving the key goals of the restoration program and establishing a naturally functioning aquatic resource would be the focus of all adaptive management decisions.

If determined necessary by, the Project Biologist in consultation with the City would notify the regulatory agencies and prepare an analysis of the Project's problem(s) and propose remedial actions to correct the problems in order to meet the performance standards and success criteria at the end of the 5-year maintenance and monitoring period. The maintenance and monitoring obligations would continue and/or alternative contingency measures and interim performance standards would be negotiated, until the Resource Agencies give final permit compliance/approval or approval for alternative compensation measures. Individual environmental stressors are discussed below along with an anticipated range of management responses to correct any damage that may occur to the wetland restoration area.

## 12.1 DROUGHT

Seasonal drought is a normal annual cycle in San Diego County. Periods of extended drought could occur, including low seasonal rainfall and prolonged high temperatures that may negatively affect the wetland restoration area (e.g., lower native cover, higher plant mortality, increased potential for pest infestations on site). If drought conditions limit native vegetation development, an additional

seed application may be considered to replenish the native seed bank to allow the site to respond normally in the event of renewed rainfall and/or flooding.

## 12.2 HERBIVORY

Some grazing and browsing by native herbivores is expected to occur within the wetland restoration area. The plant palettes for each vegetation community have been designed to tolerate a moderate level of plant browsing. If browsing levels should become elevated (i.e., if significant plant mortality and cover reduction occurs) as indicated by qualitative monitoring of the wetland restoration area, remedial measures would be implemented. Browse guards (e.g., plastic fencing/wire cages) may be installed around the base of trees and young shrub plants in affected areas to reduce plant mortality. In addition, remedial planting or seeding may be necessary, depending upon the stage of the Project.

## 12.3 ADVERSE HYDROLOGIC CHANGES

Tidal marshes are dynamic systems that can experience topographic modification due to tidal fluctuations. In addition, this site has two storm drain outlets which can also affect topographic modification from storm flow and flood events. It is expected that sediment would be deposited and exported from the wetland restoration area during especially high tides and flood events. If elevations within the wetland restoration area (such as excessive aggradation, degradation and/or sea-level rise) change in such a way that compromises the success of the Project, localized grading, thin-layer sediment additions, recontouring, and/or re-planting may be necessary for the Project to achieve success. In the event of adverse hydrologic and/or topographic changes affecting the wetland restoration area, the Project Biologist would assess the conditions and provide adaptive management recommendations to the City and the resource agencies including but not limited to weed free BMPs such as burlap encased straw wattles, fiber rolls or burlap gravel bags; and/or additional grading.

## 12.4 FIRE

San Diego County experiences periodic wildfires. While this wetland restoration area is on the coast and within a park setting, there is still potential for a fire to affect this site. In the absence of non-native weed cover, particularly non-native grasses, there would be a very low chance of fire to carry through the wetland restoration area. Should weeds be allowed to persist, the fire threat would increase. Therefore, weed management would be an important factor in keeping this environmental stressor to a minimum.

Fire presents the possibility for faster-growing, early successional non-natives to out-compete the recovering native species. In the event of fire affecting the wetland restoration area, the Project Biologist would assess the post-fire conditions and provide adaptive management recommendations, including but not limited to an increase in weed control management.

INTENTIONALLY LEFT BLANK

# 13 FINANCIAL ASSURANCES

The City is the owner and permittee of the Project and is financially responsible for implementation and management of the wetland restoration area. Proposition C, which amended the City Charter by adding Section 55.2, designates the use of a portion of the lease revenue from Mission Bay Park for capital improvements in Mission Bay Park and for other Regional Parks. This fund is known as the Mission Bay Park Improvement Fund and would be used to fund this wetland restoration area.

To determine a cost estimate for this wetland restoration area, unit costs were derived from the City of San Diego Unit Price List and similar project cost estimates. The preliminary estimated construction cost of the preliminary design is shown in Table 15.

**Table 15**
**Preliminary Estimate of Construction Cost**

| Item | Unit | Quantity Total | Unit Price | Cost |
|---|---|---|---|---|
| Riprap (2 Ton), Per SDD-104 | CY | 2,900 | $340.00 | $986,000 |
| Import | CY | 58,000 | $30.00 | $1,740,000 |
| Low Saltmarsh (Low Chord) | SF | 150,700 | $2.80 | $421,960 |
| Mid Saltmarsh (Mid Chord) | CY | 68,700 | $2.80 | $192,360 |
| Oyster Bag Stabilization | SF | 127,900 | $5.50 | $703,450 |
| Perimeter Fence (6-foot Chain Link | LF | 1,800 | $28.00 | $50,400 |
| | | | *Subtotal Construction Cost* | *$4,094,170* |
| | | | *Contingency (30% of Total Construction Cost)* | *$1,228,251* |
| | | | **Total Construction Cost** | **$5,322,400** |

The planning and design cost estimate is based on 40% of the total construction costs. Additionally, the environmental permitting cost is based on 5% of the total construction costs (Appendix A). The total preliminary estimated cost of the Cudahy Creek preliminary design is shown in Table 16.

**Table 16**
**Preliminary Design Estimated Cost**

| Item | Cost |
|---|---|
| Total Construction Cost | $5,322,400 |
| Planning and Design (40% of Construction Cost) | $2,129,000 |
| Environmental Permitting (5% of Construction Cost) | $266,100 |
| PEP, Maintenance & Monitoring | $599,300 |
| **Total Cost** | **$8,316,800** |

# 14 COMPLETION OF RESTORATION

## 14.1 NOTIFICATION OF COMPLETION

At the end of Year 5, the final annual monitoring report would be submitted to the resource agencies including an evaluation of restoration program success. The report would make a determination of whether the requirements and performance standards of the restoration program have been achieved. Successful restoration would be considered to have been achieved when the wetland restoration area is self-sustaining without supplemental irrigation or any substantial remedial activities for a minimum of 2 years. Following attainment of final performance standards, a vegetation mapping effort would be conducted to document the post-Project site conditions and be included in the final annual report. At the request of the resource agencies, a formal jurisdictional wetland delineation may be performed of the wetland restoration area to assist in determination of the Project's fulfillment of its intent.

At the conclusion of the 5-year maintenance and monitoring period, or at such time that the Project has achieved the performance standards, the Project Biologist would inform the applicant and Resource Agencies and request final approval. A site review would be scheduled for all interested parties to review the wetland restoration area to confirm final conditions.

Following the maintenance and monitoring period, construction BMPs and any temporary fencing would be removed.

At the end of Year 5, or at such time that the Project has achieved the performance standards, a final report would be prepared to include the evaluation of the success of the restoration program and make a determination of whether the requirements and performance standards criteria of the restoration program have been achieved.

INTENTIONALLY LEFT BLANK

# 15 MANAGMENT ELEMENT

This Restoration site would be managed long-term by the City of San Diego Parks and Recreation Department Open Space division in accordance with the MSCP Subarea Plan and/or a Long-Term Habitat Management Plan, and consistent with future updates to the Mission Bay Park Natural Resources Management Plan (NRMP).

Prior to subsequent project-level approval and as part of the project-specific environmental review pursuant to CEQA, the Conceptual Habitat Restoration and Monitoring Plan would be updated to reflect specific site protection, long-term habitat management, and long-term habitat management funding mechanism.

INTENTIONALLY LEFT BLANK

# 16 REFERENCES

58 FR 12864–12874. Final rule: "Endangered and Threatened Wildlife and plants; Determination of Threatened Status for the Pacific Coast population of the Western Snowy Plover." March 5, 1993.

Brumbaugh, R.D., M.W. Beck, L.D. Coen, L. Craig and P. Hicks. 2006. *A Practitioners' Guide to the Design and Monitoring of Shellfish Restoration Projects: Ecosystem Services Approach*. Arlington, Virginia: The Nature Conservancy.

Brumbaugh, R.D. and L.D. Coen. 2009. "Contemporary approaches for small scale oyster reef restoration to address substrate versus recruitment limitation: A review and comments relevant for the Olympia oyster, *Ostrea lurida* Carpenter 1864." *Journal of Shellfish Research* 28:147–161.

City of San Diego. 2021. *Mission Bay Park Master Plan Update*. Adopted August 2, 1994. Amended November 23, 2021. https://www.sandiego.gov/sites/default/files/mb_park_master_plan.pdf.

City of San Diego. 2018. *San Diego Municipal Code, Land Development Code, Biology Guidelines*. Adopted September 28, 1999. Amended February 1, 2018. https://www.sandiego.gov/sites/default/files/amendment_to_the_land_development_manual_biology_guidelines_february_2018_-_clean.pdf.

CWMW (California Wetlands Monitoring Workgroup). 2013. California Rapid Assessment Method (CRAM) for Wetlands, CRAM Field Books - Episodic Riverine. Episodic Riverine version 1.0. December 2015.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* FWS/OBS-79/31. Prepared for U.S. Fish and Wildlife Service. December 1979. http://www.fws.gov/wetlands/documents/classification-of-wetlands-and-deepwater-habitats-of-the-united-states.pdf.

Dudek. 2025. *Biological Resources Technical Report Mission Bay Park Improvements Program*. Prepared for the City of San Diego.

Everest (Everest International Consultants Inc.). 2018. *ReWild Mission Bay: Wetlands Restoration Feasibility Study Report*. Prepared by Everest in association with Nordby Biological Consulting, New West Land Company, and AECOM for the San Diego Audubon Society. Funded by the California State Coastal Conservancy U.S. Fish and Wildlife Service (Coastal Program). September 2018.

Merkel (Merkel & Associates, Inc.). 2003. *Cudahy Creek Region of Mission Bay Wetland Treatment Marsh Design Direction Issue Paper, Technical Memorandum #1*. Prepared for the City of San Diego, Public Buildings and Parks. February 2003.

Merkel. 2013. Mission Bay Park Eelgrass Inventory Bathymetric Change Analysis 1988, 1992, 1997, 2001, 2007, and 2013. Prepared for the City of San Diego Public Works Department, E&CP, AEP Divisions.

Moffatt & Nichol. 2019a. Draft Mission Bay Hydrology Study. Mission Bay PEIR. April 5, 2019.

Moffatt & Nichol. 2019b. *Preliminary Engineering Report North Fiesta Island Wetland Restoration*. June 27, 2019.

NOAA (National Oceanic and Atmospheric Administration). 2019. NOAA Tides & Currents. www.tidesandcurrents.noaa.gov/.

NOAA. 2024. "Datums for 9410170, San Diego CA." NOAA Tides & Currents. https://tidesandcurrents.noaa.gov/datums.html?id=9410170.

NRCS (Natural Resources Conservation Service). 2021. U.S. Department of Agriculture. Soil Survey Geographic (SSURGO) Database for San Diego, California. Accessed January 2021. https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/california/CA638/0/part1.pdf.

Oberbauer, T., M. Kelly, and J. Buegge. 2008. *Draft Vegetation Communities of San Diego County*. Based on "Preliminary Descriptions of the Terrestrial Natural Communities of California," by R.F. Holland, PhD, October 1986. March 2008.

RWQCB (Regional Water Quality Control Board). 2021. *State Policy for Water Quality Control: State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State. State Water Resources Control Board*. Adopted April 2, 2019. Revised April 6, 2021.

SES (Schaefer Ecological Solutions). 2025. *Aquatic Resources Delineation Report Mission Bay Park Improvement Zone*. September 2025.

Smith, R.D., A. Amman, C. Bartoldus, and M.M. Brinson. 1995. *An Approach for Assessing Wetland Functions Using Hydrogeomorphic Classification, Reference Wetlands, and Functional Indices*. Technical Repot. WRP-DE-9. Vicksburg, Mississippi: U.S. Army Engineer Waterways Experiment Station.

Tronske, N.B., T.A. Parker, H.D. Henderson, J.L. Burnaford, and D.C. Zacherl. 2018. "Densities and Zonation Patterns of Native and Non-Indigenous Oysters in Southern California Bays." *Wetlands* 38:1313–1326. https://doi.org/10.1007/s13157-018-1055-0.

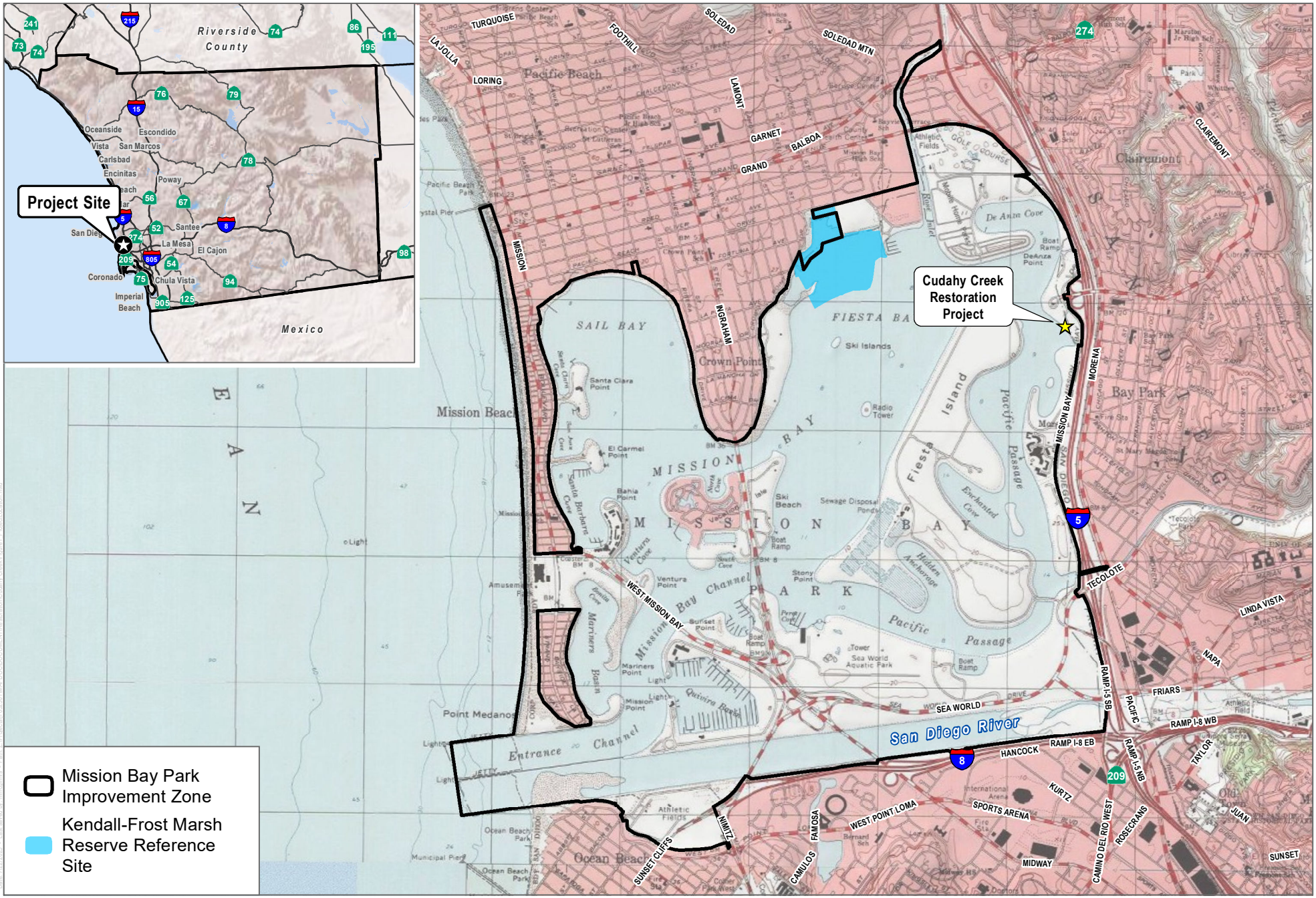
USACE (U.S. Army Corps of Engineers). 2015. Final 2015 Regional Compensatory Mitigation and Monitoring Guidelines for South Pacific Division USACE. January 12, 2015. http://www.spd.ACOE.army.mil/Portals/13/docs/regulatory/mitigation/MitMon.pdf.

USACE and EPA (U.S. Environmental Protection Agency). 2008. "Federal Register, Part II, Department of Defense, Department of the Army, Corps of Engineers, 33 CFR Parts 325 and 332, Environmental Protection Agency, 40 CFR Part 230 Compensatory Mitigation for Losses of Aquatic Resources; Final Rule." April 10.

USDA (U.S. Department of Agriculture). 2021. Web Soil Survey. USDA Natural Resources Conservation Service, Soil Survey Staff. Accessed January 2021. http://websoilsurvey.nrcs.usda.gov/.

Weightman, C. 2017. "Agency Interview. Multi-benefit Restoration Projects." In-person conversation between C. Weightman (California Department of Fish and Wildlife) and L. Monarres (Dudek). August 10, 2017.

INTENTIONALLY LEFT BLANK




SOURCE: USGS 7.5-minute La Jolla Quadrangle

DUDEK

0 1,650 3,300 Feet

**FIGURE 1**

Project Location

Cudahy Creek Wetlands Restoration Project Conceptual Habitat Restoration and Monitoring Plan

INTENTIONALLY LEFT BLANK


SOURCE: ESRI 2024; City of San Diego 2018

DUDEK

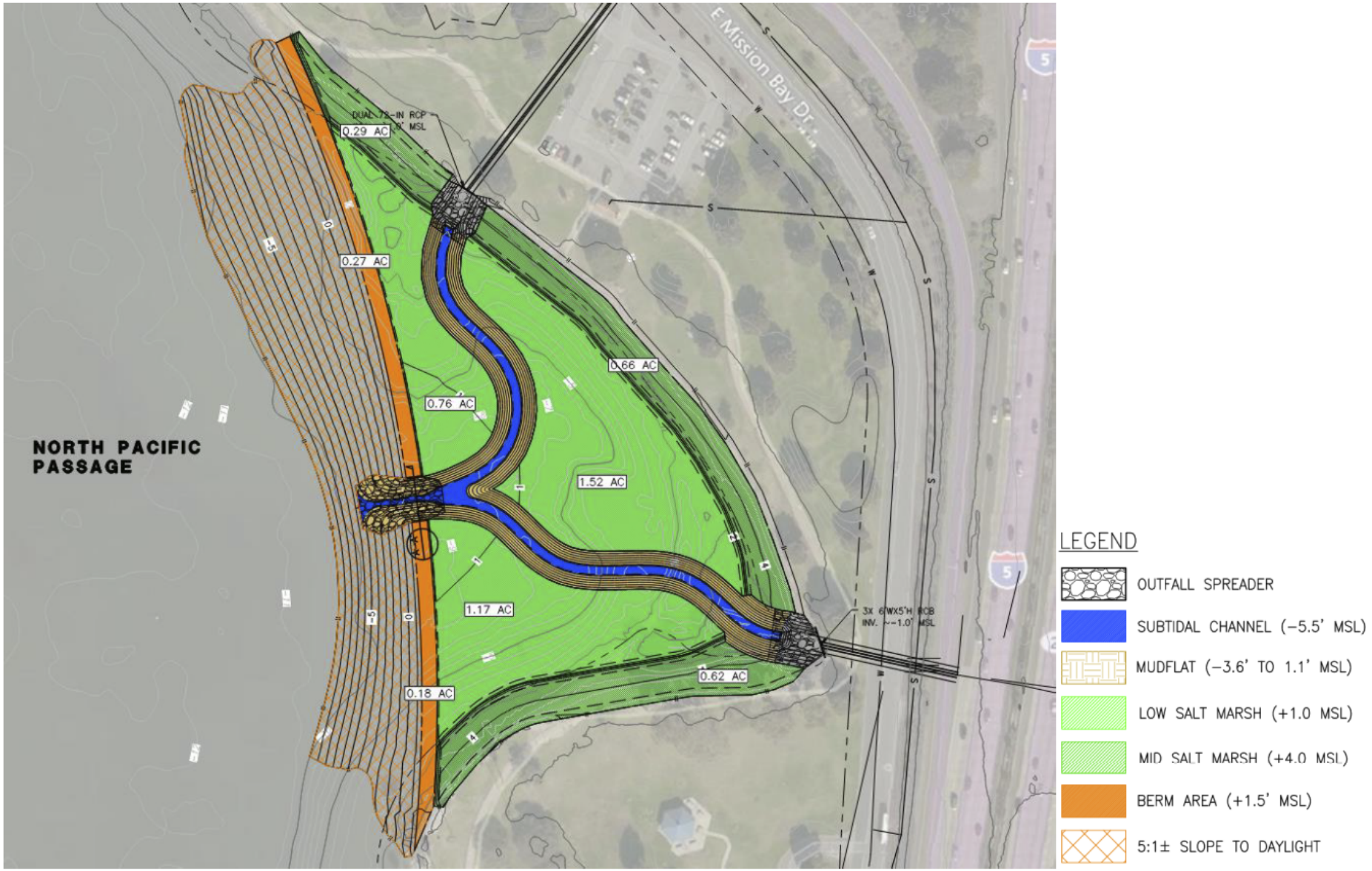
0 420 840 Feet

**FIGURE 2**

Project Site

Cudahy Creek Wetlands Restoration Project Conceptual Habitat Restoration and Monitoring Plan

INTENTIONALLY LEFT BLANK




SOURCE: MOFFAT NICHOL 2025

**FIGURE 3**

Conceptual Site Plan

Cudahy Creek Wetlands Restoration Project Conceptual Habitat Restoration and Monitoring Plan

DUDEK

INTENTIONALLY LEFT BLANK


SOURCE: SANGIS 2023; City of San Diego 2018

DUDEK

0 100 200 Feet

**FIGURE 4**

Impacts to Jurisdictional Resources

Cudahy Creek Wetlands Restoration Project Conceptual Habitat Restoration and Monitoring Plan

INTENTIONALLY LEFT BLANK


**Aerial View of Mission Beach and False Bay – 1930 (www.sandiego.gov)**

False Bay was historically unnavigable as the channels were narrow and shallow. The City began dredging in 1946 to create Mission Bay Park. Dredging operations, and subsequent land creation with dredged and upland material, occurred between 1946 and 1956, 1959 and 1961, and 1963 and 1964 to create the current configuration of Mission Bay. Landforms, such as Fiesta Island, were formed with what is geologically described as Artificial Fill. This Artificial Fill consists primarily of loose to medium dense silty sands with intermittent layers of soft clay.

SOURCE: RICK ENGINEERING, 2019

**FIGURE 5**

Historic Aerial Photo

INTENTIONALLY LEFT BLANK


SOURCE: SANGIS 2023; City of San Diego 2018

DUDEK

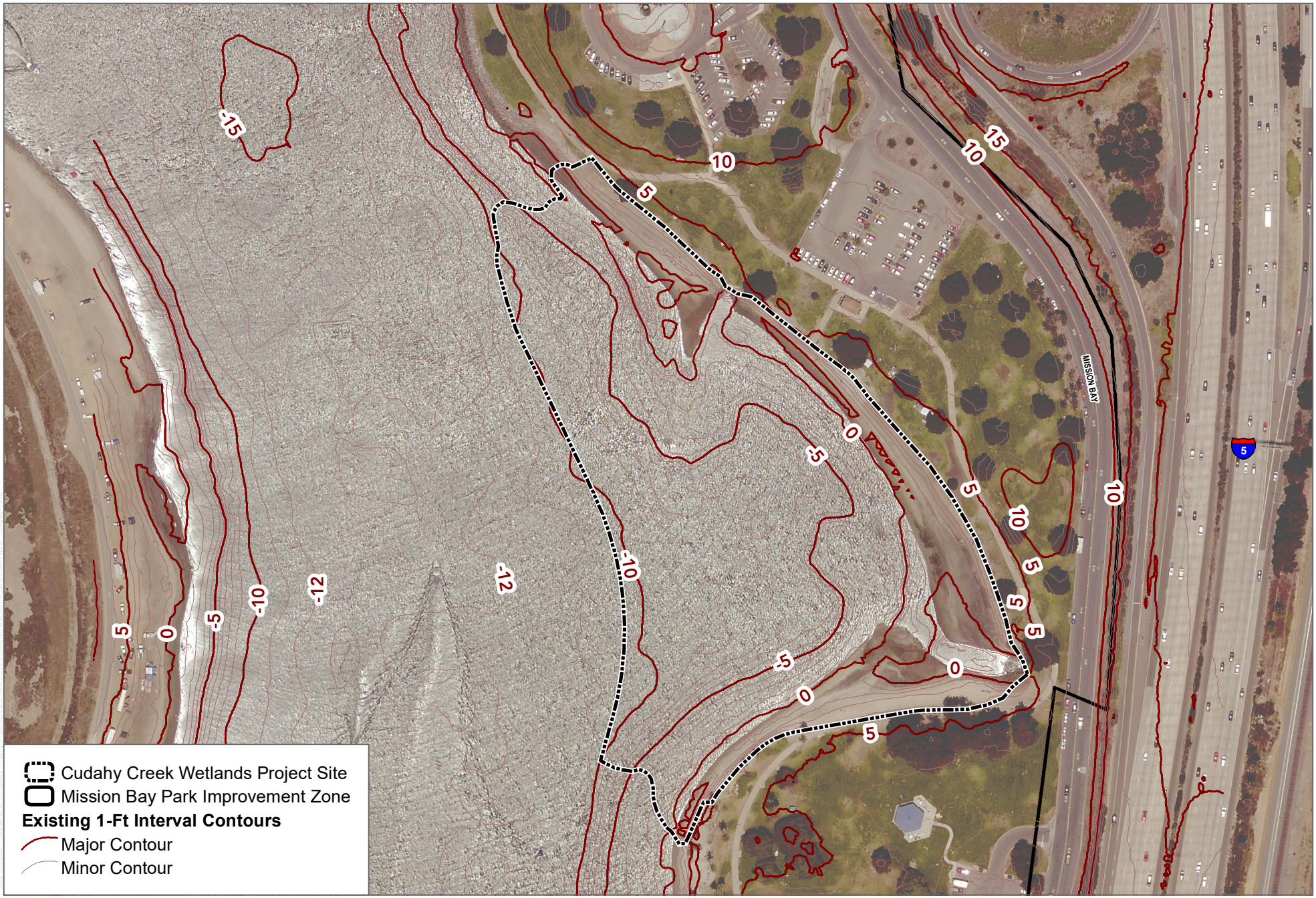
0 100 200 Feet

**FIGURE 6**

Existing Habitats and Special-Status Plants

Cudahy Creek Wetlands Restoration Project Conceptual Habitat Restoration and Monitoring Plan

INTENTIONALLY LEFT BLANK




SOURCE: SANGIS 2017; RICK ENGINEERING 2019

DUDEK

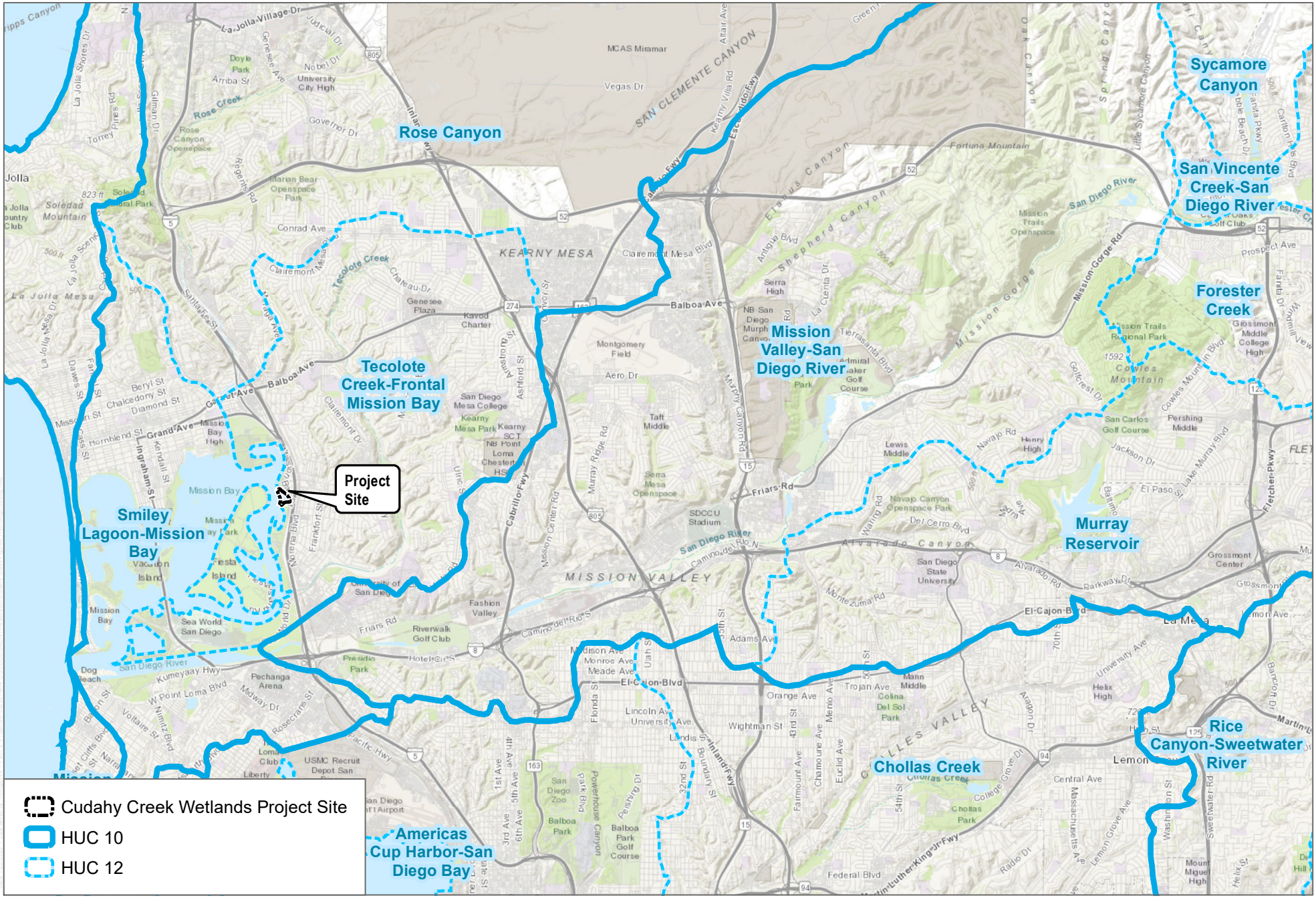
0 100 200 Feet

**FIGURE 7**

Topography

Cudahy Creek Wetlands Restoration Project Conceptual Habitat Restoration and Monitoring Plan

INTENTIONALLY LEFT BLANK




SOURCE: SANGIS 2017; USGS 2018; RICK ENGINEERING 2019

DUDEK

0 4,200 8,400 Feet

**FIGURE 8**

Hydrologic Setting

Cudahy Creek Wetlands Restoration Project Conceptual Habitat Restoration and Monitoring Plan

INTENTIONALLY LEFT BLANK


SOURCE: MOFFAT & NICHOL, 2019

**FIGURE 8**

Project Area Outfalls and Storm Drain System

Cudahy Creek Wetlands Restoration Project Conceptual Habitat Restoration and Monitoring Plan

DUDEK

INTENTIONALLY LEFT BLANK


SOURCE: SANGIS 2023; USDA 2018; RICK ENGINEERING 2019

DUDEK

0 100 200 Feet

**FIGURE 10**

Soils

Cudahy Creek Wetlands Restoration Project Conceptual Habitat Restoration and Monitoring Plan

INTENTIONALLY LEFT BLANK



SOURCE: SANGIS 2023; City of San Diego 2018

DUDEK

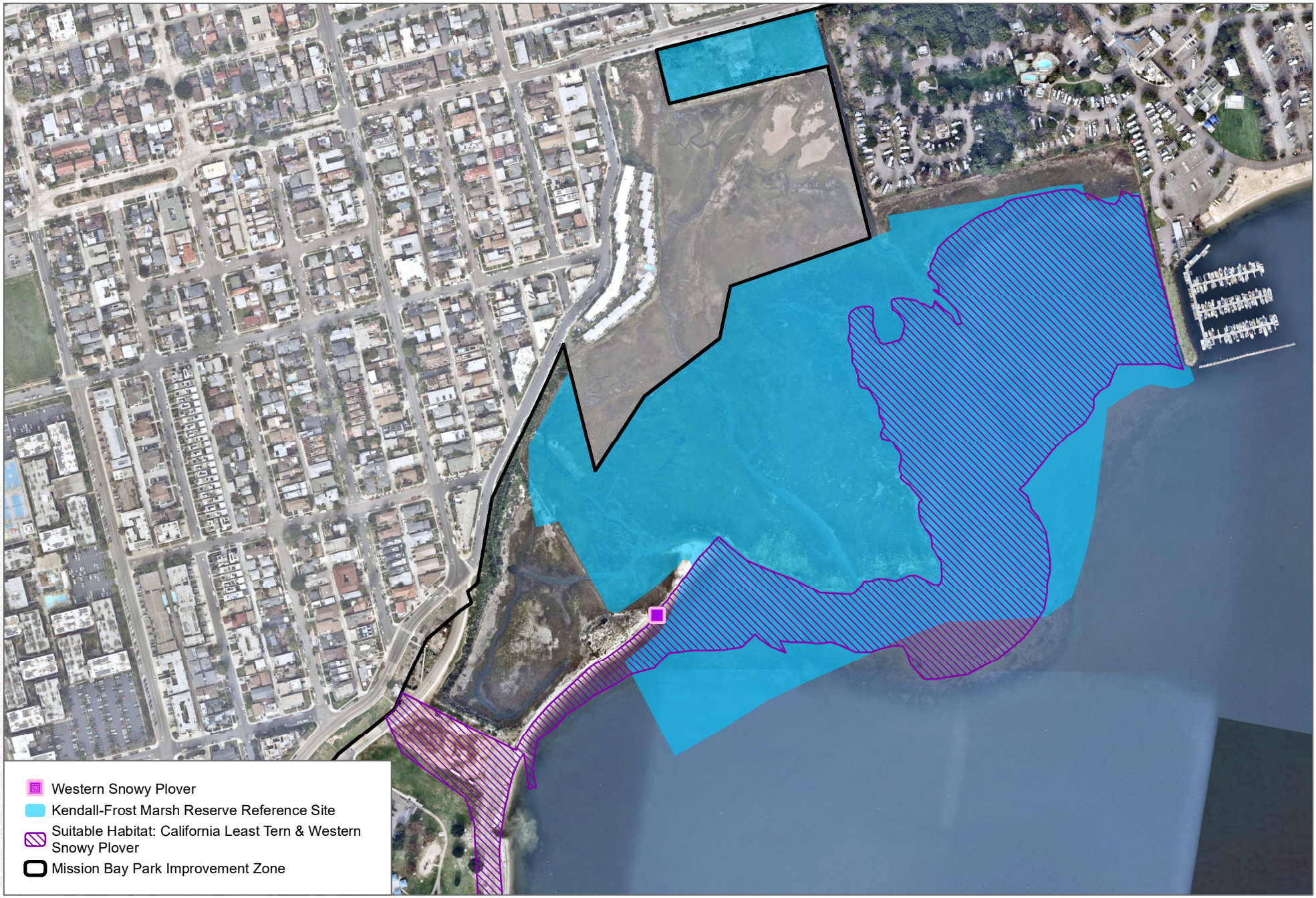
0 100 200 Feet

**FIGURE 11**

Special-Status Wildlife Species

Cudahy Creek Wetlands Restoration Project Conceptual Habitat Restoration and Monitoring Plan

INTENTIONALLY LEFT BLANK




SOURCE: SANGIS 2023; City of San Diego 2018

DUDEK

0 255 510 Feet

**FIGURE 12**

Reference Site

Cudahy Creek Wetlands Restoration Project Conceptual Habitat Restoration and Monitoring Plan

INTENTIONALLY LEFT BLANK

# APPENDIX A

*Preliminary Set of Construction Drawings*

# CUDAHY CREEK (LEISURE LAGOON) WETLAND RESTORATION

## CONTRACTOR'S RESPONSIBILITIES

1. PURSUANT TO SECTION 4216 OF THE CALIFORNIA GOVERNMENT CODE, AT LEAST 2 WORKING DAYS PRIOR TO EXCAVATION, YOU MUST CONTACT THE REGIONAL NOTIFICATION CENTER (E.G., UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA) AND OBTAIN AN INQUIRY IDENTIFICATION NUMBER.
2. NOTIFY SDG&E AT LEAST 10 WORKING DAYS PRIOR TO EXCAVATING WITHIN 10' OF SDG&E UNDERGROUND HIGH VOLTAGE TRANSMISSION POWER LINES (I.E., 69 KV & HIGHER).

## CONSTRUCTION STORM WATER PROTECTION NOTES

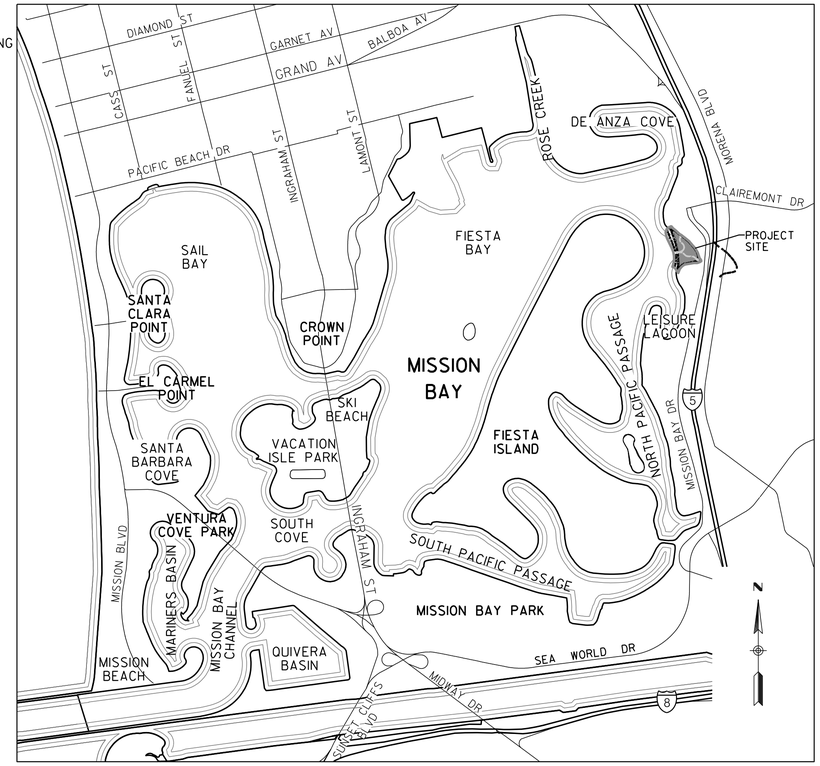
1. TOTAL SITE DISTURBANCE AREA (ACRES) -
   HYDROLOGIC UNIT/ WATERSHED -
   HYDROLOGIC SUBAREA NAME & NO. -
2. THE CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE
   - ☐ WPCP
     THE PROJECT IS SUBJECT TO MUNICIPAL STORM WATER PERMIT NO. R9-2013-0001 AS AMENDED BY R9-2015-0001 AND R9-2015-0100
   - ☐ SWPPP
     THE PROJECT IS SUBJECT TO MUNICIPAL STORM WATER PERMIT NO. R9-2013-0001 AS AMENDED BY R9-2015-0001 AND R9-2015-0100 AND CONSTRUCTION GENERAL PERMIT ORDER 2009-0009-DWQ AS AMENDED BY ORDER 2010-0014-DWQ AND 2012-0006-DWQ
     TRADITIONAL: RISK LEVEL 1 ☐ 2 ☐ 3 ☐
     LUP: RISK TYPE 1 ☐ 2 ☐ 3 ☐
3. CONSTRUCTION SITE PRIORITY
   ☐ ASBS ☐ HIGH ☐ MEDIUM ☒ LOW

## MONUMENTATION / SURVEY NOTES

THE CONTRACTOR SHALL BE RESPONSIBLE FOR SURVEY MONUMENTS AND/OR VERTICAL CONTROL BENCHMARKS WHICH ARE DISTURBED OR DESTROYED BY CONSTRUCTION. A LICENSED LAND SURVEYOR OR LICENSED CIVIL ENGINEER AUTHORIZED TO PRACTICE LAND SURVEYING IN THE STATE OF CALIFORNIA SHALL FIELD LOCATE, REFERENCE, AND/OR PRESERVE ALL HISTORICAL OR CONTROLLING MONUMENTS PRIOR TO ANY EARTHWORK, DEMOLITION, OR SURFACE IMPROVEMENTS. IF DESTROYED, A LICENSED LAND SURVEYOR SHALL REPLACE SUCH MONUMENT(S) WITH APPROPRIATE MONUMENT(S). WHEN SETTING SURVEY MONUMENTS USED FOR RE-ESTABLISHMENT OF THE DISTURBED CONTROLLING SURVEY MONUMENTS AS REQUIRED BY SECTIONS 6730.2 AND 8771OF THE BUSINESS AND PROFESSIONS CODE OF THE STATE OF CALIFORNIA. A CORNER RECORD OR RECORD OF SURVEY, AS APPROPRIATE, SHALL BE FILED WITH THE COUNTY SURVEYOR. IF ANY VERTICAL CONTROL IS TO BE DISTURBED OR DESTROYED, THE CITY OF SAN DIEGO FIELD SURVEY SECTION SHALL BE NOTIFIED IN WRITING AT LEAST 7 DAYS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF REPLACING ANY VERTICAL CONTROL BENCHMARKS DESTROYED BY THE CONSTRUCTION.

## SHEET INDEX

| SHEET NO. | DISCIPLINE CODE | TITLE | LIMITS |
|---|---|---|---|
| 1 | G-1 | COVER SHEET | |
| 2 | C-1 | GRADING PLAN | |




KEY MAP
NOT TO SCALE

## DISCIPLINE CODE

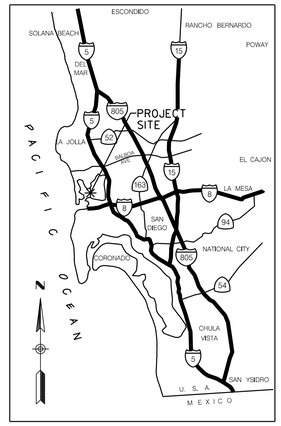
- G GENERAL
- C CIVIL

## ABBREVIATIONS

| | |
|---|---|
| CY | CUBIC YARD |
| EL, ELEV | ELEVATION |
| EX, EXIST | EXISTING |
| FG | FINISH GRADE |
| FT | FEET |
| RCB | REINFORCED CONCRETE BOX |
| RCP | REINFORCED CONCRETE PIPE |
| SD | STORM DRAIN |
| TYP | TYPICAL |
| IE | INVERT ELEVATION |
| MIN | MINIMUM |
| PROP | PROPOSED |
| MIN | MINIMUM |

## WORK TO BE PERFORMED

THE IMPROVEMENTS CONSIST OF WETLAND CREATION AND STORM DRAIN OUTFALL IMPROVEMENTS, INCLUDING SDD-104 RIP RAP.




VICINITY MAP
NOT TO SCALE

## FIELD DATA

BENCHMARK: BRASS PLUG AT THE SE CURB RETURN AT CROWN POINT DR AND INGRAHAM ST
ELEV.= 34.518, NGVD29

FIELD NOTES: N/A

BASIS OF BEARINGS / COORDINATES:
GPS 157 TO 154: N23° 40'56"W, HD 10,592.61FT
CCS 83 ZONE 6, NAD83 (EPOCH 1991.35)

DATUM: MEAN SEA LEVEL, (NVGD29)

REFERENCES: ROS 14492

## LEGEND

| IMPROVEMENTS | STANDARD DRAWINGS | SYMBOL |
|---|---|---|
| MAJOR CONTOUR | | 10 |
| MINOR CONTOUR | | 4 |
| DAYLIGHT | | |
| SUBTIDAL CHANNEL | | |
| LOW SALT MARSH | | |
| MID SALT MARSH | | |
| BERM AREA | | |
| OYSTER BAG STABILIZATION | | X |
| RIP RAP | SDD-104 | |

| EXISTING STRUCTURES | |
|---|---|
| EX STORM DRAIN | |
| EX MAJOR CONTOUR | 10 |
| EX MINOR CONTOUR | 4 |

CUDAHY CREEK

G-1

| CONSTRUCTION CHANGE / ADDENDUM | | | |
|---|---|---|---|
| CHANGE | DATE | AFFECTED OR ADDED SHEET NUMBERS | APPROVAL NO. |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

WARNING
0 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Public Works


RICK ENGINEERING COMPANY
San Diego
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619-291-0707
(FAX) 619-291-4165
rickengineering.com
Riverside - Orange - Sacramento - San Luis Obispo - Phoenix - Tucson - Denver


J-18097-AC

MISSION BAY PROGRAM EIR
CUDAHY CREEK (LEISURE LAGOON)
WETLAND RESTORATION
COVER SHEET

SPEC. NO.

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 1 OF 2 SHEETS

WBS

APPROVED: FOR CITY ENGINEER — DATE — PRINT NAME — RCE#

SUBMITTED BY: PROJECT MANAGER

CHECKED BY: PROJECT ENGINEER

| DESCRIPTION | BY | APPROVED | DATE | FILMED |
|---|---|---|---|---|
| ORIGINAL | REC | | | |

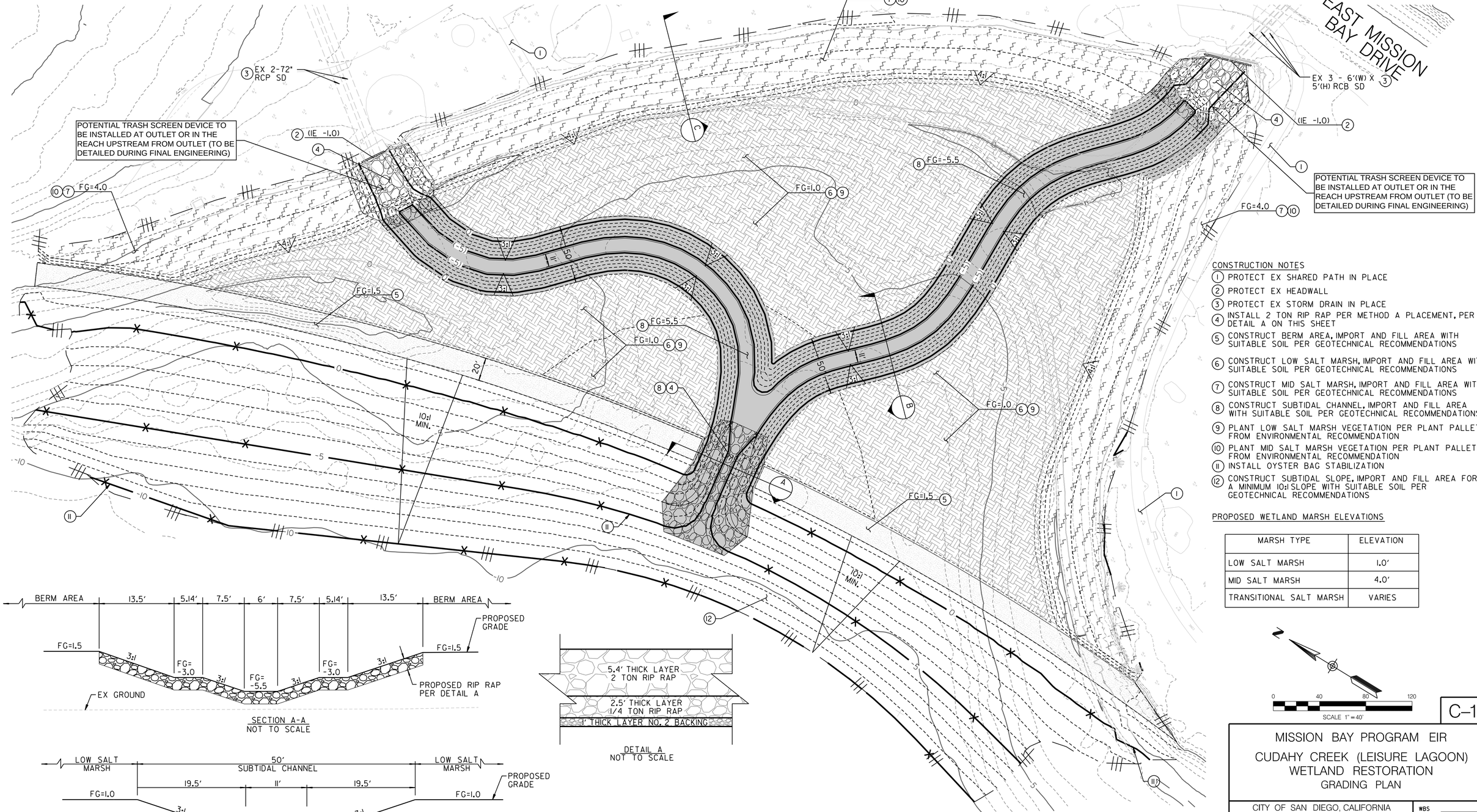
226-1701 CCS27 COORDINATE

1866-6261 CCS83 COORDINATE

XXXXX-01-D

CONTRACTOR
INSPECTOR
DATE STARTED
DATE COMPLETED

PRELIMINARY
NOT FOR CONSTRUCTION




CONSTRUCTION NOTES

1. PROTECT EX SHARED PATH IN PLACE
2. PROTECT EX HEADWALL
3. PROTECT EX STORM DRAIN IN PLACE
4. INSTALL 2 TON RIP RAP PER METHOD A PLACEMENT, PER DETAIL A ON THIS SHEET
5. CONSTRUCT BERM AREA, IMPORT AND FILL AREA WITH SUITABLE SOIL PER GEOTECHNICAL RECOMMENDATIONS
6. CONSTRUCT LOW SALT MARSH, IMPORT AND FILL AREA WITH SUITABLE SOIL PER GEOTECHNICAL RECOMMENDATIONS
7. CONSTRUCT MID SALT MARSH, IMPORT AND FILL AREA WITH SUITABLE SOIL PER GEOTECHNICAL RECOMMENDATIONS
8. CONSTRUCT SUBTIDAL CHANNEL, IMPORT AND FILL AREA WITH SUITABLE SOIL PER GEOTECHNICAL RECOMMENDATIONS
9. PLANT LOW SALT MARSH VEGETATION PER PLANT PALLETE FROM ENVIRONMENTAL RECOMMENDATION
10. PLANT MID SALT MARSH VEGETATION PER PLANT PALLETE FROM ENVIRONMENTAL RECOMMENDATION
11. INSTALL OYSTER BAG STABILIZATION
12. CONSTRUCT SUBTIDAL SLOPE, IMPORT AND FILL AREA FOR A MINIMUM 10:1 SLOPE WITH SUITABLE SOIL PER GEOTECHNICAL RECOMMENDATIONS

PROPOSED WETLAND MARSH ELEVATIONS

| MARSH TYPE | ELEVATION |
|---|---|
| LOW SALT MARSH | 1.0' |
| MID SALT MARSH | 4.0' |
| TRANSITIONAL SALT MARSH | VARIES |



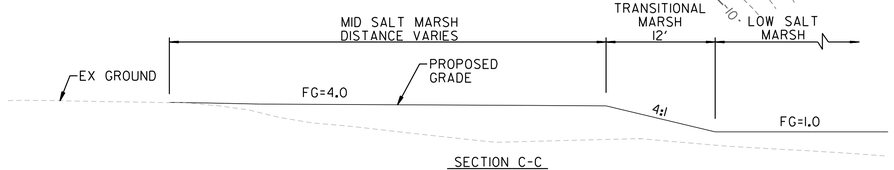

SECTION A-A
NOT TO SCALE




DETAIL A
NOT TO SCALE




SECTION B-B
NOT TO SCALE




SECTION C-C
NOT TO SCALE




C-1

MISSION BAY PROGRAM EIR

CUDAHY CREEK (LEISURE LAGOON) WETLAND RESTORATION

GRADING PLAN

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 2 OF 2 SHEETS

WBS

APPROVED: FOR CITY ENGINEER — DATE
PRINT NAME — RCE#

SUBMITTED BY: PROJECT MANAGER
CHECKED BY: PROJECT ENGINEER

| DESCRIPTION | BY | APPROVED | DATE | FILMED |
|---|---|---|---|---|
| ORIGINAL | REC | | | |

226-1701 CCS27 COORDINATE
1866-6261 CCS83 COORDINATE

CONTRACTOR — DATE STARTED
INSPECTOR — DATE COMPLETED

XXXXX-02-D

PRELIMINARY
NOT FOR CONSTRUCTION

RICK ENGINEERING COMPANY
San Diego
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619-291-0707
(FAX) 619-291-4165
rickengineering.com
Riverside - Orange - Sacramento - San Luis Obispo - Phoenix - Tucson - Denver

C:\RICK\Projects\C_SD_T\18097_MissionBayPEIR\Civil\Leisure Lagoon\Sheets\18097AC_C-1_Leisure Lagoon.dgn

06-AUG-2020 15:25 kanub