SAN MATEO COUNTY PARKS DEPARTMENT

NOTICE OF INTENT TO ADOPT
A NEGATIVE DECLARATION

A notice, pursuant to the California Environmental Quality Act of 1970, as amended (Public Resources Code 21,000, et seq.) that the following project: Coyote Point Recreation Area Shoreline and Promenade Improvement Project, when implemented will not have a significant impact on the environment.

OWNER: San Mateo County Parks Department

APPLICANT: San Mateo County Parks Department

ASSESSOR'S PARCEL NO.: 029-321-060

PROJECT DESCRIPTION AND LOCATION

The Coyote Point Recreation Area (Coyote Point) is located in the County of San Mateo between the cities of Burlingame and San Mateo. The project site within the Coyote Point Recreation Area is located along 1800 feet of San Francisco Bay shoreline from the Coyote Point headland west to the Humane Society facility. The existing conditions along the bay front include shoreline protection features, windsurf access, promenade, restrooms, lawn area, and parking areas. The proposed changes to the shoreline and beach area facilities include rock revetment, creation of a crenulate shaped bay, beach area and dunes, reconstruction of the existing promenade and beach access, parking and restroom improvements.

FINDINGS AND BASIS FOR A NEGATIVE DECLARATION

The Parks Department has reviewed the initial study for the project and, based upon substantial evidence in the record, finds that:

1. The project will not adversely affect water or air quality or increase noise levels substantially;

2. The project will not have adverse impacts on the flora or fauna of the area;

3. The project will not degrade the aesthetic quality of the area;

4. The project will not have adverse impacts on traffic or land use;

5. In addition, the project will not:

a. Create impacts, which have the potential to degrade the quality of the environment.

b. Create impacts, which achieve short-term to the disadvantage of long-term environmental goals.

c. Create impacts for a project, which are individually limited, but cumulatively considerable;

d. Create environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly.

The County of San Mateo has, therefore, determined that the environmental impact of the project is insignificant.

MITIGATION MEASURES included in the project to avoid potentially significant effects:

Mitigation Measure 1 – Avoidance of Eelgrass. The direct loss of eelgrass shall be avoided at all stages of construction. Prior to construction all existing eelgrass patches shall be surveyed and flagged. All attempts shall be made during construction to avoid direct impacts to these patches. A construction monitoring plan shall be created in consultation with NOAA Fisheries as part of the Army Corps of Engineers Section 404 permitting process.

Mitigation Measure 2 – Control of Fugitive Dust. Implement feasible control measures for construction emission of fugitive dust. The County shall ensure implementation of the following mitigation measures during project construction, in accordance with BAAQMD standard mitigation requirements:

- Water all active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.
- Pave, apply water three times daily, or apply (non-toxic soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.

Mitigation Measure 3 – Stockpiled Materials. Stockpiled materials shall be enclosed, covered, or have soil binders applied for prevention of fugitive dust emissions and water erosion. Control measures shall be implemented in accordance with BAAQMD standard mitigation requirements. Vegetative cover such as application of a hydro seed erosion control mix using native non-invasive species may be used. Any hydro seeding or use of erosion control mats should be implemented in conformance with Best Management Practices outlined in the San Mateo County Watershed Protection Standards.

Mitigation Measure 4 – New Replacement Restroom. The County shall develop a restroom facility in the beach area of Coyote Point Recreation Area to replace the

restroom facility removed to construct the Project. The replaced restroom shall provide a minimum of three toilet fixtures and one shower in each the men's and women's restroom. The replacement restroom shall be constructed within 2 years of project completion.

Mitigation Measure 5 – New Replacement Parking. The County shall develop new parking areas within the Coyote Point Recreation Area to replace the 105 spaces removed to construct the Project. There shall be no net loss in parking capacity at the park. Replacement parking shall be available to the public within 2 years of project completion.

RESPONSIBLE AGENCY CONSULTATION

US. Army Corps of Engineers
Bay Conservation and Development Commission
Regional Water Quality Control Board
City of San Mateo
City of Burlingame

INITIAL STUDY

The San Mateo County Parks Department has reviewed the environmental evaluation of this project and has found that the probable environmental impacts are insignificant as mitigated. A copy of the Initial Study is attached.

REVIEW PERIOD May 28, 2009 to June 29, 2009

A copy of the Negative Declaration can be viewed on the San Mateo County Park website at www.eparks.net under Park Planning. All comments regarding the correctness, completeness, or adequacy of this Negative Declaration must be received by the County Parks Department, 455 County Center, Fourth Floor, Redwood City, no later than 5:00 p.m., June 29, 2009.

CONTACT PERSON

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Coyote Point Recreation Area
Shoreline and Promenade Improvement Project

Initial Study/
Mitigated Negative Declaration

May 2009

County of San Mateo
Department of Parks

Coyote Point Recreation Area
Shoreline and Promenade Improvement Project

Initial Study/
Negative Declaration

May 2009

Prepared for:
San Mateo County Parks Department
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COYOTE POINT RECREATION AREA
SHORELINE AND PROMENADE IMPROVEMENT PROJECT
INITIAL STUDY

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County of San Mateo
Parks Department

INITIAL STUDY
ENVIRONMENTAL EVALUATION CHECKLIST
(To Be Completed By Parks Planning Section)

I. BACKGROUND

Project Title: Coyote Point Recreation Area – Shoreline and Promenade Improvement Project

File No.:

Project Location: Coyote Point Recreation Area, San Mateo County

Assessor's Parcel No.: 029-321-060

Applicant/Owner: San Mateo County Parks Department

Date Environmental Information Form Submitted: May 26, 2009

PROJECT DESCRIPTION

1. Overview

The Coyote Point Recreation Area (Coyote Point) is located in the County of San Mateo between the cities of Burlingame and San Mateo (Figure 1, Project Site Location). The park comprises 149 land acres and 538 water acres of the San Francisco Bay. Coyote Point is a popular destination with annual visitation estimated at 240,000 visitors. Popular recreation activities include picnicking, windsurfing, swimming, informal turf play, playground activities, special events, boating, fishing, and sightseeing. The Marina area, which includes a private Yacht Club, offers boating opportunities ranging from motor boating, and sailing, to kayaking. The Pistol and Rifle Range and the Coyote Point Museum of Environmental Education provide additional recreation and educational opportunities. The regional Bay Trail (the recreational trail route for the Juan Bautista de Anza National Historic Trail overlays on the Bay Trail in this location) and various internal trails within the recreation area provide linear corridors for walking, running, skating, bicycling and observing shoreline aquatic life.

A Draft Master Plan for Coyote Point was prepared in 2002 and not completed. An updated and Final Master Plan (Amphion 2008) was approved by San Mateo County on February 26, 2008 (Figure 2, Coyote Point Illustrative Master Plan). The purpose of the revised Master Plan was to make improvements to landscape and infrastructure, update existing recreation facilities to improve safety and disability access, enhance natural resources, and provide educational opportunities for visitors regarding biotic and cultural resources. Additional special studies were recommended by the Master Plan including the proposed stabilization of the beach shoreline along the San Francisco Bay, which is subject to severe erosion. In April 2008, a Conceptual Design Report (PWA 2008) was prepared for the County Parks and Recreation Department which outlined several design alternatives to stabilize the beach shoreline. The County selected Conceptual Alternative 5 as the Preferred Alternative (Figure 3, Preferred Conceptual Alternative) and directed the preparation of a Preliminary Design Report to implement this alternative (PWA 2009). The Preferred Alternative is presented in this Initial Study as the proposed design for the Shoreline and Promenade Improvement Project (Project). The purpose of the proposed Project is to develop a sustainable solution to the coastal erosion problem along the San Francisco Bay at the park shoreline while facilitating good public access to the beach and water for a variety of users, particularly swimmers and windsurfers.

2. Project Design Features

The project site within the Coyote Point Recreation Area is located along 1800 feet of San Francisco Bay shoreline from the Coyote Point headland west to the Humane Society facility. The existing conditions along the bayfront include shoreline protection features, windsurf access, promenade, restrooms, lawn area, and parking areas (Figure 4, Existing Coastal Frontage). The proposed changes to the shoreline and beach area facilities are described below and shown in the project site plan (Figure 5, Plan View of Proposed Western Shoreline Improvements and Figure 6, Plan View of Proposed Eastern Shoreline Improvements. The total project area including the construction footprint and equipment staging areas is 10.67 acres. Roughly 2.73 acres of the site occurs in tidal land bayward of the Mean High Water (MHW) line from elevation 6.3 feet North American Vertical Datum (NAVD) to 0 feet NAVD. The remaining 7.94 acres occurs inland of the MHW line (see Figures 5 and 6).

The following project features are proposed as part of the Project. Additional detail is presented in the Preliminary Design Report in Appendix A.

Rock Revetment. In the Western Reach of the Shoreline and Promenade Improvement Area, 950 linear feet of existing rock revetment would be reconstructed. Existing materials would be removed as described in the Site Demolition description below. The slope would be rough-graded to create a workable surface and then covered in a layer of bedding material at least one foot thick with an overlay of filter fabric. Two layers of ¼ ton angular quarry stone would be placed on top of the filter fabric with top of rock elevations from 13 feet NAVD extending down to 0 feet NAVD (Figure 7, New Revetment and Windsurf Ramp Section). Large stone salvaged from the demolition will be reused. Three windsurfing access ramps would be constructed over the rock revetment using Armor Flex which is a mat of concrete blocks cabled together. The ramps would be 20 feet wide and constructed at a 3:1 slope from 11 feet NAVD to 0 feet NAVD to provide safe access ramps from the promenade to the water (Figure 7).

Crenulate-Shaped Bay. Roughly 950 feet of shoreline in the Eastern Reach would be realigned and moved up to 170 feet south (inland) of its current position. The shoreline would be reconfigured to form a crenulate or half heart shaped bay (Figure 6) engineered using local wind and wave data to minimize loss of sand from the beach. The special shape of the crenulate bay design would help to dissipate wave energy and abate the severe erosion of shoreline presently occurring. The reconfigured shoreline has been designed to promote stabilization of the beach area and the associated facilities which would be reconstructed as part of the Project. Shoreline reconfiguration requires demolition of existing facilities described further below.

The Project comprises grading the beach and bay floor out to elevation 0 feet NAVD which is approximately 100 feet from the top of the existing beach (Figure 8, New Beach Sections). Excavation in the intertidal zone would occur during low tide periods only. No equipment would be operating in the water at any time, except for the bucket of an excavator or similar when working in lower elevations, and no construction in tidal lands would occur during high tide periods. See Construction Activity Description in Appendix B. The beach floor would be excavated 3 feet in depth and then back filled with imported sand (see description below) to create a stable beach foundation (Appendix A). The beach floor would be graded to a gentle slope as illustrated in the cross-sections presented in

Figure 8. The project grading limit to elevation 0 feet NAVD would be scaled back to elevation 3 feet NAVD (Figure 8) depending on design and funding constraints.

Beach Area and Dunes. Roughly 25,000 cubic yards of sand would be imported for the creation of the beach and sand dunes between the existing beach and new promenade (Figures 5 and 8). The imported sand would be medium-sized grain imported locally from San Francisco Bay. While this sand is finer than the coarse gravel lag left over on the eroding beach, it is similar to the other sands on site and believed to be of a similar grain size or possibly coarser than the native sands that existed before the area was developed. Sand would be imported to the site from an offshore barge and pumped onto shore from a floating pipeline, or mechanically transferred onto shore, or hauled into the park in trucks. Roughly 100 to 170 feet of beach area and an additional 16 feet of sand dunes would be created between the promenade and the MHW line (6.3 feet NAVD). The sand dunes would be planted with native dune vegetation listed in Appendix C. Protective wire fencing will be installed around the dune plantings to prevent trampling by visitors accessing the beach.

Promenade and Beach Access. The existing promenade would be removed and 2,000 linear feet of a new Promenade would be reengineered and constructed with multiple points of beach access. The promenade would consists of an all weather surface (Asphaltic Concrete or Concrete) traversing the length of the Shoreline and Promenade Improvement Area (Figures 5 and 6). The shoreline trail or promenade would be constructed 15 feet wide at approximately 11 feet NAVD. The beach area occurs in the Eastern Reach of the project site. At least five access points to the beach area would be developed from the promenade through the dunes. The promenade is designed to have a firm, stable, hardened surface to allow for hikers, wheelchairs, and cyclists. The promenade has been designed to be multi-use per County Trail Plan Design and Management Guidelines. In addition, all promenade access points will incorporate Americans with Disabilities Act (ADA)-compliant features.

Parking and Access Road. The Old Beach Parking Lot with 165 spaces would be partially removed to form the crenulate-shaped bay. The remaining parking area would be reconfigured as a smaller lot with 71 spaces as shown in Figure 6. A new drop-off point with turnaround access would be constructed at the terminus of the eastern access road where a restroom facility and 11 parking spaces currently exists (Figure 6). The new parking lot (36,800 square feet) would be designed using guidelines from the San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook (San Mateo County 2009) to the extent appropriate for use and setting. Eight new parking lot lights would be installed in the lot to provide night lighting and public safety. All surface runoff from the new parking lot would be directed to a bioretention swale (bioswale) on the southern side of the parking lot. The bioswale consists of 500 linear feet of shallow drainage ditch roughly 10 feet wide and 6 inches deep lined with vegetation (Figure 9, Bioswale Typical Section). The bioswale uses biological filtering to remove contaminants such as hydrocarbons from storm drainage prior to discharge into the County storm drain system and ultimate discharge into San Francisco Bay.

A total of 105 parking spaces would be removed by the Project (94 spaces in Old Beach Parking Lot and 11 spaces at restroom). All parking spaces removed by the Project would be offset by the development of new parking areas within the Coyote Point Recreation Area. Four additional parking locations were identified in the Preliminary Design Report (Appendix A) which could provide up to 165 parking spaces (Figure 10, Alternative Parking Locations). The development of these parking areas would offset the loss of parking spaces.

Restrooms. A new restroom would be constructed to replace the existing restroom at the terminus of the eastern access road which would be removed by Project construction. The new restroom facility would be a CXT prefabricated bathroom with three stalls and 1 shower each for the men's and women's restroom. The new restroom would be developed on Beach Road in the same vicinity as the existing restroom (Figure 6). The restroom would have sewer hookups to the main sewer line serving the Coyote Point Recreation Area.

3. Site Demolition

Existing site features in the Shoreline and Promenade Improvement Area need to be removed (Appendix A, Table 2). These facilities include the following and are shown in the site aerial photo (Figure 4), project site plan (Figure 5) as well as site photos (Figure 3 of Appendix A).

- 1300 linear feet of deteriorated ArmorFlex and riprap lining the western shoreline slope
- 19000 linear feet of trail pavement from the existing promenade
- 74,700 square feet parking area in Old Beach Parking Lot (All existing parking pavement will be removed).
- 1 restroom building at terminus of eastern access and associated parking.
- 67,000 square feet of lawn area.
- Landscape trees in lawn area and parking lot medians
- Irrigation lines

San Mateo County Construction Waste Management Policy requires County Departments and their contractors working on County facilities to divert as much waste as possible from landfills through waste reduction, deconstruction, reuse, and recycling. The County Parks Department and their contractors for the Project would work with the Department of Public Works to develop a waste management plan for the construction debris created during project activities.

4. Construction Methods

Grading. Approximately 27,300 cubic yards of soil would be removed from the Eastern Reach of the Shoreline and Promenade Improvement Area to create the new crenulate bay (Figure 4). The total disturbance area encompasses 10.67 acres. Elevations in the existing beach area would be excavated 3 feet and then backfilled with sand (Figure 8). Excavation in the inland area would occur up to a depth of 10 feet at the west end of the beach area from the existing elevation of 15 feet NAVD to roughly 5 feet NAVD (Figure 8). Removed soil would be reused to build up the grades under the new promenade. Excess soil would be used in the Knoll for recreating a lawn south of existing parking lot near Captains House and stockpiled on western edge of park south of Humane Society. No off-hauling of the soil is proposed. Stockpile erosion control measures would be implemented per County Watershed Protection standards.

Construction Equipment and Staging. All equipment would be staged in the park near the work area. While working on the Western Reach, equipment would be staged in the western parking lot within a fenced location. Public access to the parking lot and windsurfing access to the bay would be maintained at all times, unless special circumstances arise that require temporary access restrictions. During work on the Eastern Reach of the project site, equipment would be staged in the Old Beach Parking Lot. Access to the Old Beach Parking Lot and adjacent beach area would be closed to the public during construction – public utilization of the western parking area and beach would be encouraged.

Hours of Operation/Construction Schedule. Project construction would occur once funding is secured. Construction activity would begin in the late summer and fall months to minimize disruption to summer recreation and potential biological impacts. Work hours in the tidal zones are dependent upon tides and would only occur for roughly 4 hours in any given day. Work hours on land may occur during normal work week hours. Construction is expected to occur over a 3 to 5 month period. General hours of operation would be limited to the hours of 7:00 a.m. and 6:00 p.m. Monday through Friday, and 9:00 a.m. and 5:00 p.m. on Saturdays. Construction would not occur during any time on Sundays and holidays in compliance with San Mateo County Codes.

Project Phasing. Project construction would begin with work on the Western Reach of the project site and move east toward the beach area. Construction in the beach area would occur from the east end and move west toward the center of the project area. Beach area grading would occur by working in 200 foot wide (approximate, precise dimension t be determined during design) segments. After grading is completed in one segment and sand is being placed in the excavated area, grading would begin in the adjacent 200 +/- foot segment. At no time would more than two segments be in active construction.

5. Permit Requirements

The proposed Project would require permits from Bay Conservation and Development Commission (BCDC), U.S. Army Corps of Engineers (USACE), and Regional Water Quality Control Board (RWQCB). These agencies have jurisdiction over aspects of the Project involving disturbance and use of the shoreline or its waters. The RWQCB also has jurisdiction over storm water discharges; the reconfigured parking lot would be reconstructed to be permeable and to handle storm water per the new RWQCB requirements. The County would file a Joint Agency Regional Permit Application (JARPA) to apply for the required permits from these agencies. See Section III of this Initial Study.

6. Mitigation Incorporated into Project

Several design measures and Best Management Practices (BMPs) have been incorporated into the Project in order to minimize potential adverse impacts upon the environment and recreational use of the park. These measures are described fully in the Description of Construction Activity presented in Appendix B.

Five mitigation measures are identified in the Initial Study to reduce significant environmental effects. These measures include the avoidance of eelgrass in the intertidal zone, control of fugitive dust, construction of new parking and a restroom to replace what is removed during project construction, and protection of stockpiled soil from wind and water erosion. These measures reduce the environmental impacts to a less than significant level. The measures are presented in Section IV of this Initial Study.

II. ENVIRONMENTAL ANALYSIS

Any controversial answers or answers needing clarification are explained on an attached sheet. For source, refer to pages 11 and 12.

	IMPACT					
		YES				
	NO	Not Significant	Significant Unless Mitigated	Significant	Cumulative	SOURCE
1. LAND SUITABILITY AND GEOLOGY Will (or could) this project:						
a. Involve a unique landform or biological area, such as beaches, sand dunes, marshes, tidelands, or San Francisco Bay?		X				B,F,O
b. Involve construction on slope of 15% or greater?		X				E,I
c. Be located in an area of soil instability (subsidence, landslide or severe erosion)?		X				Bc,D

	IMPACT					
		YES				
	NO	Not Significant	Significant Unless Mitigated	Significant	Cumulative	SOURCE
d. Be located on, or adjacent to a known earthquake fault?		X				Bc,D
e. Involve Class I or Class II Agriculture Soils and Class III Soils rated good or very good for artichokes or Brussels sprouts?	X					M
f. Cause erosion or siltation?		X				M,I
g. Result in damage to soil capability or loss of agricultural land?	X					A,M
h. Be located within a flood hazard area?		X				G
i. Be located in an area where a high water table may adversely affect land use?		X				D
j. Affect a natural drainage channel or streambed, or watercourse?	X					E
2. <u>VEGETATION AND WILDLIFE</u> Will (or could) this project:						
a. Affect federal or state listed rare or endangered species of plant life in the project area?	X					F
b. Involve cutting of heritage or significant trees as defined in the County Heritage Tree and Significant Tree Ordinance?	X					I,A
c. Be adjacent to or include a habitat food source, water source, nesting place or breeding place for a federal or state listed rare or endangered wildlife species?	X					F
d. Significantly affect fish, wildlife, reptiles, or plant life?			X			I

	IMPACT					
		YES				
	NO	Not Significant	Significant Unless Mitigated	Significant	Cumulative	SOURCE
e. Be located inside or within 200 feet of a marine or wildlife reserve?	X					E,F,O
f. Infringe on any sensitive habitats?		X				F
g. Involve clearing land that is 5,000 sq. ft. or greater (1,000 sq. ft. within a County Scenic Corridor), that has slopes greater than 20% or that is in a sensitive habitat or buffer zone?		X				I,F,Bb
3. PHYSICAL RESOURCES Will (or could) this project:						
a. Result in the removal of a natural resource for commercial purposes (including rock, sand, gravel, oil, trees, minerals or topsoil)?	X					I
b. Involve grading in excess of 150 cubic yards?		X				I
c. Involve lands currently protected under the Williamson Act (agricultural preserve) or an Open Space Easement?	X					I
d. Affect any existing or potential agricultural uses?	X					A,K,M
4. AIR QUALITY, WATER QUALITY, SONIC Will (or could) this project:						
a. Generate pollutants (hydrocarbon, thermal odor, dust or smoke particulates, radiation, etc.) that will violate existing standards of air quality on-site or in the surrounding area?			X			I,N,R

	IMPACT					
		YES				
	NO	Not Significant	Significant Unless Mitigated	Significant	Cumulative	SOURCE
b. Involve the burning of any material, including brush, trees and construction materials?	X					I
c. Be expected to result in the generation of noise levels in excess of those currently existing in the area, after construction?	X					Ba,I
d. Involve the application, use or disposal of potentially hazardous materials, including pesticides, herbicides, other toxic substances, or radioactive material?	X					I
e. Be subject to noise levels in excess of levels determined appropriate according to the County Noise Ordinance or other standard?	X					A,Ba,Bc
f. Generate noise levels in excess of levels determined appropriate according to the County Noise Ordinance standard?	X					I
g. Generate polluted or increased surface water runoff or affect groundwater resources?			X			I
h. Require installation of a septic tank/leachfield sewage disposal system or require hookup to an existing collection system which is at or over capacity?	X					S
5. <u>TRANSPORTATION</u> Will (or could) this project:						
a. Affect access to commercial establishments, schools, parks, etc.?		X				A,I
b. Cause noticeable increase in pedestrian traffic or a change in pedestrian patterns?		X				A,I

	IMPACT					
		YES				
	NO	Not Significant	Significant Unless Mitigated	Significant	Cumulative	SOURCE
c. Result in noticeable changes in vehicular traffic patterns or volumes (including bicycles)?		X				I
d. Involve the use of off-road vehicles of any kind (such as trail bikes)?	X					I
e. Result in or increase traffic hazards?	X					S
f. Provide for alternative transportation amenities such as bike racks?	X					I
g. Generate traffic which will adversely affect the traffic carrying capacity of any roadway?		X				S
6. LAND USE AND GENERAL PLANS Will (or could) this project:						
a. Result in the congregating of more than 50 people on a regular basis?		X				I
b. Result in the introduction of activities not currently found within the community?	X					I
c. Employ equipment which could interfere with existing communication and/or defense systems?	X					I
d. Result in any changes in land use, either on or off the project site?	X					I

	IMPACT					
		YES				
	NO	Not Significant	Significant Unless Mitigated	Significant	Cumulative	SOURCE
e. Serve to encourage off-site development of presently undeveloped areas or increase development intensity of already developed areas (examples include the introduction of new or expanded public utilities, new industry, commercial facilities or recreation activities)?	X					I,Q,S
f. Adversely affect the capacity of any public facilities (streets, highways, freeways, public transit, schools, parks, police, fire, hospitals), public utilities (electrical, water and gas supply lines, sewage and storm drain discharge lines, sanitary landfills) or public works serving the site?			X			I,S
g. Generate any demands that will cause a public facility or utility to reach or exceed its capacity?		X				I,S
h. Be adjacent to or within 500 feet of an existing or planned public facility?		X				A
i. Create significant amounts of solid waste or litter?		X				I
j. Substantially increase fossil fuel consumption (electricity, oil, natural gas, coal, etc.)?	X					I
k. Require an amendment to or exception from adopted general plans, specific plans, or community policies or goals?	X					B
l. Involve a change of zoning?	X					C
m. Require the relocation of people or businesses?	X					I
n. Reduce the supply of low-income housing?	X					I

	IMPACT					
		YES				
	NO	Not Significant	Significant Unless Mitigated	Significant	Cumulative	SOURCE
o. Result in possible interference with an emergency response plan or emergency evacuation plan?	X					S
p. Result in creation of or exposure to a potential health hazard?	X					S
7. AESTHETIC, CULTURAL AND HISTORIC Will (or could) this project:						
a. Be adjacent to a designated Scenic Highway or within a State or County Scenic Corridor?	X					A,Bb
b. Obstruct scenic views from existing residential areas, public lands, public water body, or roads?	X					A,I
c. Involve the construction of buildings or structures in excess of three stories or 36 feet in height?	X					I
d. Directly or indirectly affect historical or archaeological resources on or near the site?	X					H
e. Visually intrude into an area having natural scenic qualities?		X				A,I

Explanation of Environmental Impacts

1. LAND SUITABILITY AND GEOLOGY

a. **Not Significant.** The Shoreline and Promenade Improvement Area is located on Coyote Point, a small peninsula that juts into San Francisco Bay. The central and eastern portions of Coyote Point Recreation Area consist primarily of a rock outcropping; the easternmost and western portions of the Recreation Area are primarily artificial fill. Coyote Point Recreation Area has a beach area along its northwestern edge and a marsh area on the south side of the Recreation Area.

The Shoreline and Promenade Improvement Area comprises 1800 feet of shoreline generally oriented east-west. In the Western Reach, the existing shoreline armor (rock riprap and Armor Flex) would be cleared, the slope slightly regraded, and then armored with ¼ ton riprap. The western shoreline would remain in its current configuration with only minor disturbance to the slope soils during construction activities. In the Eastern Reach, a crenulate-shaped bay would be created between the board sports retail outlet and the Coyote Point headland. The shoreline would be moved up to 170 feet inland, requiring the excavation and removal of 27,300 cubic yards of soil.

Because the Shoreline and Promenade Improvement Area occurs on artificial and modified waterfront, the impacts of shoreline realignment and hardscape restructuring are not expected to result in significant impacts upon the existing landform. Since the late 1800s, this section of beach has been anthropogenically altered, first for commercial purposes (sand export) and then for recreation. The original export of beach sand in the late 1800s, and subsequent filling and development, has resulted in persistent erosion and unstable shoreline conditions (PWA 2008). Through the years, sand augmentation and hardscaping projects have attempted to armor the shoreline from further erosion with limited success. Through shoreline realignment, the Project seeks to stabilize the shoreline, negate the need for recurrent modification, and minimize shoreline maintenance. As a result, the Project's impact upon the unique landform is considered not significant.

b. **Not Significant.** The Shoreline and Promenade Improvement Area consists of 1800 feet of shoreline fronting the San Francisco Bay. The Western Reach of the Shoreline and Promenade Improvement Area comprises a sloped shoreline covered with large placed rock (riprap) and three ArmorFlex ramps (see photos in Figure 3 of Appendix A). The western slope is 2:1 which exceeds 15%. The existing rock and ArmorFlex would be removed, the slope slightly regraded, and rock reset onto the slope for stabilization. Disturbance to the shoreline slope would be minimal and would not alter the shoreline landform. The armored slopes would remain at a 2:1 slope (Figure 7). The impact is not significant. The Eastern Reach fronts the beach area which has a relatively flat slope. Grading in the Eastern Reach to create the crenulate-shaped bay and stabilize the beach area does not involve disturbance of slopes greater than 15% (Figure 8).

c. **Not Significant.** The Shoreline and Promenade Improvement Area suffers from the effects of severe erosion. Storm-wave action of San Francisco Bay has compromised the structural integrity of the coastal protection structures on the Western Reach undermining the ArmorFlex articulated mat. Erosion along the length of the project site has undercut the promenade (Figure 3 in Appendix A). Erosive forces are also exposing previously buried old pier posts in the intertidal and subtidal areas of the beach, creating submerged hazards for swimmers and windsurfers. The Project is proposed for the purpose of stabilizing the shoreline and halting the ongoing erosion and loss of beach sand. Previous study of the Coyote Point Recreation Area shoreline determined that the stable planform position of the shoreline is a crenulate bay shape in static equilibrium (PWA 2008). Historically, the area was a salt marsh with a wide sandy beach. It was subsequently filled for agriculture then recreation uses (PWA 2008). By engineering a crenulate-shaped bay, the Project intends to create dynamic equilibrium between the shoreline and wave processes resulting in a relatively constant shoreline location despite seasonal fluctuations in total beach sand volume. This would stabilize the current location of the beach, decrease the need for future sand augmentation, and protect the promenade and other hardscape structures such as the parking lot. The Project has been designed to anticipate sea level rise described in Appendix D (Beach Berm Response to Sea Level Rise). Thus, the Project would have a beneficial impact on the existing shoreline erosion problem.

d. **Not Significant.** The Shoreline and Promenade Improvement Area is not located in a designated Alquist-Priolo Earthquake Fault Zone and is therefore not subject to surface rupturing from a known fault. The closest known fault is the San Andreas which is located about 4.7 miles west from the project site. The Shoreline and Promenade Improvement Area and the larger San Francisco Bay Area are in a seismically active region. Recent studies by the United States Geological Survey (USGS) indicate that there is a 62 percent likelihood of a moment magnitude 6.7 (MW 6.7) or larger earthquake occurring in the Bay Area within the next 30 years, and a 21 percent chance that one or more earthquakes of MW 6.7 or greater will occur on the San Andreas fault within the next 30 years. The project site could experience a range of groundshaking effects during an earthquake on a Bay Area fault, particularly the San Andreas fault. A characteristic earthquake on the San Andreas Fault could result in violent (Modified Mercalli Intensity IX) to strong (Modified Mercalli Intensity VII) groundshaking intensities at the project site.

Seismic groundshaking could result in damage to constructed project facilities such as the promenade or rock revetment through shifting of underlying ground material. Although the potential for seismic groundshaking to occur at the project site is unavoidable, the risk of excessive, permanent damage to the promenade or rock revetment, and consequent injury or death, is anticipated to be relatively minor because they would be designed in accordance to County engineering standards. Therefore, groundshaking hazards are considered not significant.

f. **Not Significant.** The purpose of the Project is to stabilize the coastline by reducing the severe erosion that is presently occurring, restoring the full use of the deteriorated promenade and enhancing the long-term recreational uses for windsurfers and swimmers at the beach; the Project is not expected to cause erosion once construction activities have ceased. During construction there is a potential for temporary erosion from earthwork and construction activities associated with the Project. BMPs (identified in Appendix B) would be implemented to minimize erosion. The Project would result in grading 2.73 acres of land seaward of the Mean High Water (MHW) line (6.3 feet NAVD) and an additional disturbance of 7.94 acres of land inland from the MHW line. The total area of disturbance including shoreline, promenade, parking reconfiguration, and construction equipment staging area is 10.67 acres.

Since the Project would result in more than one acre in soil disturbance, it is subject to the San Francisco Bay Regional Water Quality Control Board's National Pollutant Discharge Elimination System (NPDES) permitting process. To obtain coverage under the State Construction Activity Storm Water General Permit for the management of site storm water runoff and pollution, the County or its project contractors would be required to prepare and implement a project-specific storm water pollution prevention plan (SWPPP). Furthermore, because the County has implemented the San Mateo County Water Pollution Prevention Program (SMCWPPP), the Project would also be required to obtain coverage under SMCWPPP's Phase I Municipal Storm Water Permit and comply with performance standards set forth by SMCWPPP's Stormwater Management Plan. Compliance with the NPDES and SMCWPPP performance standards would ensure that erosion and siltation during inland grading operations are not significant.

The Project involves excavation of soils below the MHW line to the 0 feet NAVD which is the equivalent of 0.75 feet Mean Lower Low Water (MLLW) at the project site. Excavation and subsequent sand placement work in the tidal zone would be restricted to low tide hours when wave action is not occurring or very limited on the project site (Appendix B). The excavation of project soils in the tidal zone would disturb bay sediments and could cause some sediment to become mobilized into the water column during high tides. Although the disturbed sediments can be transported in wave action, it is expected to settle out quickly due to its course nature; as a

result, construction activity in the tidal zone is not likely to significantly increase turbidity or result in significant erosion or siltation. Work within the tidal zone is subject to authorization from BCDC and USACE. These agencies will review the Project and BMPs and make additional requirements as necessary to minimize erosion and siltation during their permitting process.

h. **Not Significant.** The northern and western portions of the Coyote Point Recreation Area are within the 100-year flood hazard zone. The Shoreline and Promenade Improvement Area occurs within the flood zone. The improvements proposed as part of the Project such as shoreline armoring and promenade and parking areas are compatible uses within a flood plain. Flood zone impacts are considered not significant because the Project would not place housing or large structures within the floodplain and would not displace flood waters to nearby properties.

Over the next 100 years (by 2100) sea level rise of the San Francisco Bay at Coyote Point Recreation Area is estimated between 0.5 and 1.5 feet (Appendix D). A higher water level on the beach would result in a steeper beach profile and encroachment upon the beach berm (sand dune constructed between the beach and the promenade) by wave runup. Under a 0.5 feet sea level rise, the berm retreat would be 10 to 20 feet. Under a 1.5 feet sea level rise, the berm retreat would be 30 to 50 feet (see Figures 1 and 2 in Appendix D). Under worst-case conditions, the berm would not be sustainable without additional sand placement and our other future actions. The promenade would not be affected by mean sea level rise (Appendix D).

i. **Not Significant.** The western portions of Coyote Point Recreation Area include artificial fill and are noted to have a high water table with depths of water ranging from 30 to 60 inches in some areas because of the influence of fluctuating tides. Excavation of the land fronting the shoreline to create the crenulate bay requires grading existing elevations to a depth of up to 10 feet (Figure 8). Excavation of the beach area would be to a depth of 3 feet. It is possible that grading operations needed to reconfigure the shoreline could intercept a high groundwater table at this location. Drainage from the construction area inland from the MHW line would be collected and controlled from direct discharge into the bay through implementation of BMPs. The presence of a high groundwater table would not conflict with the intended purpose of the Project which is to stabilize the shoreline and beach area for recreational use. Construction of the new promenade, shoreline armoring, and replacement parking do not require extensive grading and would not impact the groundwater table.

j. **Not Significant.** The proposed Project would reconfigure and reinforce 1800 feet of San Francisco Bay shoreline as described in Section II of this Initial Study. This action would change the wave/shoreline dynamic from erosional to no net loss of beach sediment and should result in stabilization. Given the present-day degraded and modified condition of the shoreline, the impact of this change to the watercourse is considered beneficial. The change in sediment dynamics at the shoreline are expected to be very localized and are not anticipated to have significant impacts to the natural movement of water outside of the project area.

2. VEGETATION AND WILDLIFE

d. **Significant Unless Mitigated.** As stated above in Section II.2(c), there are no federal or state wildlife species of special concern that are known to occur or likely to occur within the project site. This is due largely to the absence of terrestrial habitat within the beach, promenade, and parking lot areas. Marine bird species likely use the beach, intertidal, and open-water areas within the Shoreline and

Promenade Improvement Area for foraging, but are very unlikely to use these areas for nesting and rearing because of the high level of human traffic. Because birds are mobile and able to avoid disturbance, except during nesting season, the impact to marine birds is considered not significant.

Impacts to fish species are also considered not significant. Although estuarine fish species almost assuredly forage, breed, and rear, in the intertidal habitats within the project site, they are mobile and able to avoid the site during times of high disturbance.

Impacts to the subtidal and intertidal invertebrate community from construction-related activities are considered not significant because that community not only rebounds well from disturbance with very high recolonization rates (Nichols and Thompson 1985), but also because it is almost entirely made up of non-native species. The south San Francisco Bay benthic invertebrate community is dominated in both relative abundance and species composition by three non-native species: *Gemma gemma* (amethyst gem clam), *Ampelisca abdita* (tube amphipod), and *Streblospio benedicti* (segmented polycheate) (Nichols and Thompson 1985). Cohen and Carlton (1998) found that within the benthic infaunal (living in the sediments) and epifaunal (living on the sediment surface) invertebrate communities, non-native species accounted for 40 to 100% of the common species, 97% of the total number of species, and 99% of the biomass.

Improved access and beach quality would facilitate increased shoreline use by windsurfers and swimmers. The increased use may result in greater disturbances to the intertidal mudflat invertebrate community adjacent to the shore at Coyote Point, particularly in the near-shore areas where people are entering or leaving the water. Although mudflat areas may see slight increases in disturbance, the impacts are not expected to be significant given the existing, highly modified status of South San Francisco Bay mudflats.

Native oyster (*Ostreola conchaphila*) and eelgrass (*Zostera marina*) communities existed historically in the vicinity of Coyote Point (NOAA Program briefing document n.d.) (Wyllie-Echeverria and Rutten 1989 as cited in Wyllie-Echeverria and Fonseca 2003) and could be present within the Shoreline and Promenade Improvement Area. The native oyster community, once the cornerstone of the subtidal benthic community in San Francisco Bay, now persists only in a few remnant populations (NOAA Program briefing document n.d.). The eelgrass bed near Coyote Point still exists today based on 2003 survey data (Merkel 2004). The restoration of oyster colonies and eelgrass beds are a priority for the San Francisco Bay Subtidal Habitat Goals Project, which is currently overseen by the State Coastal Conservancy.

Eelgrass is a submerged vascular plant with its distribution and abundance in San Francisco Bay predominately limited by light (Zimmerman et al. 1991), particularly during winter and early spring (Zimmerman et al. 1995). This likely explains why in highly turbid San Francisco Bay the majority of eelgrass beds (98%) were found to occur between -5.8 to 1.3 feet MLLW (Merkel 2004). Eelgrass bed locations near Coyote Point were surveyed in 2003 by Merkel and Associates, Inc. (Merkel 2004). Three conglomerations of eelgrass patches oriented east-west along the shoreline at Coyote Point occur in the intertidal zone (Figure 11, 2003 Eelgrass Survey Locations). The eelgrass beds are located at or just below 0 feet MLLW (Based on eelgrass patch locations relative to a 0' contour line on a chart in Merkel 2004 eelgrass atlas). The largest, western-most patch is located approximately 1750 meters west from the center of the Shoreline and Promenade Improvement Area. The central eelgrass community is comprised of 12 separate patches of eelgrass. This central community is also oriented east-west and runs along the entire edge of the Shoreline and Promenade

Improvement Area. The eastern-most patch is one solitary patch, like the western-most patch, and is located approximately 750 meters to the east of the center part of the Shoreline and Promenade Improvement Area.

Project improvements in the Western Reach would require construction activities to occur within the tidal range down to maximum depth of 0.75 feet MLLW. Construction activities associated with the Eastern Reach would not exceed 0.75 feet MLLW. The disturbance zone of the Project falls within the elevational range of eelgrass which is known to occur in the project vicinity based on the 2003 Merkel survey data. Subsequently, eelgrass beds could be present within the project work area. Direct impacts to the eelgrass such as removal by project grading would be considered a significant impact. Mitigation Measure 1 requires avoidance of eelgrass through performance of pre-construction surveys and modification of the grading limit where eelgrass is found present within the Shoreline and Promenade Improvement Area. Implementation of Measure 1 would reduce direct effects of the Project on eelgrass to a less than significant level.

Indirect impacts to eelgrass could occur from light reduction caused by increased suspension of sediment or turbidity. Sediment suspended during construction activities would not decrease light attenuation below those levels which have been found by Zimmerman et al. (2005) to limit eelgrass productivity. Construction activities would be limited to summer and fall months when eelgrass plants are most resilient to increased turbidity (Zimmerman et al. 1995). Construction hours in the intertidal zone would be limited to low tide hours. Increased turbidity associated with construction would occur two hours before and two hours after low tide resulting in approximately two hours of suspended sediment exposure to eelgrass plants on the east side of the project site during the outgoing tide and the west side during the incoming tide. Sediment settlement rates are expected to be high due to the coarse, sandy nature of on-site sediment and therefore the sediment transport distance is expected to be low. Given the limited hours of operation, the coarseness of the existing bay sediments being disturbed, and the implementation of BMPs (Appendix B), the indirect impacts to eelgrass from turbidity would not be significant.

Mitigation Measure 1 – Avoidance of Eelgrass Beds. The direct loss of eelgrass potentially occurring within the intertidal zone in or adjacent to the project site shall be avoided at all stages of construction. Prior to construction all existing eelgrass patches shall be surveyed and flagged. All attempts shall be made during construction to avoid direct impacts to these patches. A construction monitoring plan shall be created in consultation with NOAA Fisheries as part of the Army Corps of Engineers Section 404 permitting process.

f. **Not Significant.** The following sensitive habitats are adjacent to or in the vicinity of the project site: coastal salt marsh; riparian and wetland habitat; native oyster colonies; and eelgrass beds. There is no potential for project-related activities to affect adjacent terrestrial communities, but there is potential for impact to oyster and eelgrass communities through the suspension of sediment during construction activities. See Section II.2(d) above for further discussion.

g. **Not Significant.** The total area of disturbance by the Project is 10.67 acres. Of the total, 2.73 acres would occur in tidal land (below MHW). No vegetation or intact natural community would be cleared on land. Portions of the intertidal benthic community within the Shoreline and Promenade Improvement Area would be cleared during construction in the intertidal zone. However, as mentioned in Section II.2(d), this impact is considered to be not significant given the degraded nature and high recolonization rates of this community.

3. PHYSICAL RESOURCES

b. **Not Significant.** The Project involves removal of 27,300 cubic yards of sediment from the beach front shoreline and adds 25,000 cubic yards of sand. The impacts associated the removal of sediment and augmentation of sand on landform and erosion is presented in Section II.1. Dust emissions from the transport, moving, and grading of imported sand is controlled through BMPs stipulated through the Bay Area Air Quality Management District (BAAQMD) permit required for all construction projects (see Section II, 5(a). Impacts to the intertidal and subtidal benthic community during grading are not expected to be significant and are discussed more thoroughly in Section II.3(d) below. The augmentation of sand and reconfiguration of the shoreline would likely result in a slight change in runoff patterns, however this change would not impact to the conveyance of flood waters or impede the movement of water over land (see Section II.2(j)). Suspended sediment and erosion issues associated with construction would be managed through BMPs outlined in the National Pollution Discharge Elimination System (NPDES) permit as well as the Regional Water Quality Control Board permit.

4. AIR QUALITY, WATER QUALITY, SONIC

a. **Significant Unless Mitigated.** The Project would generate temporary emissions of air pollutants during construction activities. The operation of heavy equipment such as graders, bulldozers, and pavers as described in Section I (Project Description) would generate exhaust emissions from the use of diesel fuel. Emissions would occur during the construction phase of the Project which is expected to last 3 to 5 months. Based on BAAQMD standards, construction vehicle emissions would be temporary and not significant. Upon completion of construction, the Project would not create new sources of air emissions. There would be no permanent increase in vehicle emissions associated with the Project.

Fugitive dust during project grading activity would be a potentially significant impact. BAAQMD requires implementation of dust control measures in order to mitigate dust impacts. The Coyote Point Recreation Area Master Plan Initial Study/Mitigated Negative Declaration identified the following mitigation measure to control fugitive dust emissions for improvement projects occurring within the county park. This measure shall be applied to the Project to reduce fugitive dust emissions from construction activities to a less than significant level.

Mitigation Measure 2 – Control of Fugitive Dust. Implement feasible control measures for construction emission of fugitive dust. The County shall ensure implementation of the following mitigation measures during project construction, in accordance with BAAQMD standard mitigation requirements:

i. Water all active construction areas at least twice daily.
ii. Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.
iii. Pave, apply water three times daily, or apply non-toxic soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
iv. Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites.
v. Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.

In addition to temporary construction dust, the Project would create a large stockpile of excess soil excavated during the creation of the crenulate-shaped bay. The soil would be loaded into haul trucks and delivered to a site within the park near the Humane Society for storage. If left unprotected, the soil would be exposed to wind and could become airborne creating significant fugitive dust emissions. BAAQMD requires that stockpiles on construction sties greater than 4 acres be enclosed, covered, watered, or otherwise stabilized to prevent airborne emissions. Establishing a protective covering as required below in Mitigation Measure 3 would reduce the fugitive dust emissions from the stockpiles to a less than significant level. This measure would also protect soils from water erosion associated with storm water as described below in Section II.4.g.

Mitigation Measure 3 – Stockpiled Materials. Stockpiled materials shall be enclosed, covered, or have soil binders applied for prevention of fugitive dust emissions and water erosion. Control measures shall be implemented in accordance with BAAQMD standard mitigation requirements. Vegetative cover such as application of a hydroseed erosion control mix using native non-invasive species may be used. Any hydroseeding or use of erosion control mats should be implemented in conformance with Best Management Practices outlined in the San Mateo County Watershed Protection Standards.

g. **Significant Unless Mitigated.** In the short-term, construction-related activities may increase the turbidity of storm water or intercepted ground water draining from the construction site. BMPs (see Appendix B) would be applied during project construction to minimize water quality impacts. The County contractor performing the work must develop and implement a Storm Water Pollution Prevention Plan (SWPPP) under the State Water Resources Control Board's state-wide National Pollutant Discharge Elimination System (NPDES) General Construction Activity Storm Water Permit. Additionally, the County contractor must conform to the standards of the San Mateo Countywide Water Pollution Prevention Plan. Implementation of BMPs specified in the SWPPP and SMCSWPPP would mitigate the Project's potential impact on water quality during construction. The construction impact on water quality is therefore considered not significant. No long-term water quality issues are expected once the Project is complete.

At project completion, the reconfigured parking lot would be designed based on principles presented in the San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook (San Mateo County 2009). Drainage from the parking area would be directed to a bioretention swale (Figure 9) fitted with biological filters to reduce pollutants prior to discharge into the County's storm water drainage system. With these design measures, the impact of the Project upon storm water quality would be not significant.

Excess soil excavated from project area would be stockpiled in the Coyote Point Recreation Area. This material would be exposed to rain resulting in water erosion which could be potentially significant. A protective covering such as erosion control blankets or vegetation would stabilize the soil surface. Implementation of Mitigation Measure 3 as described in Section II.4.a above would reduce this impact to a less than significant level.

5. TRANSPORTATION

a. **Not Significant.** Public access to the project site would be partially restricted during the 3 to 5 month construction period. Windsurfers, swimmers, and sunbathers would be unable to access the water or beach through the active work areas, but some

access to the shoreline would be maintained at all times. Once construction is complete, the public would have full access once again to all park beachfront and facilities. The impact is therefore not significant.

b. **Not Significant.** An increase in pedestrian traffic is possible given the creation of new facilities, particularly in the months following project completion. As park capacity is limited by parking availability, no significant impacts on parks facilities or maintenance is expected.

c. **Not Significant.** As described in the Master Plan IS/MND, all Master Plan improvements, of which the proposed beachfront upgrade is a part, are expected to increase the number of person trips to Coyote Point by five to ten percent of the existing use level. The increase in person trips would be distributed among pedestrian, bicycle, and vehicle trips within the park and would be expected to follow the same pattern as existing park users. Therefore, there would not be a substantial change in the pattern of vehicle and bicycle trips within the park (PBS&J 2007). The new promenade promotes pedestrian and bicycle movement through the park and does not create an adverse impact to circulation patterns. The proposed visitor drop-off area and vehicle turn-around at the end of the eastern access road would improve vehicle access to the beach area and ease vehicle movement.

g. **Not Significant.** Although improvements to the waterfront would account for a portion of the anticipated five to ten percent increase in traffic anticipated from all improvement projects identified in the Master Plan. The increase in visitors to the park shoreline and promenade generated by the Project would be dispersed throughout the daylight hours and mostly occur on weekends. The increase in vehicle trips to the park attributed to the Project would occur during non-peak traffic hours on local roads. The increase in vehicle trips would not significantly increase traffic volumes on local roads or result in a decrease of traffic carrying capacity on roads adjacent to the park. Temporary construction traffic would be generated by construction workers traveling to the project site. No off hauling of graded materials is proposed and the import of sand for the beach would most likely be delivered by marine transport as described in the Project Description (Section I above). The impact of construction vehicles on local road traffic and capacities is not significant.

6. LAND USE AND GENERAL PLANS

a. **Not Significant.** As stated above, the proposed Project would likely increase the number of visitors on a daily basis. However, because the number of visitors already exceeds 50 people per day the impact is not considered significant.

f. **Significant Unless Mitigated.** The Project would not adversely affect the capacity of any public facility or utility. The Project would eliminate a small restroom facility located at the eastern terminus of the beach area (Figure 4). The County intends to replace the demolished restroom with a new prefabricated restroom facility located off Beach Road near the existing facility (Figure 6). Until replacement facilities are constructed, restroom and showers are available to beach area visitors near the board sports retail shop west of the beach near the midpoint of the Shoreline and Promenade Improvement Area. In the short-term, the loss of the beach area restroom facility from the Project is not considered significant due to continued availability of restrooms near the beach by the board sports shop. Without in-kind replacement, the long-term loss of the beach area restroom would diminish the restroom service capacity in the park and the impact is considered significant. However, with the provision of a new restroom as required in Mitigation

Measure 4, there would be no net loss in restroom service capacity at the park and the Project impact on restroom service would be reduced to a less than significant level.

The Project would reduce the number of parking spaces at the Old Beach Parking Lot and restroom from 176 to 71. There are currently 990 parking spaces within the park scattered within 10 parking lots which do fill to capacity on occasion (PBS&J 2007). Without replacement, the loss of 105 parking spaces at the park is a significant impact. The County intends to replace the eliminated parking spaces by developing new parking areas within the park and has identified four alternative locations of the new parking facilities which if developed could accommodate a total of 165 new spaces (Figure 10). With construction of replacement parking as required in Mitigation Measure 5, there would be no net loss in parking capacity at the park and the Project impact on parking would be reduced to a less than significant level.

Mitigation Measure 4 – New Replacement Restroom. The County shall develop a restroom facility in the beach area of Coyote Point Recreation Area (Eastern Reach of the project improvement area) to replace the restroom facility removed to construct the Project. The replaced restroom shall provide a minimum of three toilet fixtures and one shower in each the men's and women's restroom. The replacement restroom shall be constructed within 2 years of project completion.

Mitigation Measure 5 – New Replacement Parking. The County shall develop new parking areas within the Coyote Point Recreation Area to replace the 105 spaces removed to construct the Project. There shall be no net loss in parking capacity at the park. Replacement parking shall be constructed within 2 years of project completion.

g. **Not Significant.** The Project could increase visitor use of the Coyote Point Recreation Area. However, the increase would not create additional service demands such that the park would reach its capacity.

h. **Not Significant.** The Project expands and improves a public facility and does not cause any utility to exceed its capacity.

i. **Not Significant.** The Project could result in increased visitor use of the waterfront area of the park, and therefore may slightly increase the creation of solid waste and litter. Any increase would be minor and is not expected to result in an increased maintenance cost to the County. The impact is considered not significant.

7. AESTHEIC, CULTURAL, AND HISTORIC

e. **Not Significant.** The parking, concessionaire, and restroom facilities proposed by this Project would replace existing structures in roughly the same location. Therefore the visual impact is not anticipated to be significant.

III. **RESPONSIBLE AGENCIES.** Check what agency has permit authority or other approval for the Project.

AGENCY	YES	NO	TYPE OF APPROVAL
U.S. Army Corps of Engineers (CE)	X		Permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbor Act
State Water Resources Control Board		X	
Regional Water Quality Control Board	X		Preparation of a Storm Water Pollution Prevention Plan (SWPPP) for compliance with the State of California's NPDES General Permit for Storm Water Discharges Associated with construction Activity. Certification under Section 401 of the Clean Water Act that the Section 404 permit issued by the USACE complies with state water quality standards.
State Department of Public Health		X	
San Francisco Bay Conservation and Development Commission (BCDC)	X		Permit for intertidal grading work and project development on land within 100 feet of the Bay shoreline.
U.S. Environmental Protection Agency (EPA)		X	
County Airport Land Use Commission (ALUC)		X	
CalTrans		X	
Bay Area Air Quality Management District		X	
U.S. Fish and Wildlife Service		X	
Coastal Commission		X	
City		X	
Sewer/Water District:		X	
Other:			

IV. MITIGATION MEASURES

	Yes	No
Mitigation measures have been proposed in project application.	X	
Other mitigation measures are needed.	X	

The following measures are included in the project plans or proposals pursuant to Section 15070(b)(1) of the State CEQA Guidelines:

Mitigation Measure 1 – Avoidance of Eelgrass. The direct loss of eelgrass shall be avoided at all stages of construction. Prior to construction all existing eelgrass patches shall be surveyed and flagged. All attempts shall be made during construction to avoid direct impacts to these patches. A construction monitoring plan shall be created in consultation with NOAA Fisheries as part of the Army Corps of Engineers Section 404 permitting process.

Mitigation Measure 2 – Control of Fugitive Dust. Implement feasible control measures for construction emission of fugitive dust. The County shall ensure implementation of the following mitigation measures during project construction, in accordance with BAAQMD standard mitigation requirements:

- Water all active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.
- Pave, apply water three times daily, or apply (non-toxic soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.

Mitigation Measure 3 – Stockpiled Materials. Stockpiled materials shall be enclosed, covered, or have soil binders applied for prevention of fugitive dust emissions and water erosion. Control measures shall be implemented in accordance with BAAQMD standard mitigation requirements. Vegetative cover such as application of a hydroseed erosion control mix using native non-invasive species may be used. Any hydroseeding or use of erosion control mats should be implemented in conformance with Best Management Practices outlined in the San Mateo County Watershed Protection Standards.

Mitigation Measure 4 – New Replacement Restroom. The County shall develop a restroom facility in the beach area of Coyote Point Recreation Area (Eastern Reach of the project improvement area) to replace the restroom facility removed to construct the Project. The replaced restroom shall provide a minimum of three toilet fixtures and one shower in each the men's and women's restroom. The replacement restroom shall be constructed within 2 years of project completion.

Mitigation Measure 5 – New Replacement Parking. The County shall develop new parking areas within the Coyote Point Recreation Area to replace the 105 spaces removed to construct the Project. There shall be no net loss in parking capacity at the park. Replacement parking shall be available to the public within 2 years of project completion.

V. MANDATORY FINDINGS OF SIGNIFICANCE

		Yes	No
1.	Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal, or eliminate important examples of the major periods of California history or prehistory?	X	
2.	Does the project have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals?		X
3.	Does the project have possible environmental effects which are individually limited, but cumulatively considerable?		X
4.	Would the project cause substantial adverse effects on human beings, either directly or indirectly?		X

On the basis of this initial evaluation:

_____ I find the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared by the Current Planning Section.

__X__ I find that although the proposed project could have a significant effect on the environment, there WILL NOT be a significant effect in this case because of the mitigation measures in the discussion have been included as part of the proposed project. A NEGATIVE DECLARATION will be prepared.

_____ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

Samuel Hayhoe
(Sign)

5/26/09
Date

Senior Planner
(Title)

VI. SOURCE LIST

A. Field Inspection

B. County General Plan 1986

a. General Plan Chapters 1-16
b. Local Coastal Program (LCP) (Area Plan)
c. Skyline Area General Plan Amendment
d. Montara-Moss Beach-El Granada Community Plan
e. Emerald Lake Hills Community Plan

C. County Ordinance Code

D. Geotechnical Maps

1. USGS Basic Data Contributions

a. #43 Landslide Susceptibility
b. #44 Active Faults
c. #45 High Water Table

2. Geotechnical Hazards Synthesis Maps

E. USGS Quadrangle Maps, San Mateo County 1970 Series (See F. and H.)

F. San Mateo County Rare and Endangered Species Maps, or Sensitive Habitats Maps

G. Flood Insurance Rate Map – National Flood Insurance Program

H. County Archaeologic Resource Inventory (Prepared by S. Dietz, A.C.R.S.) Procedures for Protection of Historic and Cultural Properties – 36 CFR 800 (See R.)

I. Project Plans or EIF

J. Airport Land Use Committee Plans, San Mateo County Airports Plan

K. Aerial Photography or Real Estate Atlas – REDI

1. Aerial Photographs, 1941, 1953, 1956, 1960, 1963, 1970
2. Aerial Photographs, 1981
3. Coast Aerial Photos/Slides, San Francisco County Line to Año Nuevo Point, 1971
4. Historic Photos, 1928-1937

L. Williamson Act Maps

M. Soil Survey, San Mateo Area, U.S. Department of Agriculture, May 1961

N. Air Pollution Isopleth Maps – Bay Area Air Pollution Control District

O. California Natural Areas Coordinating Council Maps (See F. and H.)

P. Forest Resources Study (1971)

Q. Experience with Other Projects of this Size and Nature

R. Environmental Regulations and Standards:

Federal	–	Review Procedures for CDBG Programs	24 CFR Part 58
	–	NEPA 24 CFR 1500-1508	
	–	Protection of Historic and Cultural Properties	36 CFR Part 800
	–	National Register of Historic Places	
	–	Floodplain Management	Executive Order 11988
	–	Protection of Wetlands	Executive Order 11990
	–	Endangered and Threatened Species	
	–	Noise Abatement and Control	24 CFR Part 51B
	–	Explosive and Flammable Operations	24 CFR 51C
	–	Toxic Chemicals/Radioactive Materials	HUD 79-33
	–	Airport Clear Zones and APZ	24 CFR 51D
State	–	Ambient Air Quality Standards	Article 4, Section 1092
	–	Noise Insulation Standards	

S. Consultation with Departments and Agencies:

a. County Health Department
b. City Fire Department
c. California Department of Forestry
d. Department of Public Works
e. Disaster Preparedness Office
f. Other

(1/22/07)

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Appendix A

Coyote Point Recreation Area
Preliminary Design Report

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COYOTE POINT RECREATION AREA PHASE 2 – PRELIMINARY DESIGN REPORT

Prepared for

San Mateo County Parks Department

Prepared by

Philip Williams & Associates, Ltd.

with

Treadwell & Rollo

March 2009

PWA REF. #1876.02

Services provided pursuant to this Agreement are intended solely for the use and benefit of the San Mateo County Parks Department.

No other person or entity shall be entitled to rely on the services, opinions, recommendations, plans or specifications provided pursuant to this agreement without the express written consent of Philip Williams & Associates, Ltd., 550 Kearny Street, Suite 900, San Francisco, CA 94108.

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1. INTRODUCTION

Coyote Point is a regional recreation area operated by the San Mateo County Parks and Recreation Department (County). The recreation area is located southeast of San Francisco International Airport (Figures 1 and 2) and its coastal section is a popular destination for swimmers, windsurfers, kiteboarders, kayakers, cyclists, and walkers. In the 1990s, a series of coastal structures were built along the frontage to provide erosion protection to the recreation area, and in particular to protect a pedestrian promenade adjacent to the beach (Figure 2). Presently, these structures are failing, leading to undercutting and damage to the seaward side of the promenade (Figure 3). The San Mateo County Parks and Recreation Department (County) retained Philip Williams & Associates, Ltd. (PWA) to develop a sustainable solution to the coastal erosion problem while maintaining park functions. Part of the enhancement is to facilitate good public access to the beach and water for a variety of users, particularly swimmers, windsurfers, and kiteboarders.

The project is divided into two phases; Phase 1 – conceptual alternatives and selection of preferred alternative; Phase 2 – preliminary design, permitting, and final design. In April 2008, PWA recommended a preferred conceptual design for the restoration of the Coyote Point Recreation Area shoreline, which was subsequently selected by the San Mateo County Parks Commission to take forward to Phase 2 (PWA, 2008). This Preliminary Design Report documents the project description as a basis for environmental review, permitting, and budgeting purposes, prior to design plans and specifications.

1.1 PREFERRED CONCEPTUAL ALTERNATIVE

1.1.1 East of Retail Outlet

The preferred conceptual alternative removes the existing structures and realigns the shoreline to a position set back inland from its current position (between the board sports retail outlet and Coyote Point headland) (PWA, 2008). The equilibrium planform shape for the set back would be a crenulate-shaped bay (Figure 4). The crenulate-shaped bay would be held in position by an artificial upcoast hard point located close to the retail outlet, and by Coyote Point headland as the downcoast hard point. This alternative would be combined with beach nourishment within the crenulate-shaped bay cell. The beach created to the east of the retail outlet would be used for recreational activities, excluding windsurfing.

1.1.2 West of Retail Outlet

The preferred conceptual alternative for the frontage west of the board sports retail outlet is armoring in combination with access ramps (Figure 4). This length of shoreline would be used by the windsurfing community.

2. EXISTING SITE CONDITIONS

The existing site conditions are described fully in the Phase 1 Conceptual Design Report (PWA, 2008) and the relevant physical process information extracted from that report is presented in Appendix A. Two new investigations have been carried out as part of Phase 2 to provide detail on subsurface conditions and the characteristics of the modern beach sediment.

2.1 SUBSURFACE GROUND CONDITIONS

Treadwell & Rollo, Inc carried out a subsurface assessment of the site (Appendix B). A single boring (B-1) located in the eastern parking lot and three CPT's (CPT-1, CPT-2, and CPT-3) on the lawn area between the retail outlet and the eastern parking lot (Figure 5) were recovered on October 13, 2008. The boring penetrated 25.5 feet subsurface and the CPT's were to depths between 27 and 27.5 feet subsurface. These subsurface data in combination with the existing stratigraphic data collected for Phase 1 (PWA, 2008) shows that the near-surface geology of the eastern portion of the Recreation Area comprises alluvial fan and fluvial deposits (interbedded clay, clayey sand, sandy clay), overlain by clay (Bay Mud), overlain by sand with silt (antecedent beach deposits), overlain by fill (gravelly clay, clay, clayey sand) (Figure 6). The sand with silt forms a lens of sediment, a maximum of about nine feet thick, located beneath the eastern parking lot and the lawn area, thinning to the south into the park where it transitions with Bay Mud. This sand lens also thins and disappears to the west, beyond the retail outlet, where fill rests directly on about 5-10 feet of Bay Mud. The above interpretation of subsurface conditions is an interpretation using sparse data, and actual conditions may differ substantially from this interpretation.

2.2 BEACH PARTICLE SIZE AND EQUILIBRIUM BEACH PROFILE

2.2.1 Present-day Beach

In order to gauge the particle size of sediment required to successfully nourish the crenulate beach, the grading of the current beach sediment was analyzed. The beach grading also provides data for input into formulae to estimate an equilibrium cross-shore beach profile. The particle size and equilibrium beach profiles are important parameters of the beach nourishment design at Coyote Point Recreation Area, in order to predict the type of design that will fare best in the physical conditions (Appendix A), and to predict how the beach will respond after it has been nourished.

The beach at Coyote Point Recreation Area is a dynamic three-dimensional feature that varies in form and sediment composition, both temporally and spatially. Spatial variations may be due to the underlying geology, transient morphology, and influences of different types of shore protection structures. The particle size at any given point on the beach is a function of the energy of the cumulative coastal processes (wind, waves, and currents – Appendix A) and the mineralogy of the available sediment.

For a beach sampling strategy, the key to a successful beach nourishment design is to eliminate spatial variability, to determine which combination of beach samples provides the best indication of actual beach behavior over the long-term. We chose an intertidal composite of sediment samples from the existing beach between approximately mean low water and mean high water. This provides the best representation of beach behavior over time, since this zone will be the location of the main nourishment placement, and subsequent reworking. Surface sediment samples were collected from this portion of the beach east of the retail outlet on July 10, 2008. A total of 12 samples were collected along four shore-normal transects comprising three samples in each transect (Figure 5). In all cases the beach is thin and resting on mud.

Particle size analyses were carried out at the University of California, Berkeley. Table 1 and Figure 7 present the medians (D_{50}) for whole samples, and for samples with the fraction coarser than 4.7 mm removed. The latter analysis was undertaken to account for potential skewing of the data caused by incorporation of pebbles in the beach eroded from the underlying artificial fill deposits. The data in Table 1 are presented according to the approximate elevation of the sample, which was measured from the site topography map (PWA, 2008) (Figure 5). The table shows that the whole sample medians are coarser due to pebble content. When this coarser fraction (greater than 4.7 mm) is removed from the analysis, the scatter in the data caused by the biasing towards the gravel fraction is removed. The majority of samples (including those in the swash zone) have a median size of approximately 0.5 mm. This would appear to still be coarse for the moderately well protected beach at Coyote Point, and our interpretation is that the majority of the beach sediment is a coarse lag deposit and not representative of a beach that would be in equilibrium at this location. These data provide a maximum median particle size for beach nourishment.

Table 1. Particle Size Characteristics of Modern Beach Sediment

Elevation (ft relative to MSL)	Median, D50 (mm) whole sample	Median, D50 (mm) with D >4.7 mm removed	Sample ID
3.5	0.84	0.51	CP1
3.0	1.74	0.78	CP4
2.1	1.00	0.50	CP2
1.6	0.58	0.52	CP7
1.6	1.08	0.63	CP10
1.1	0.49	0.49	CP5
0.1	0.53	0.50	CP8
-0.3	0.86	0.50	CP3
-0.3	0.57	0.48	CP11
-0.8	0.56	0.50	CP6
-1.9	0.50	0.49	CP9
-2.0	0.52	0.50	CP12

2.2.2 Equilibrium Beach Profiles

Median sediment particle sizes can be used to construct theoretical equilibrium beach profiles (EBP) using rules proposed by Bruun (1954) and discussed extensively in Dean (2002). The EBP has the form:

$$h(y) = Ay^{2/3}$$

where h is the depth below mean sea level (MSL) at a distance y from the shoreline and A is a profile scale parameter with dimensions of length to the one third power. The parameter A has extensively been correlated with sediment particle size. Solving the equation shows that finer particle sizes produce a flatter sloping beach profile and coarser particle sizes produce a steeper sloping beach profile.

Figure 8 shows a comparison of four measured PWA shore normal transects (PWA Survey, March 27, 2007 – Figure 5) and the EBPs constructed for median particle sizes of 0.3, 0.4, 0.5, 1.0, and 1.8 mm. The data shows that equilibrium beach profiles constructed from the finest median particle size analyzed (0.3 mm) provides the best fit to the beach transects below mean sea level.

The use of finer median particle sizes for beach nourishment purposes is supported by an analysis of the relationships between median particle size, slope of the beach face, and wave climate (Wiegel, 1964). Three curves of median diameter of sand versus slope of beach face were described for three conditions of exposure; protected beaches, moderately protected beaches, and exposed beaches. In general, assuming a constant degree of exposure to waves, the Wiegel (1964) curves show that finer beach sand will produce a flatter beach slope.

The Coyote Point Recreation Area can be defined as a moderately protected beach. In this case, given a median particle size between 0.4 mm and 0.5 mm, the equilibrium beach slope is between 8(H):1(V) and 12(H):1(V). However, for a finer beach of 0.3 mm, the beach slope would be 20(H):1(V), more in line with the current slope.

3. WESTERN SHORELINE IMPROVEMENTS

The proposed improvements for the western shoreline and promenade include a rock revetment, with sections of articulated block mat (Armor Flex) to facilitate windsurfer access. A plan view of the proposed actions for the western shoreline including the revetment, windsurfer and kiteboarder access, and promenade are shown in Figure 9. Typical cross-sections of the revetment and kiteboarder/windsurfer access points are presented in Figure 10A (revetment) and Figure 10B (windsurfer access ramp), respectively.

3.1 ROCK REVETMENT

Prior to construction of the rock revetment, the existing armored slopes will be cleaned and cleared of unsuitable foundation materials. Side slopes will be roughly graded with bedding stone to provide a good base for the new armor overlay. There are several existing cavities and voids in the structures that should be filled with bedding stone to provide a continuous foundation surface for the new armor. Any portions of the existing armor that remain above the rough graded bedding layer should be demolished. Filter fabric will be placed on top of the bedding layer from the toe through the crest. The existing promenade will likely be damaged in the construction process and will therefore be replaced (Section 3.3). Finally, the bedding layer and filter fabric will be overlain with ½ ton class armor stone as depicted in Figure 10A. The slope of the revetment surface will be 2(H):1(V) and the height will be 13.0 feet NAVD.

3.2 ARTICULATED BLOCK MAT - WINDSURFER ACCESS

The preference for the articulated block mat is Armor Flex-coated riprap because windsurfers could then utilize the Armor Flex surface. Riprap with an Armor Flex overlay would also mitigate the potential for slumping and collapse phenomena as developed over the last few years in the existing structures (PWA, 2008).

Local windsurfers and representatives from the board sports retail outlet were asked for their preferences regarding the number, location, and geometry of the access points. Three locations along the rock revetment will act as points of access for windsurfers (Figure 9). One access point will be located near the retail outlet with west and west-central access points, near the gravel rigging area behind the current promenade, where the majority of windsurfers launch. Having two westerly access points in the busiest windsurfing area will reduce the likelihood of windsurfers having to line up and could accommodate two directions simultaneously. On crowded days it may be possible to use the most westerly access for entry to the water and the west-central access for exit from the water.

According to local windsurfers and the retail outlet an Armor Flex surface slope of 2(H):1(V) contiguous with the adjacent rock revetment, would be too steep. Hence, the slope of the Armor Flex surface and adjacent riprap will be 3(H):1(V) to allow safer access. Figure 10B presents a typical section at the Armor

Flex. The height of the access points at the promenade will be 11 feet NAVD, providing a flush transition with the promenade surface. In addition to a safer passage on to the access area, this will allow improved visibility of the ground ahead when a windsurfer is carrying the board and sail (generally the center of the board where the base of the sailing rig attaches is positioned directly in front of the windsurfer). The access points will be 20 feet wide (minimum), to accommodate two windsurfers without their boards hanging over the adjacent riprap.

Preparation of the bedding foundation will be the same as for the rock revetment (Section 3.1). However, ¼ ton class armor will be placed on the filter fabric which will support a new layer of Armor Flex (Figure 10B).

3.3 RECONSTRUCTED PROMENADE

Due to unavoidable damage during construction of the revetment and access points, the old promenade will be replaced. In keeping with its current elevation, the design elevation of the new promenade behind the rock revetment will be 11 feet NAVD. This will place the promenade at the same height as the windsurfer access ramps and approximately two feet below the elevation of the fronting revetment. The new promenade will be 15 feet wide for the most part with a short wider section at the junction with the eastern end of the eastern parking lot (Figure 9). This will provide a 'waiting' area for people crossing from the parking lot to the beach.

4. EASTERN SHORELINE IMPROVEMENTS

4.1 SHORELINE PLANFORM

The preliminary design is to set back the eastern shoreline in the form of a crenulate-shaped bay between an artificial hard point close to the retail outlet and Coyote point headland. The preliminary design was guided by the conceptual design (PWA, 2008) (Figure 4) and by the desire to create a beach-shoreline orientation in dynamic equilibrium with wave processes. The preliminary design comprises a sloping beach face, backed by a beach berm and a field of low dunes, with a new promenade skirting the back of the dunes (Figure 11). The upcoast hard point for the bay will be a breakwater comprising an easterly extension of the existing revetment design for the western shoreline (Section 3). The design length of the breakwater will be 85 feet from its tip to the point of connection with the revetment.

The design planform shape of the bay was constructed using the parabolic bay shape equation of Silvester and Hsu (1997).

$$R_n/R_\beta = 0.81\beta^{0.83} / \theta_n^{0.77}$$

Parameter β is the angle between the incident wave crest (assumed linear) and the control line (R_β), which joins the upcoast hard point to the downcoast hard point. The radius R_n to any point on the bay periphery in static equilibrium is angled θ_n from the same wave crest line radiating out from the upcoast point. Once the two basic parameters, β and R_β are known, values for pairs of R_n and θ_n are calculated for a bay in equilibrium under the same wave approach direction.

The idealized bay planform was constructed from this formula using a control line length of 780 feet (the straight line distance from the tip of the breakwater to the west side of the headland) and an incident wave crest angle of 11°. The methodology used to calculate the incident wave crest angle is discussed in PWA (2008).

The planform line constructed for the bay represents the proposed junction between the dunes and the new promenade (Figure 11). At the western end of the bay, the planform line impinges with the connecting point of the breakwater and revetment to its west. At the eastern end the planform line impinges with the point where the headland starts to protrude out into the bay. The maximum distance of this line from the existing shoreline (the seaward edge of the promenade) is 170 feet, across the current lawn area between the eastern parking lot and the retail outlet. Although mean sea level or mean tide level could be used as the datum for the planform line, the use of either of these datums would lead to a crenulate bay requiring excavation much further into the park, with loss of additional lawn area and parking lot.

4.2 SHORELINE CROSS-SECTIONAL PROFILES

Even though a wide variety of troughs and ridges (berms, ridges and runnels, longshore bars) may be present on any beach profile, and the profile may change seasonally due to changes in wave climate, the most important morphological feature is the average slope between the seaward and landward limits. The backshores of many beaches usually possess a flat-topped ridge or bar known as the berm that forms at the limit of typical winter wave runup. Hence, the design cross-sectional profile of the crenulate bay-beach will comprise two main components; the elevation and width of the backshore berm and the slope of the foreshore (Figure 12). We have also added a further design feature of low dunes between the beach berm and the start of the promenade. It is possible that dunes were present at the back of the 19th century beach before land reclamation took place (PWA, 2008).

4.2.1 Dunes/Beach Berm

The sand dunes are intended to provide an aesthetic and also a volume of sand to mitigate the extent of erosion. During erosion events, waves will erode the dunes and nourish the fronting beaches. When there is sufficient wide, dry beach and onshore winds, finer sands will be carried landward by the winds to nourish the dunes. A natural dune typically covers a wider area extending farther inland. Since there is not enough space for a wider dune field, we have opted for a narrow line of dunes. This unnatural configuration can be expected to erode over time, and require sand placement and planting to maintain. Also, without plants to stabilize the dunes, the sand will be blown inland by prevailing and storm winds, possibly causing a nuisance. Erosion control fabric, access limitations, planting and irrigation are probably necessary to stabilize the dunes.

In order to select the elevation of the dunes and beach berm we have used the runup calculations of Schaaf and Wheeler Consultants (2006) for the Bayfront Levee Improvement project immediately to the west of our study frontage (Appendix A). They estimated the 100-year wave runup (maximum wave runup plus tidal elevation) of 9.5 feet NGVD (or 12.2 feet NAVD). We selected a nominal dune crest elevation of 12 feet NAVD, to provide a temporary barrier to extreme wave runup. It should be noted that this project is not intended to provide flood protection and a lower dune elevation may be desried for other reasons, such as views and reduced maintenance of planting. The nominal dunes base width will be 15 feet wide at a minimum (Figure 12).

Immediately seaward of the sand dunes, an approximately 50 foot wide beach berm will slope downward from an elevation of 10 feet NAVD adjacent to the dunes to elevation 8 feet NAVD. The beach berm elevation estimate is based on the beach forming runup with a return period of one to five years. FEMA considers parts of the site to be within the 100-yr coastal flood plain (see PWA, 2008; Appendix A). This project is not intended to reduce flood risk. Rather, consistent with the City of San Mateo's flood management plan, the 100-year wave runup will inundate the park up to a proposed new earth berm. This shoreline realignment project will generate earth which may be suitable for this new berm.

4.2.2 Foreshore

The design foreshore seaward from the edge of the berm will vary in slope from west to east, sloping down from 8 feet NAVD to the existing 6 foot NAVD contour. Across the widest part of the bay (west) the slope will be approximately 60(H):1(V) and approximately 25(H):1(V) on the east end of the bay (Figure 12). This slope connects the seaward edge of the berm to the existing beach. An optional additive portion of new beach shown in Figure 12 connects the new foreshore with the existing break in slope at approximately 0 feet NAVD (this is approximately the sand-mudflat interface). A benefit of performing the optional additive section is to remove pilings and other debris located on the existing beach. Details on the exact limits of excavation will be determined in subsequent levels of design. Regardless, we anticipate that over time the beach slope will equilibrate to adjust to the dynamic conditions. Towards the headland the beach face slopes will gradually steepen as the break in slope progresses closer to the shoreline, while the west end of the beach will remain relatively flat.

4.2.3 Potential Fluctuations due to Sea-Level Rise

One of the most important long-term concerns for the Coyote Point frontage is the physical response of the shoreline to future sea-level rise. Predicting potential shoreline recession is critical to the design. An approximate quantitative approach for predicting shoreline response to sea-level rise is to multiply the estimated amount of sea-level rise by the ratio of the foreshore width to foreshore height (Bruun, 1962; Everts, 1985).

$$R = \frac{Y}{X} S$$

where R = recession rate, Y = horizontal dimension of foreshore, and X = vertical dimension of foreshore, and S = sea-level rise.

In the Phase 1 Conceptual Design Report (PWA, 2008), we recommended using a future relative sea-level rise of 0.5 feet in 50 years and 1.5 feet in 100 years, for planning purposes. A recent statement by the State of California Resources Agency recommends a 'high-end' estimate for global sea-level rise of 55 inches (about 4.6 feet) by 2100 and 16 inches (about 1.3 feet) by 2050, for planning purposes (CRA, 2008). In our design, the top of the foreshore (at its juncture with the beach berm) is eight feet NAVD and its slope is approximately 20(H):1(V) (Figure 12). Assuming a future relative sea-level rise of 0.5 to 1.5 feet in 50 years and 1.5 to 4.5 feet in 100 years, the corresponding estimates of shoreline recession would be approximately 10 to 30 feet in 50 years (average 20 feet) and approximately 30 to 90 feet in 100 years (average 60 feet). Shoreline recession rates would be approximately 0.2 to 0.6 ft/year averaged over 50 years and approximately 0.3 to 0.9 ft/year averaged over 100 years.

Given our design width for the beach berm is 50 feet, would suggest a gradual reduction in the width of this feature over 50-year timescales, and the potential for loss of this feature and erosion of the backing

dunes, over 100-year timescales. Further beach nourishment would be required to maintain the width of the beach berm at 50 feet, in the light of future sea-level rise.

4.2.4 Design Uncertainty

Although we have used established methods to provide a preliminary design, there are inherent uncertainties in some of the input parameters and the resulting equilibrium configuration. The largest uncertainty is the potential for changes in beach profile caused by storm waves and seasonal changes in wave direction. Winds from the north and northeast are responsible for generating the most extreme wind-wave conditions because of the relatively long fetch (PWA, 2008). Given the orientation of the crenulate bay planform, waves from the north have the potential to induce greater alongshore sediment transport, creating lateral shifts in the equilibrium beach profile shape. During the winter months, high-energy storm waves move sand offshore where it may form a nearshore bar, and in the process steepening and narrowing the beach profile. As high-energy wave conditions subside in late spring and early summer, the beaches recover as sand is moved onshore to rebuild the beach berm, which flattens and widens the beach profile. At the end of the summer and early fall when typically calm seas occur, the berm will be well developed, reaching its peak width.

A further uncertainty relates to the potential for sediment leakage to the east around Coyote Point headland. Although the crenulate planform shape is designed to minimize sediment transport in the bay, it is possible that due to variations in sediment supply and wave direction, the system may not be completely closed. PWA (2008) indicated that sediment supply from the west is limited and would not be sufficient to replace any sediment lost from the east. It may therefore be necessary to re-nourish the beach at intervals to restore lost sediment.

4.3 EXCAVATION FOR SHORELINE REALIGNMENT

4.3.1 Composition and Quantities of Excavated Fill

The site will be excavated to a depth of three feet below the design grade. Given the present site grade, this will amount to approximately 27,300 cubic yards of fill. The geotechnical investigation shows that the fill is likely to be composed of a mixture of gravelly clay, clay, and clayey sand. However, it is probable that the site has lateral heterogeneity and the composition of the boring is no guarantee of the composition of the fill elsewhere across the site.

4.3.2 Disposal of Fill

The shoreline realignment entails excavation and off-haul or re-use of the fill. Some of the fill could be used as core for the new breakwater at the western end of the bay. The remaining excess soil will be the contractor's property for legal disposal off-site, including any soil sampling and testing that is required, with the option that the County could modify the contract to place soil on-site and/or conduct testing themselves. There is a possibility that the City of San Mateo may want the soil for a coastal flood

protection project which includes levees on either side of the park on City property and a low berm on the park inland of the shore.

4.4 DUNE AND BEACH NOURISHMENT

The present beach is comprised of sediment with a median particle size of approximately 0.5 mm. We consider this size to be larger than is required to successfully nourish the beach for the reasons given in Section 2.2, and a preferred particle size of 0.3 mm is recommended at this stage. To nourish the beach to the design grade would require approximately 20,000 cubic yards of sand.

Dunes will be built-up using sand of the appropriate particle size; generally the same or finer than the beach sands. Dune restoration will likely have a construction sequence that entails the following components. Sand will be imported to fill the landward part of the excavated area to 12 feet NAVD in front of the promenade revetment. The dunes will be sculpted to create a 'natural' look. They will then be planted with native vegetation to stabilize.

4.5 PROMENADE

In keeping with its current elevation, the design elevation of the majority of the new promenade (apart from the eastern extremity) around the back of the bay will be at 11 feet NAVD. This will place the promenade approximately one foot below the elevation of the fronting dunes and one foot above the elevation of the top of the beach berm. A one foot high curb (or partially buried Caltrans K-Rail) will be positioned along the seaward edge of the promenade to provide stability to the landward edge of the dunes. The curb will also allow for capture of landward transport of wind blown sand, reducing spillage of this sand on to the promenade.

At the eastern end of the bay where the promenade is adjacent to the access road, it will slope upwards to the east to be contiguous with the elevation of the road. This slope will not exceed 5% to be conversant with American with Disabilities Act Accessibility Guidelines. The promenade will then slope downwards at less than 20(H):1(V) to a beach access point at the eastern extremity of the beach (Figure 11).

4.6 BREAKWATER

The preliminary design of the breakwater considers a previous design for the Coyote Point Marina north breakwater dogleg trunk and head (Moffatt & Nichol and PWA, 1998). The design crest elevation will be 11 feet NAVD with a width of 15 feet in keeping with the width of the promenade. Selected excavated material or imported material may be used to construct an embankment to form the breakwater sub-grade. A bedding layer and filter fabric will be placed on top allowing for rough grading of the outer and inner slopes ¼ ton armor stone. The design will incorporate side slopes of 2(H):1(V) on both sides and at the tip.

4.7 PARKING LOTS AND ACCESS ROAD

4.7.1 Parking Lot Configuration

Excavation of the crenulate-shaped bay will remove a large part of the east parking lot, and necessitates reconfiguration of the parking lot landscape and vehicle spaces. The layout of the lot will be changed to accommodate as many vehicles as possible within the space available. The number of vehicle spaces is reduced from 165 to 71, a reduction of almost 60% (Figure 11). The new spaces are realigned to be perpendicular with the orientation of the new promenade. Entry to the eastern parking lot will be directly opposite the access road to the Captain's House. This entrance is approximately 100 feet from the original entry point, which will be demolished and replaced by a portion of the new promenade. The exit from the parking lot will remain unchanged. Up to six disabled parking spaces will be located at the northeastern corner of the parking lot enabling easy access on to the promenade.

Because of the reduction in number of parking spaces in the east parking lot, additional parking is proposed to maintain the existing number of parking spaces. Four alternative parking locations have been identified.. A design of the additional parking alternatives is not included in this report. The four alternatives are as follows (also see Figure 13):

- Alternative 1 – Located at the existing site of the Castaways Restaurant, which has approximately 40 existing parking spaces. Use of this site would decrease the demand for additional parking to approximately 54 spaces.
- Alternative 2 – The flat area on the west side of the entrance road has capacity for approximately 35 new parking spaces.
- Alternative 3 – The flat area south side of Beach Road just north of the existing Rifle Range parking lot has capacity for approximately 50 new parking spaces.
- Alternative 4 – The raised earth fill area bordered by Airport Boulevard to the South, the Humane Society fence to the West, and the Bay Trail gently turning to the east and north. This site would be under the existing PG&E power lines and has capacity for approximately 40 new parking spaces.

A combination of the four alternatives would be sufficient to maintain the same number of existing parking spaces. Based on the cost of new parking provided in the cost estimate below, the additional cost of new parking will range from about $240,000 to $420,000. The lower estimate assumes the reuse of the existing parking provided in Alternative 1 at Castaways Restaurant.

4.7.2 Bioretention Swales

The existing parking lot slopes from the northwest to the southeast, and a storm drain under the parking lot slopes away from the shoreline to the approach road. The drain inlets are mostly landward of the limits of excavation.

The design modifications proposed for the remaining east parking lot result in a functional lot, but also implement storm water pollution best management practices (BMPs). These BMPs involve grading and landscaping into bioretention swales to avoid direct runoff to storm drains and the Bay. Three bioretention swales will be installed, one at the southern border of the parking lot, and one either side of the entrance on the eastern border of the parking lot (Figure 11). The swales will be a maximum of 10 feet wide and in vertical section will follow the guidelines in the California Stormwater BMP Handbook (2003) and the San Mateo County's Sustainable Green Streets and Parking Lots Design Guidebook (2009). Runoff at the southern and eastern sides of the lot will be captured and filtered through the bioretention media and captured in an underground perforated pipe before reaching an outlet to the drainage system adjacent to the approach road.

4.7.3 Modification of Access Road

The eastern end of the main access road adjacent to the promenade will be modified to incorporate a turn-around and drop-off point (Figure 11). This design feature will lead to loss of an additional 11 parking spaces.

4.7.4 Lighting

The new parking lot configuration will include eight new lights (Figure 11). The performance specification/design build for the light standards will be determined with assistance from a County of San Mateo electrical expert.

4.8 BEACH ACCESS

Access to the eastern beach will be at five points along the promenade. Access Point 1 is at the eastern end of the promenade before it starts to climb upwards around Coyote Point headland. Here, access is directly on to the beach from the promenade without the need to cross sand dunes. Access Point 2 is located at the eastern end of the eastern parking lot. The access point is adjacent to disabled parking spaces and crosses the sand dunes to the beach. Access Point 3 is located at the western end of the eastern parking lot, and crosses the sand dunes to the beach. Access Point 4 is off the promenade and crosses the dunes mid-way between the eastern parking lot and the retail outlet. Access Point 5 is off the promenade and crosses the dunes close to the retail outlet and upcoast breakwater.

4.9 LANDSCAPE PLANTING

The perimeter of the site will be graded to match the existing lawn and pavement grades.

4.10 DEMOLITION

Four main infrastructure components will require demolition. Approximately 1,900 linear feet of promenade, 74,700 square feet of asphalt paving as part of the eastern parking lot, the rest rooms at the eastern end of the promenade, and approximately 10 lights will be demolished or salvaged.

5. ENGINEER'S ESTIMATE OF LIKELY CONSTRUCTION QUANTITIES AND COSTS

Table 2 presents the preliminary estimate of construction quantities and costs. The estimate is divided into six main categories: mobilization, site preparation and demolition, new promenade, new shoreline revetment, new beach area, and new parking area. We assumed that the construction will be completed in two phases:

- Phase 1: Western Shoreline Improvements
- Phase 2: Eastern Shoreline Improvements

Costs were split into two phases assuming that the construction of Phase 2 starts at the end of Phase 1 construction. However, in reality there might be a significant lag between phases which will require additional work which was not considered here, such as transitions from new to existing features, drainage, and demolition. Also the existing promenade in the eastern section is not fully serviceable and hence may require partial reconstruction or closure if Phase 2 is delayed. This suggests that the cost for Phase 1 might increase if Phase 2 is not constructed shortly after.

These estimates are subject to refinement and revisions as the design is developed in future stages of the project. Table 2 does not include estimated project costs for permitting, design construction, monitoring and/or ongoing maintenance. Estimated costs are presented in 2009 dollars, and would need to be adjusted to account for price escalation for implementation in future years. This opinion of probable construction costs is based on: PWA's previous experience, bid prices from similar projects, consultation with contractors/suppliers, and R.S Means 2007 edition.

These cost estimates are intended to provide an approximation of total project costs appropriate for the preliminary level of design. These cost estimates are considered to be approximately -15% to +30% accurate, and include a 25% contingency to account for project uncertainties (such as final design, permitting restrictions and bidding climate). These estimates are subject to refinement and revisions as the design is developed in future stages of the project.

Please note that in providing opinions of probable construction costs, PWA has no control over the actual costs at the time of construction. The actual cost of construction may be impacted by the availability of construction equipment and crews and fluctuation of supply prices at the time the work is bid. PWA makes no warranty, expressed or implied, as to the accuracy of such opinions as compared to bids or actual costs.

Table 2. Engineers Estimate of Likely Construction Quantities and Costs

Item	Phase 1 - Western Shoreline Improvements				Phase 2 - Eastern Shorelien Improvements				Total (Phases 1 and 2)		
	Quantity	Unit	Unit Price	Cost	Quantity	Unit	Unit Price	Cost	Quantity	Unit	Total
Mobilization				**$80,000**				**$125,000**			**$205,000**
Mobilization	1	LS	$80,000	$80,000	1	LS	$125,000	$125,000	2	LS	$205,000
Site Preparation/Demolition				**$57,250**				**$143,450**			**$200,700**
Shoreline Revetment	950	LF	$50	$47,500	350	LF	$50	$17,500	1300	LF	$65,000
Buildings					1	EA	$8,000	$8,000	1	EA	$8,000
Parking Lot					74,700	SF	$1	$74,700	74700	SF	$74,700
Trail	950	LF	$5	$4,750	950	LF	$5	$4,750	1900	LF	$9,500
Lawn					67,000	SF	$0.50	$33,500	67000	SF	$33,500
Miscellaneous	1	LS	$5,000	$5,000	1	LS	$5,000	$5,000	2	LS	$10,000
New Promenade/Trail				**$28,500**				**$31,500**			**$60,000**
AC/Concrete Trail	950	LF	$30	$28,500	1,050	LF	$30	$31,500	2000	LF	$60,000
Revetment				**$844,500**				**$0**			**$844,500**
Revetment	950	LF	$650	$617,500					950	LF	$617,500
Breakwater	140	LF	$1300	$182,000					140	LF	$182,000
Windsurf Ramps	3	EA	$15,000	$45,000					3	EA	$45,000
Beach Activities				**$0**				**$948,000**			**$948,000**
Excavation / Local Fill					27,300	CY	$20	$546,000	27300	CY	$546,000
Sand Fill and Grade					20,000	CY	$20	$400,000	20000	CY	$400,000
Dune Planting					0.4	AC	$5,000	$2,000	0.4	AC	$2,000
New Parking				**$0**				**$317,500**			**$317,500**
Grading					38,600	SF	$0.50	$19,300	38600	SF	$19,300
AC Paving					38,600	SF	$4	$154,400	38600	SF	$154,400
Striping					2,800	LF	$1	$2,800	2800	LF	$2,800
Drainage Bioswales					500	LF	$200	$100,000	500	LF	$100,000
Curbs					2,100	LF	$10	$21,000	2100	LF	$21,000
Lighting					10	EA	$2,000	$20,000	10	EA	$20,000
Subtotal				**$1,010,250**				**$1,565,450**			**$2,575,700**
Contingency		**25%**	**of subtotal**	**$252,600**		**25%**	**of subtotal**	**$391,400**		**25%**	**$644,000**
Total				**$1,262,850**				**$1,956,850**			**$3,219,700**

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7. LIST OF PREPARERS

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With:

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8. FIGURES

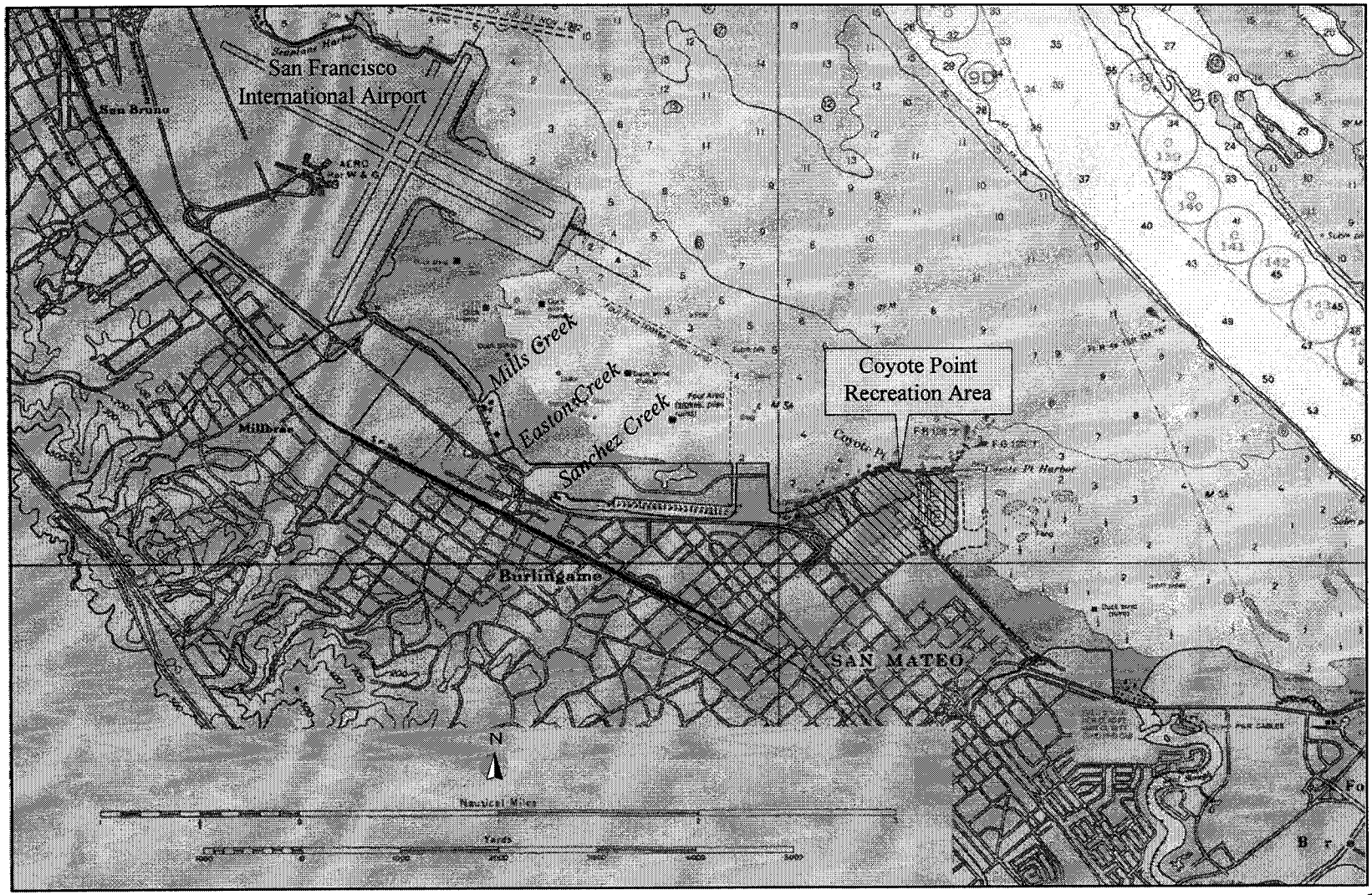

figure 1

Coyote Point Recreation Area

Site Location Map

Note: Contours are feet below mean lower low water.

Source: NOAA Coast Survey, July 1995

PWA

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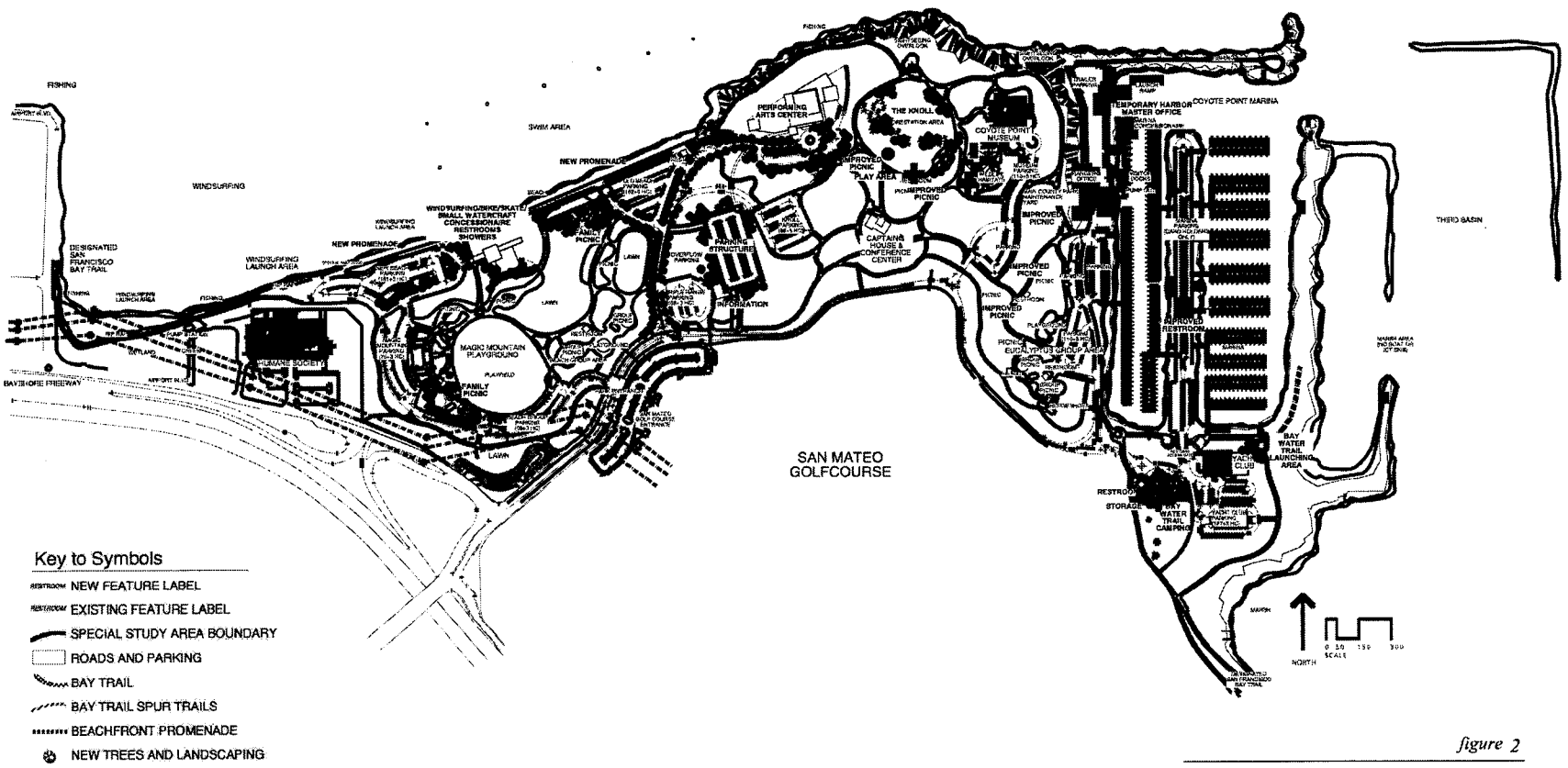

figure 2

Coyote Point Recreation Area

Illustrative Master Plan

Amphion Environmental Inc.

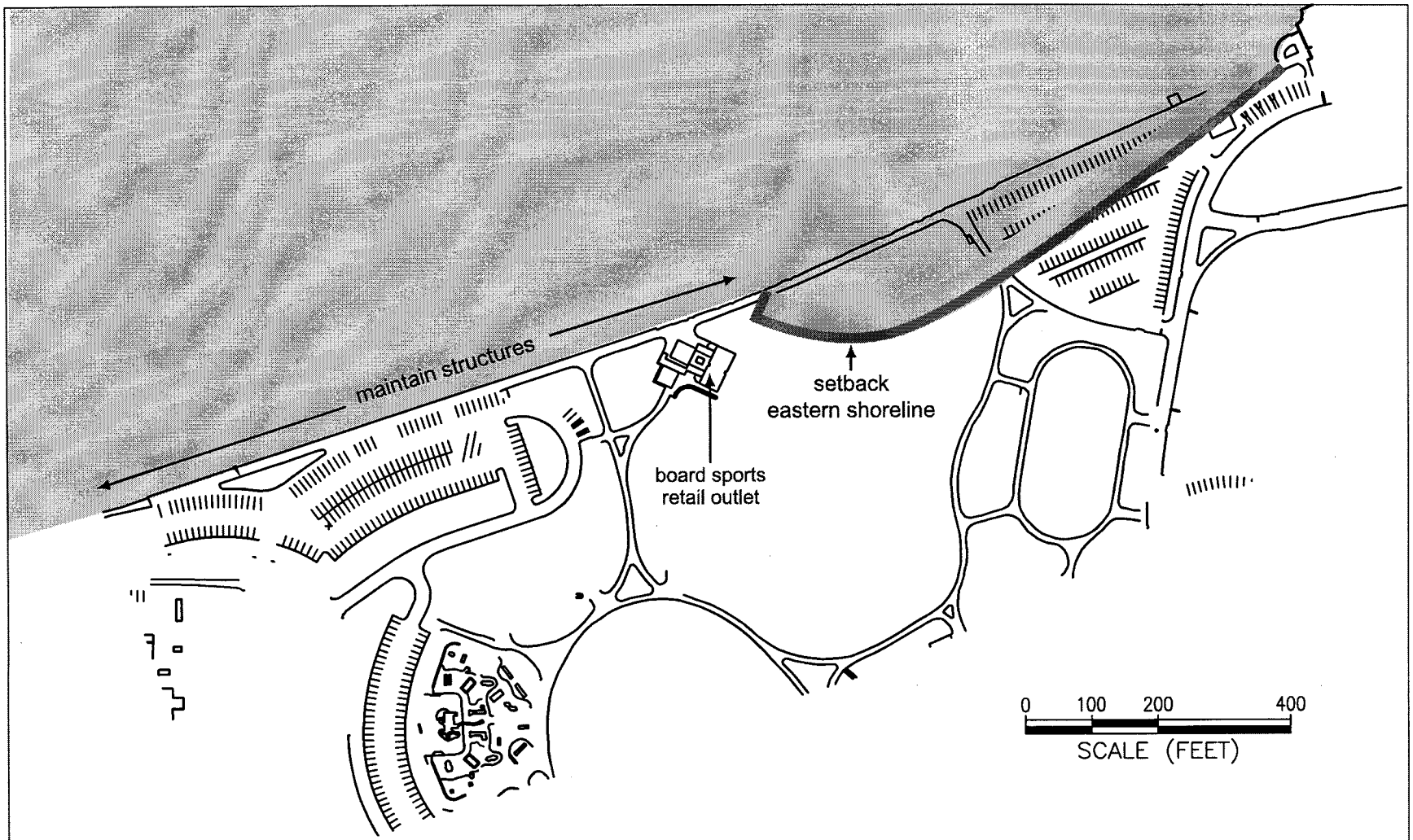

figure 3

Coyote Point Recreation Area

Preferred Conceptual Alternative

PWA

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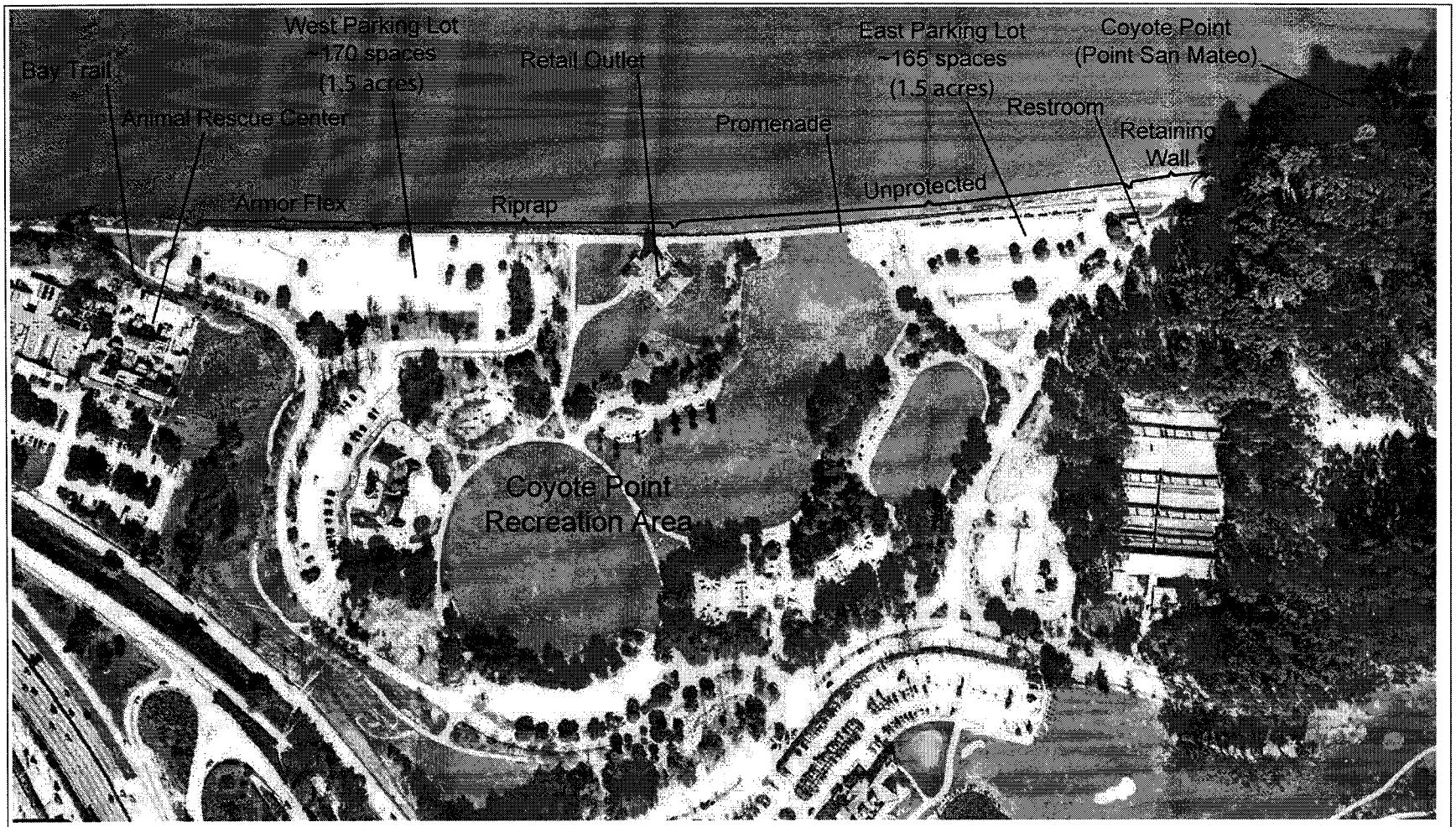

figure 4

Coyote Point Recreation Area

Existing Coastal Frontage

Source of photo: HJW Geospatial flight February 17, 2007

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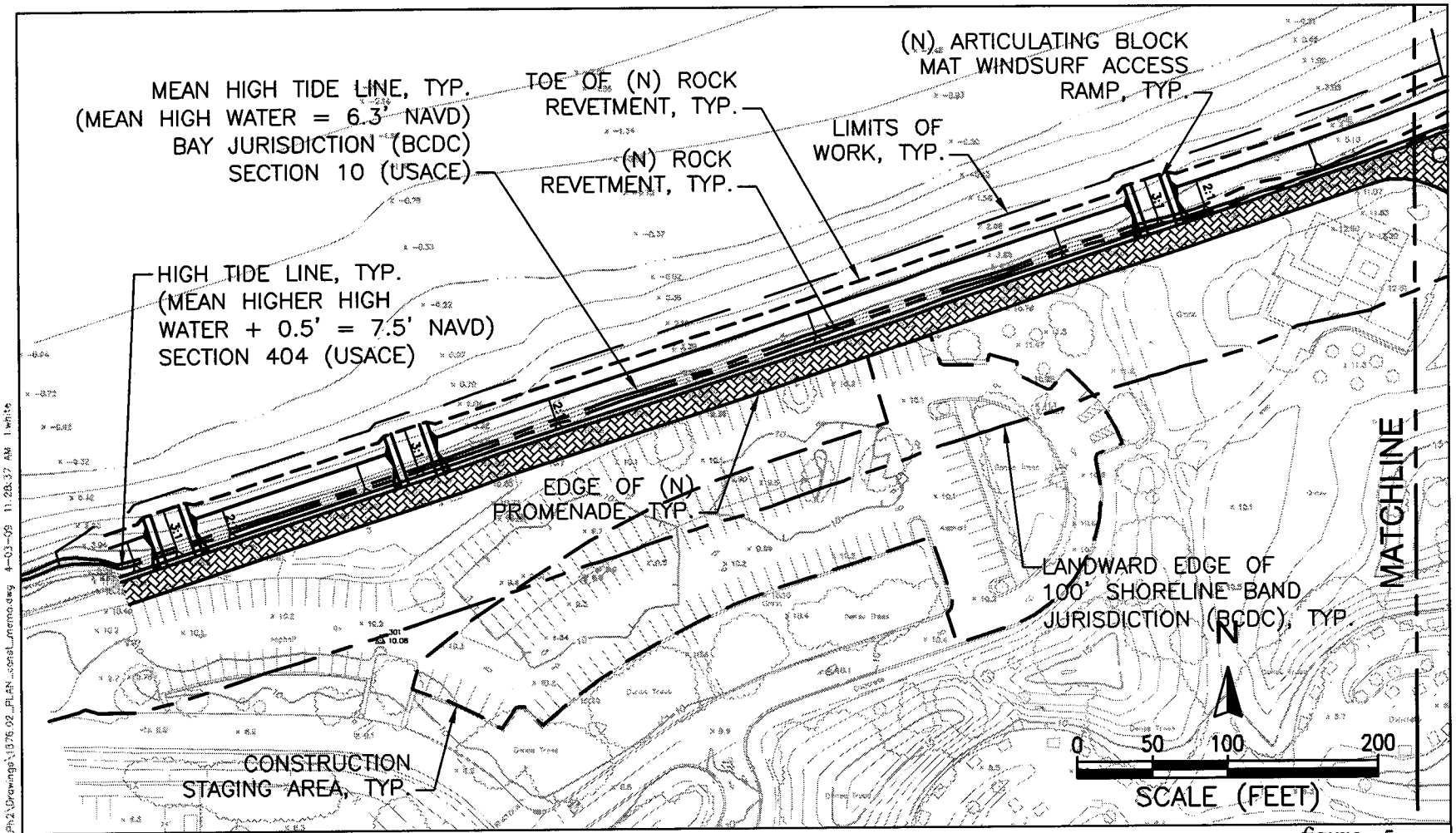

figure 5

Notes: *1 ft Contour Interval*
All elevations referenced to NAVD88

Sources: *HJW Geospatial, 2007*

Coyote Point Recreation Area

Plan View of Proposed Western Shoreline Improvements

PWA

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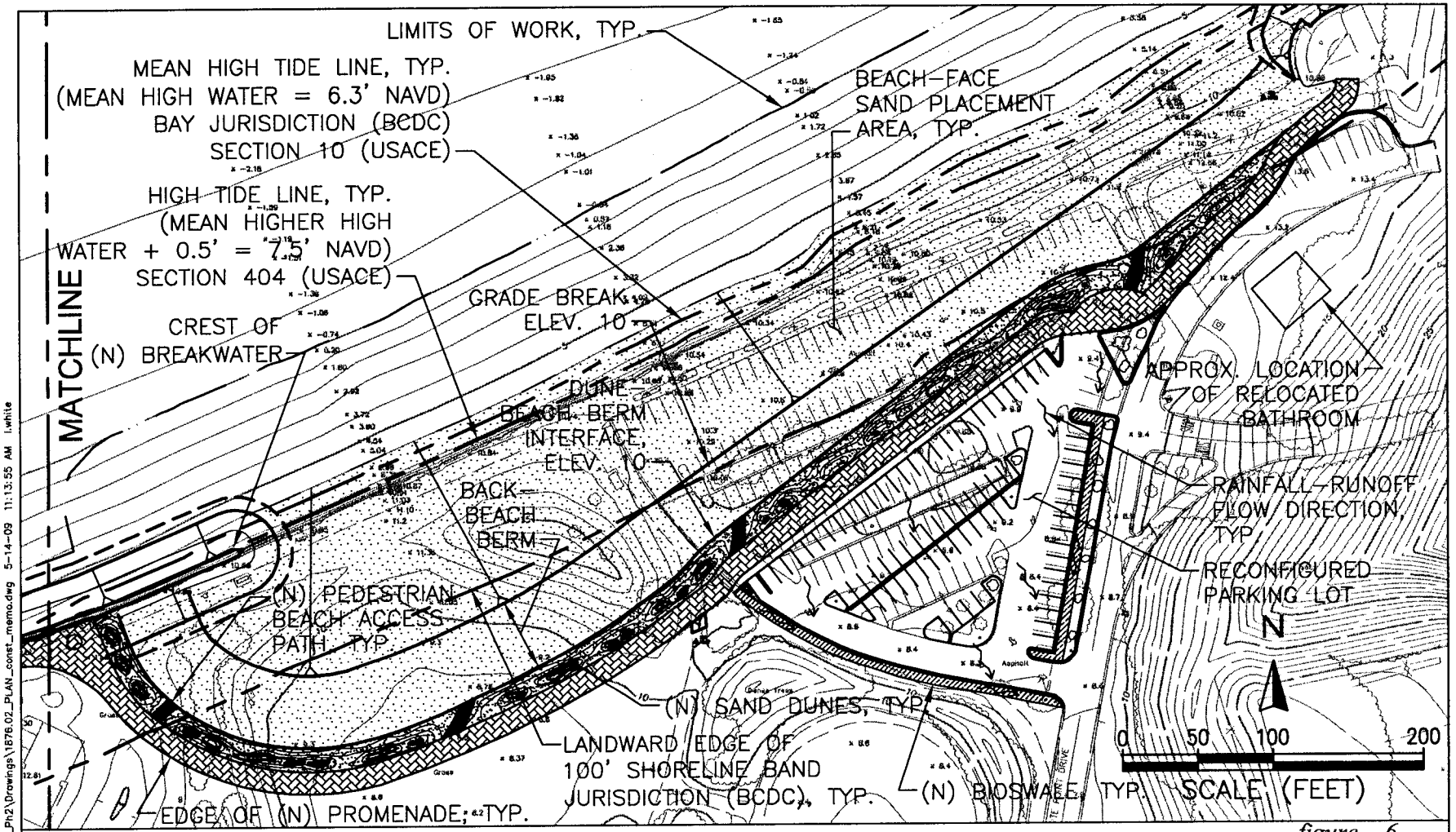

figure 6

Notes: *1 ft Contour Interval*
All elevations referenced to NAVD88

Sources: *HJW Geospatial, 2007*

Coyote Point Recreation Area

Plan View of Proposed Eastern Shoreline Improvements

PWA

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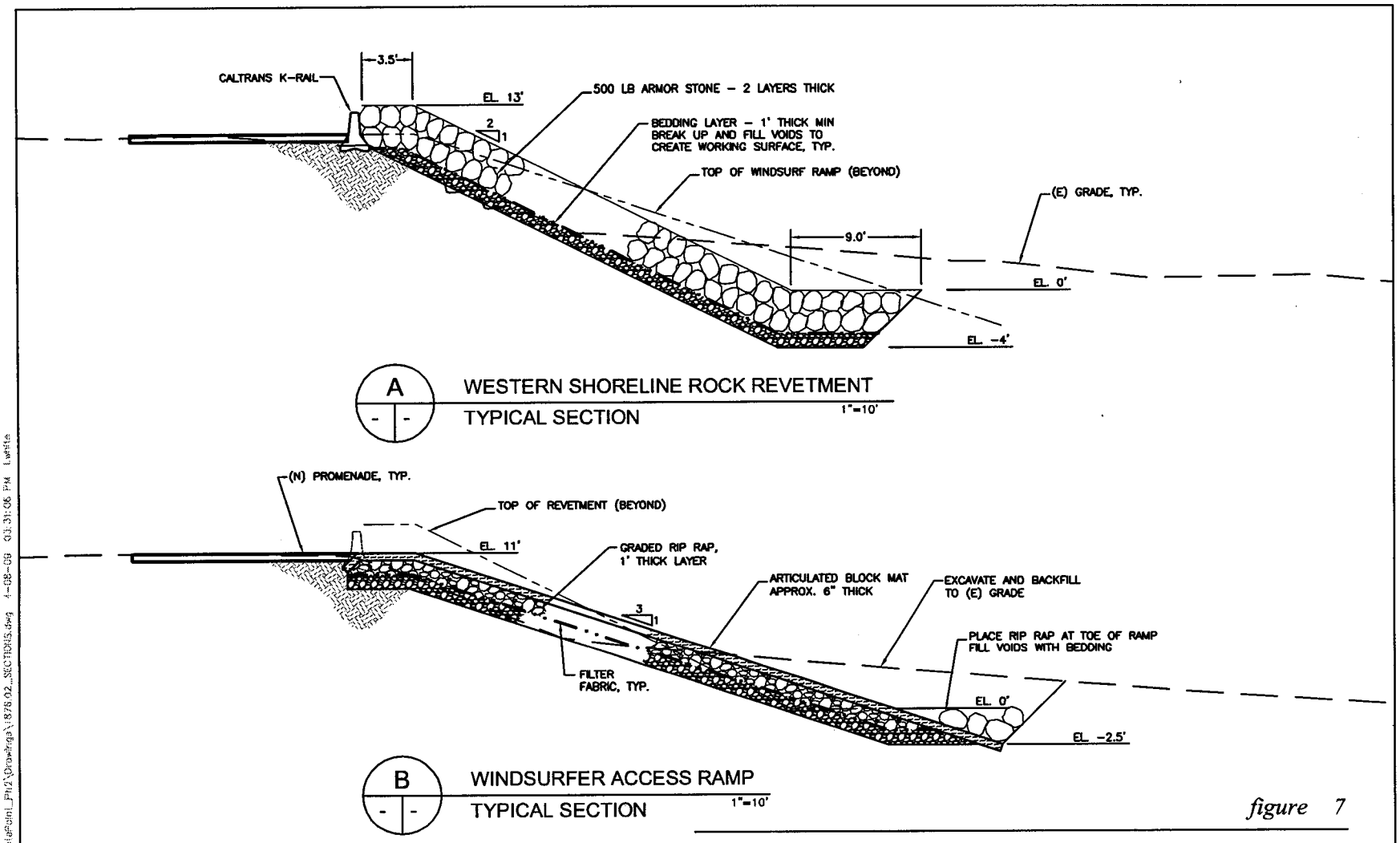

figure 7

Coyote Point Recreation Area

New Revetment and Windsurf Ramp - Section

Notes: Scale is 1"=10'

PWA

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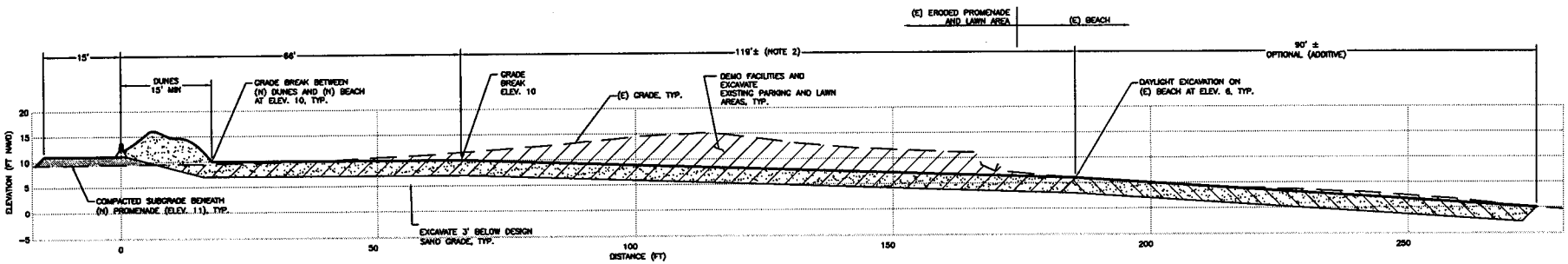
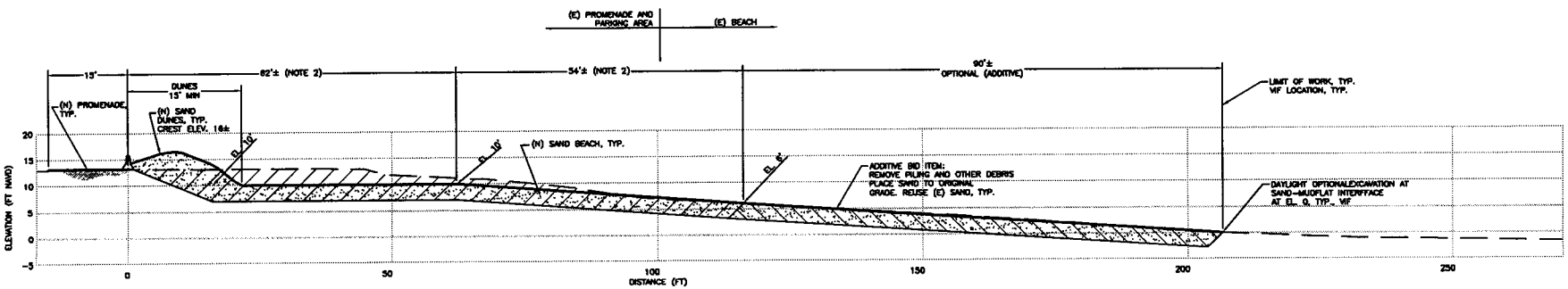


A NEW BEACH - WEST END SECTION 1"=20'



B NEW BEACH - EAST END SECTION 1"=20'

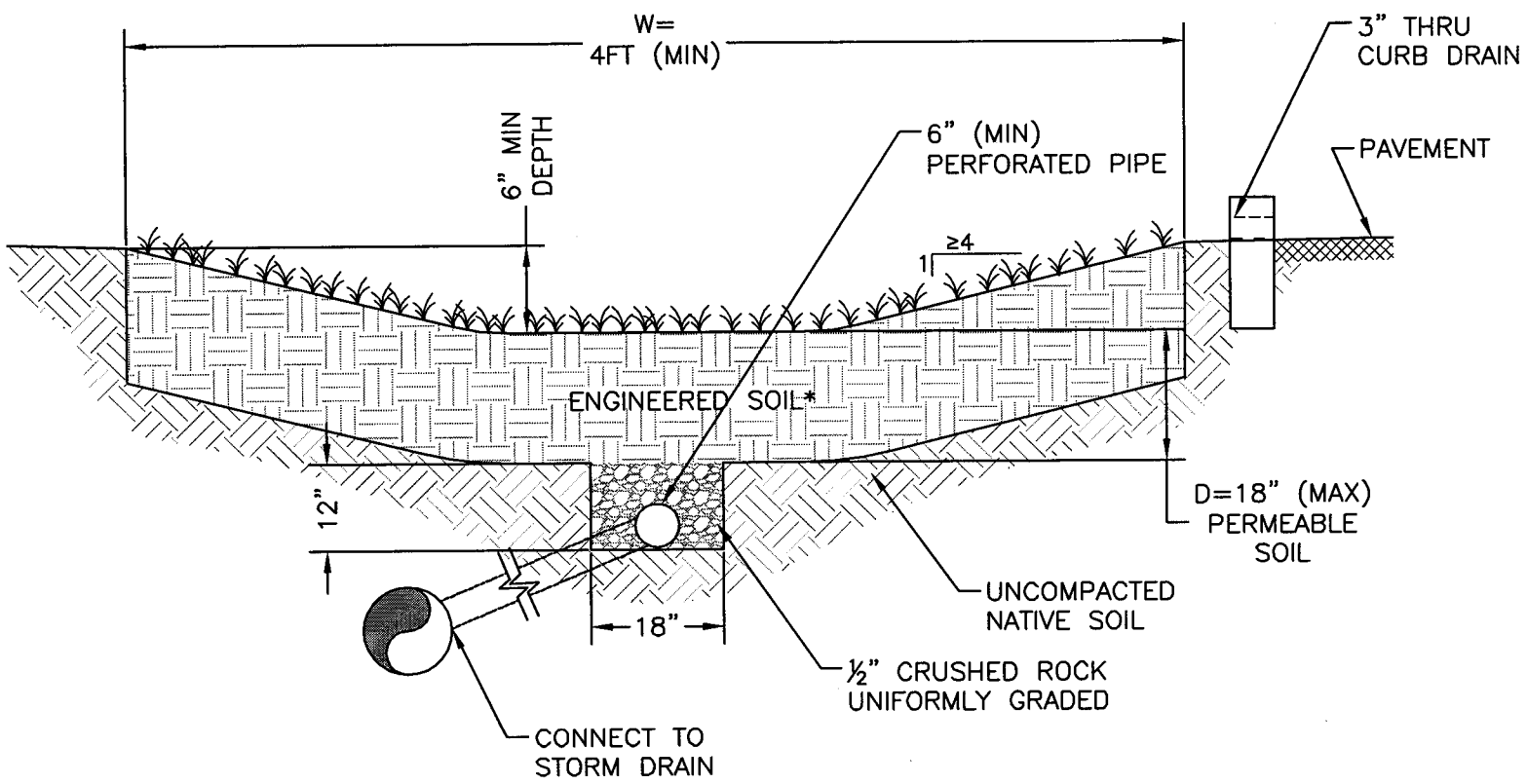
figure 8

Coyote Point Recreation Area

New Beach - Sections

PWA Ref. # 1876.02

PWA



Notes: Scale is 1"=2'

figure 9

COYOTE POINT RECREATION AREA

BIOSWALE - TYPICAL SECTION

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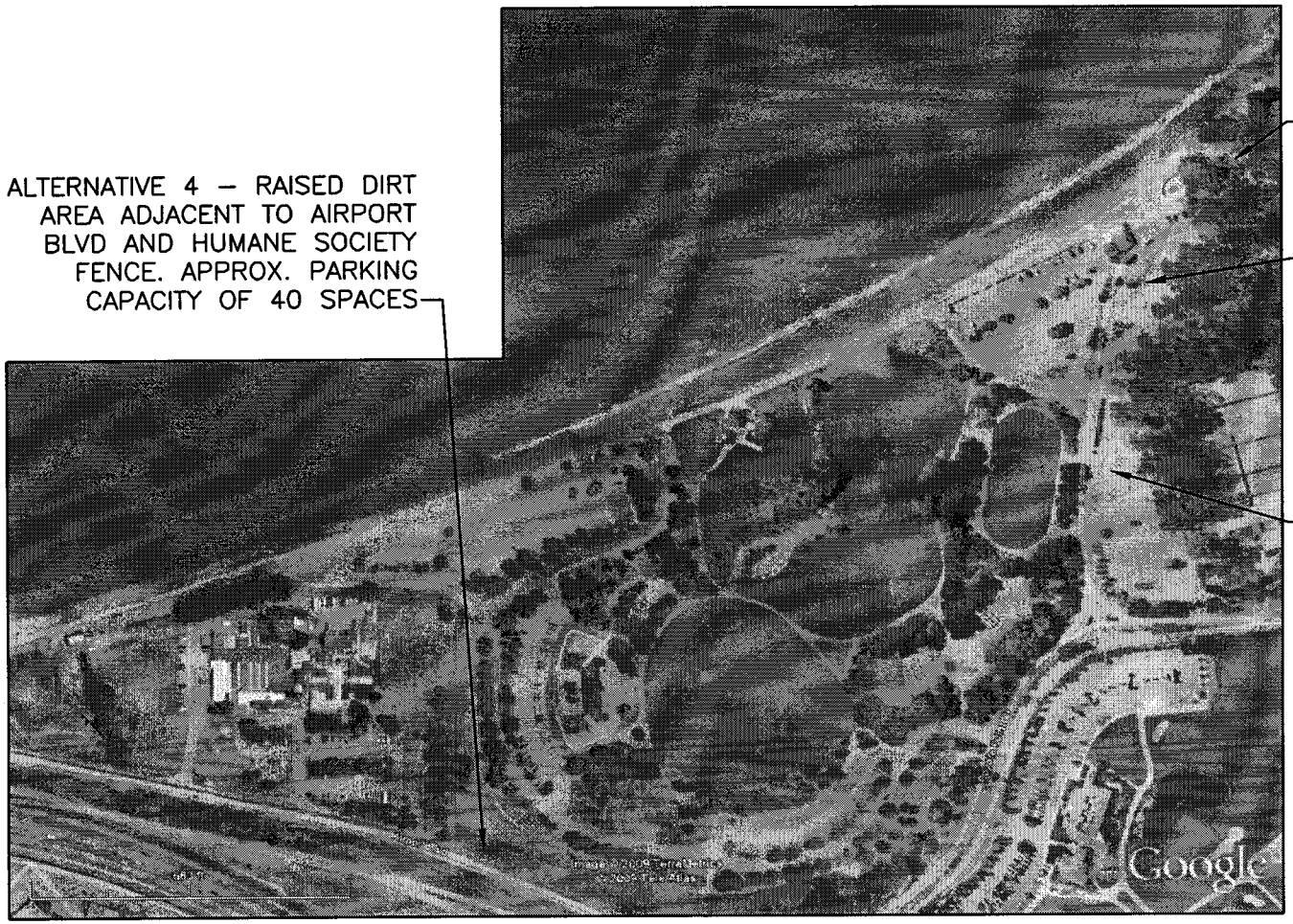

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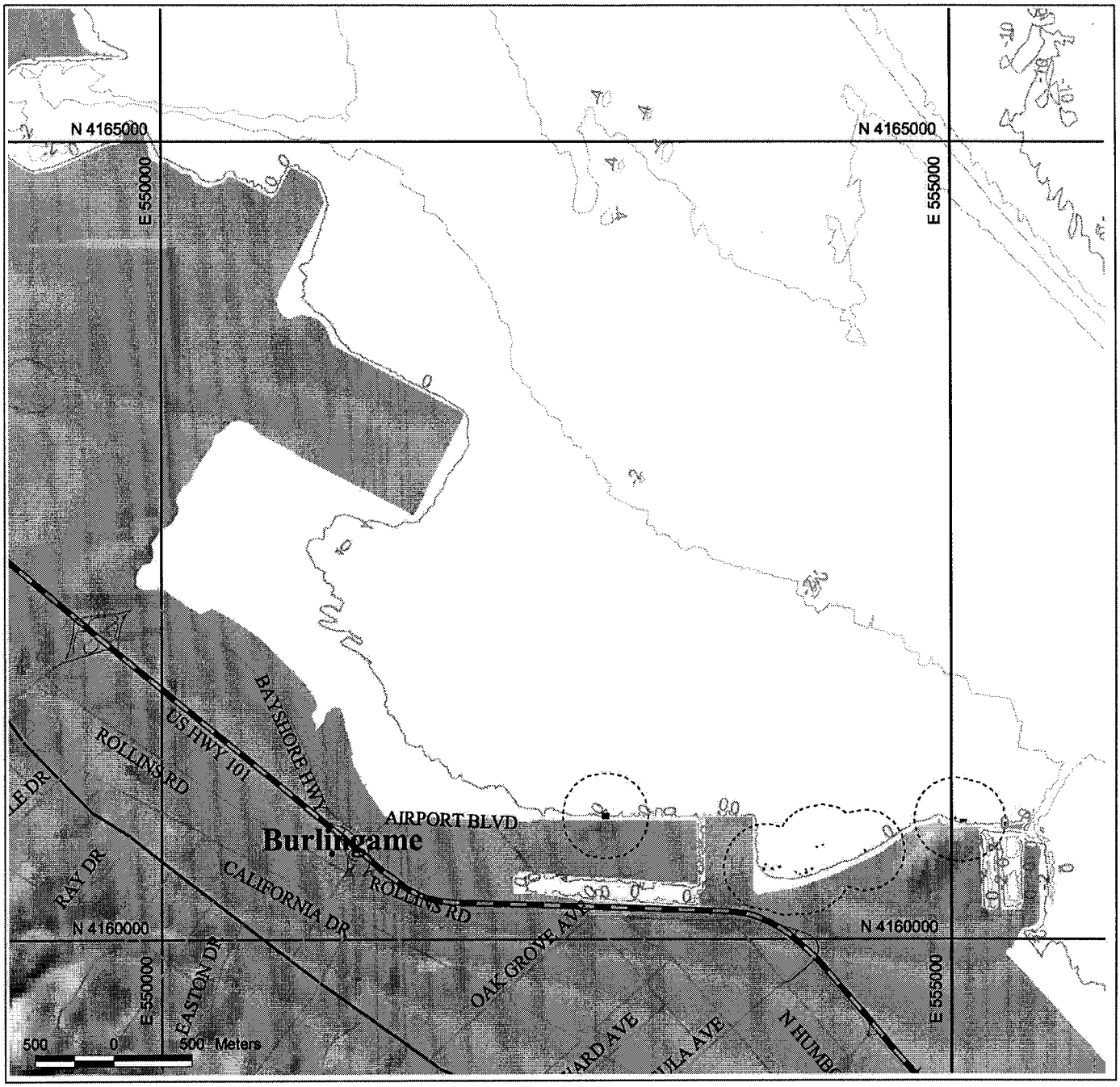
figure 10

Coyote Point Recreation Area

Additional Parking Alternatives

PWA

Notes: Parking Spaces Estimated Based on Area
Not to Scale
Source: Image from Google Earth



SAN FRANCISCO BAY, CALIFORNIA
Eelgrass 2003

Merkel & Associates, Inc.
San Diego, California Tel: (858) 560-5465

Horizontal Datum: UTM 10N NAD1983 (meters)
Vertical Datum: MLLW (meters)

Note: Charts are for planning and management purposes only. Information application is limited by survey scale and some error is expected. Information is not to be used for navigation or specific project applications.

- 0 - 5 % Density
- 5 - 20 % Density
- 20 - 40 % Density
- >40 % Density
- Maximum Documented Eelgrass Extents
- 250m Buffer of Maximum Documented Eelgrass Extents

N

figure 11

Coyote Point Recreation Area

2003 Eelgrass Survey Locations

Merkel & Associates, Inc

Appendix B

Coyote Point Shoreline and Promenade Improvement Description of Construction Activities

PWA
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ENVIRONMENTAL HYDROLOGY
550 Kearny Street, Suite 900
San Francisco, California 94108-2404
TEL 415.262.2300 FAX 415.262.2303
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MEMORANDUM

Date:	April 3, 2009
To:	Kate Werner; Pat Boursier
Organization:	Coyote Point Team (TRA, HT Harvey)
From:	Bob Battalio; Louis White
PWA Project #:	1876.02
PWA Project Name:	Coyote Point Recreation Area Phase 2
Subject:	Description of Construction Activities
Copy(ies) To:	Sam Herzberg

1. INTRODUCTION

This memorandum describes potential construction methods and activities as part of the Coyote Point Managed Shoreline Retreat and Renovation Project. The description that follows includes possible construction methods, equipment, sequencing, best management practices (BMPs), public access, and jurisdictional boundaries with respective areas of encroachment.

2. CONSTRUCTION METHODS, EQUIPMENT, AND SEQUENCING

Construction for Coyote Point Shoreline Managed Retreat and Renovation Project can be divided into two portions:

- Western: Traditional quarry stone shore protection, with access ramps for wind surfers, etc. (Figure 1)
- Eastern: Innovative beach restoration with fill removal and imported sand placement. (Figure 2)

Both portions, hereafter called the Western Reach and Eastern Reach, include a new paved public access trail called the promenade that roughly parallels the new shoreline. The promenade replaces the existing degraded trail, and connects to existing trails on the west and east ends. The Eastern Reach also includes demolition of a restroom, and reconfiguration of an existing parking lot, and runoff management actions. The reconfigured parking will utilize green permeable asphalt and bioswales. The Western Reach is to be constructed first. Depending on funding, the Eastern Reach may be constructed in a separate construction contract. Construction is expected to take place in late summer and fall, and will likely last approximately 3 to 5 months per construction period.

2.1 WESTERN REACH

The contractor will have a designated staging area which will be located in the parking lot in the Western Reach. Public access will be maintained during construction by allowing pedestrians to travel along a path separated by a fence from the construction zone and staging area. A temporary windsurf ramp, similar to the two existing sandbag ramps at the site, will be constructed to provide access to the water. Public access to the Eastern Reach will be available during construction of the Western Reach. Existing shoreline treatments will be removed and replaced with engineered shore protection and a new asphalt concrete promenade. The existing pre-fabricated shore protection called ArmorFlex (this is an articulated block mat constructed of concrete blocks cabled together) will be removed and disposed off site. Similarly, all deleterious materials such as asphalt paving and reinforcing steel will be removed and recycled according to the standards set forth by San Mateo County. Existing quarry stone that meets size requirements will be re-used. Otherwise, existing rubble will be rough-graded, covered with bedding (filling voids), and overlain with a layer of filter fabric, and then a layer of ¼ ton + quarry stone. The bayward "toe" of the rock structure will be placed below the existing beach grade into an excavation, and work will extend into the tidal range. Allowing for some disturbance bayward of the limit of excavation and rockwork, we have assumed a 10' distance; the limit of disturbance will be between elevation 2 ft NAVD and 4 ft NAVD. We will specify an orderly progression of construction from one end to the other, in segments around 200 feet. No more than 2 segments can be under construction at any one time. A breakwater section will be constructed on the east end of the western reach. The Contractor may pile rubble on the Bay-side of the excavation temporarily to protect his work from wave action, but will be required to remove all such materials. Three new access ramps will be constructed with ArmorFlex placed over the rock and keyed below the beach. The promenade will be reconstructed. A concrete wall will separate the promenade from the rock, except at the ramps. All construction activities on the beach are limited to low tide, and equipment will not be allowed to operate in the water.

We expect the following construction equipment and methods may be used:

- Hydraulic excavator, with skip-bucket for smaller rock and a "thumb" for placement of individual rocks;
- The excavator will prepare the existing slope and demolish the existing promenade;
- The excavator will dig a trench into the beach where the toe of the structure is to be founded, and temporarily place some material Bayward of this excavation;
- Rock will be delivered by truck and dumped on land;
- The excavator will place the bedding rock on the shore;
- Front end loaders and or dozers will shape the bedding;
- Filter fabric will be placed on the bedding primarily by hand;
- Armor stone will be carefully placed on the filter fabric in a layer roughly two stones thick.

- Material placed on the Bay side will be removed, and some will be used to backfill the excavation to match pre-existing beach grades
- Armor flex mats will be placed by the excavator in pre-fabricated sections.
- Sheeps-foot roller and vibratory compactors for earth compaction.
- Cast-in-place minor concrete structures (wall, curbs)
- Asphalt trucks, pavers and roller compaction equipment.
- Trucks will haul debris off site, and haul earth to local stockpile in the park.

2.2 EASTERN REACH

Staging for the Eastern Reach will be located in the east parking lot. Public access will not be allowed at the Eastern Reach while under construction. Public access will be available at the Western Reach. The inland portion of the eastern reach will be excavated, leaving the Bay-side as-is until the excavation is completed as much as possible and sand is ready for backfill. Demolition will be accomplished prior to excavation. A new earth embankment will be constructed to form the subgrade of the new promenade roughly paralleling the new shore. Sand meeting the quality requirements will be stockpiled on site. The sand will be delivered by truck or by barge. Barge delivery will likely be by pumped hydraulic slurry from a barge anchored offshore, or placed by an excavator from a barge floated close to shore during high tide. It is possible that use of the Coyote Point Marina for unloading from a barge to trucks may be allowed, rather than pumping a sand slurry. Multiple barge and or truck loads will be required. A short length of rock revetment will be constructed on the eastern end to anchor the beach at its terminus against the Coyote Point headland (this may be accomplished in contract one with the other rock work in Western Reach). The sand will be placed and graded in the excavated areas. The high ground on the Bay shore will be excavated from the eastern end in segments on the order of 200 feet. No more than two segments can be incomplete at any one time. The construction will progress in an orderly manner from east to west, until reaching the Western Reach. The dunes will be covered in erosion control fabric and planted. The promenade will be constructed. The new parking lot and bioswales will be constructed. Excess earth will be stockpiled on site. Debris will be off hauled and disposed of legally by the construction contractor. Similarly, all deleterious materials such as asphalt paving and reinforcing steel will be removed and recycled according to the standards set forth by San Mateo County. All construction activities on the beach are limited to low tide, and equipment will not be allowed to operate in the water. The limits of disturbance will be to the edge of excavation, and for permitting purposes this includes additive excavation to 0 ft NAVD.

We expect the following construction equipment and methods may be used:

- Hydraulic excavator, to demolish existing and load to trucks, and to move sand.
- Dump trucks to move earth.

- Front end loaders and dozers to rough grade earth and sand.
- Sheeps-foot roller and vibratory compactors for earth compaction.
- Cast-in-place minor concrete structures (wall, curbs)
- Asphalt trucks, pavers and roller compaction equipment.
- Trucks will haul debris off site, and haul earth to local stockpile in the park.
- Marine transport (if used) and delivery of sand will require scows (barges) that may be on the order of 30'x100'x8' in dimension to deliver sand. We anticipate the source of this sand will be the commercial sand minors dredging central SF Bay, with transfer locations in San Francisco or other waterfronts.
- Hydraulic slurry operations (if used) will require a water intake to the Bay, a pump to a steel or high density polyethylene pipe that is placed along the bay floor or suspended with floats on the surface from the barge to shore. On shore, the discharge would be into a diked area, where sand would settle and clear water would be decanted and discharged by gravity or pump back to the Bay. Otherwise, "bucket" operations with a crane or derrick on the barge or on land would mechanically excavate the sand from the scow and place it on shore. A third option is a conveyor belt system. If barges are unloaded in the Coyote Point Marina, a land or barge mounted crane with a bucket will be used to transfer the sand from the barges to trucks.

3. BEST MANAGEMENT PRACTICES

The contractor will be expected to use several BMPs during construction to minimize impacts to water quality at the site. The contractor is expected to conform to BMP standards set forth by the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP), whose website contains guidance and description of a wide range of BMPs and required permitting checklists (www.flowstobay.org). An overview of the BMPs that are likely to be utilized during construction for the project follows. Additional information can be found at the SMCWPPP website and in the Bay Area Stormwater Management Agencies Association's *Blueprint for a Clean Bay* document (BASMAA, 2003)

In general, containment of pollution and sediment is very important to limit impacts to water bodies, and a variety of methods and practices may be used to achieve this goal for a series of possible scenarios. SMCWPPP presents BMPs in seven major categories: (1) General construction and site supervision, (2) Heavy equipment operation, (3) Earth-moving activities, (4) Roadwork and paving, (5) Fresh concrete and mortar application, (6) Painting and application of solvents and adhesives, and (7) Landscaping and gardening. Specific BMPs used by the contractor during construction will not be limited to the following descriptions.

- Advance Planning
  - All excavation and grading should be scheduled for dry weather periods, and erosion control methods should be implemented before rain begins.
  - Locate and protect storm drains by using silt barriers and other methods to manage runoff at the site.
  - Train employees and subcontractors on the construction site.
- Good Housekeeping
  - Designation of one completely contained area for all auto parking, vehicle refueling, and maintenance.
  - Keep materials covered during wet weather.
  - Dry sweep paved surfaces
  - Clean up any spills immediately
  - Provide, cover, and maintain dumpsters and trash cans
  - Keep portable toilets clean and in working order
- Materials and Waste Handling
  - Source reduction
  - Use recyclable materials
  - Dispose of waste and debris properly – contractor is expected to conform to San Mateo County standards for recycling.
- Heavy Equipment Operation
  - All refueling and maintenance should take place in the designated and contained parking area
  - Maintain all vehicles and heavy equipment, and inspect frequently for leaks
  - Use dry cleanup methods whenever possible, and minimize use of water
- Earth-Moving Activities
  - Remove vegetation only when absolutely necessary
  - Plant or seed temporary vegetation for erosion control on slopes
  - Install waddles and silt fences at the toe of slopes to prevent sediment to be transported off site by runoff.
  - Divert runoff around excavations and graded areas.
  - Cover stockpiles and excavated material with secured tarps or plastic sheeting
  - Monitor and maintain all erosion control measures
  - Report failures of erosion and sediment controls to the local stormwater authority
  - Watch for soil and ponded groundwater that may be contaminated. If contamination is suspected, test for contamination and contact the Regional Water Quality Control Board
  - All work on the beach will be limited to low tide to minimize impacts to water quality, including turbidity.

- Roadwork and Paving – Installation and Removal
  - Avoid paving and seal coating in wet weather
  - Cover and seal catch basins and manholes when applying seal coating, etc.
  - Avoid creating excess dust when breaking asphalt or concrete
  - Remove all chunks and pieces of old pavement after break-up
  - Do not let broken pavement come in contact with rainfall or runoff
  - Protect nearby storm drain inlets during saw-cutting
- Fresh Concrete and Mortar Application
  - Secure bags of cement after they are open
  - Wash out concrete mixers only in designated washout areas. Never dispose of washout into the street, storm drains, drainage ditches, or streams.
  - Only mix up the amount of fresh concrete or cement that you will use for the day
  - Set up and operate small mixers on tarps or heavy plastic drop cloths
- Painting and Application of Solvents and Adhesives
  - Keep all liquid paint products and wastes away from the gutter, street, and storm drains
  - Never clean brushes or rinse paint containers into a street, gutter, storm drain, or stream
  - Paint out brushes to the extent possible
  - Never pour paint down a drain
  - For water-based paints rinse to the sanitary sewer after permission from the local wastewater treatment authority
  - For oil-based paints clean with thinner or solvent in a proper container. Filter and reuse thinners and solvents. Dispose of excess liquids and residue as hazardous waste.
  - Follow San Mateo County Environmental Health Division guidelines for disposal and recycling
- Landscaping and Gardening
  - Store pesticides, fertilizers, and other chemicals indoors or in a shed or storage cabinet
  - Dispose of unused pesticides as hazardous waste

4. JURISDICTIONAL BOUNDARIES

Because the project is located on the shoreline of San Francisco Bay in San Mateo County, Bay Conservation and Development Commission (BCDC) and U.S. Army Corps of Engineers (USACE) require permits for construction activities within their jurisdictional boundaries. The jurisdictional boundaries are defined as follows:

- BCDC Jurisdictional Boundaries
  - **Bay Jurisdiction** is located seaward of the mean high water (MHW) line, which is approximately 6.3 ft NAVD[1] at the site.
  - **100-ft Shoreline Band Jurisdiction** is the area located 100 ft inland from the Bay Jurisdiction.
- USACE Jurisdictional Boundaries
  - **Section 10** is located seaward of the MHW line
  - **Section 404** is located seaward of the high tide line (HTL), defined by the USACE as being the typical high water line which encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges. For purposes of permitting, the HTL has been estimated as mean higher high water (MHHW) plus 0.5 ft. At the project site, MHHW is approximately 7 ft NAVD and HTL is approximately 7.5 ft NAVD.

The boundaries of the jurisdictional zones are shown in Figures 1 and 2, the site plan for construction. Areas of impact were estimated within jurisdictional zones and are presented in Table 1. The areas were measured in AutoCAD using the 65%-complete construction drawings and extend seaward from the jurisdictional boundaries described above. At the Eastern Reach the seaward edge of the impact zone was assumed to be the limit of additive excavation (0 ft NAVD or 0.75 ft MLLW[2]). For the Western Reach the seaward edge of the impact zone was assumed to be 10 feet seaward of the toe of the new revetment.

Table 1. Impact areas in zones of jurisdiction for the BCDC and USACE.

Jurisdiction	Area (square feet)	Area (acres)
Bay Jurisdiction (BCDC)	119,080	2.73
100 ft Shoreline Band Jurisdiction (BCDC)	200,640	4.61
Section 10 (USACE)	119,080	2.73
Section 404 (USACE)	134,290	3.08

References

BASMAA, 2003, Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction-Related Activities, Available online: http://www.flowstobay.org/bs_construction.php.

[1] NAVD refers to the North American Vertical Datum of 1988.

[2] MLLW refers to mean lower low water – a tidal datum which represents the average of the lower low water height of each tidal day observed over the National Tidal Datum Epoch.

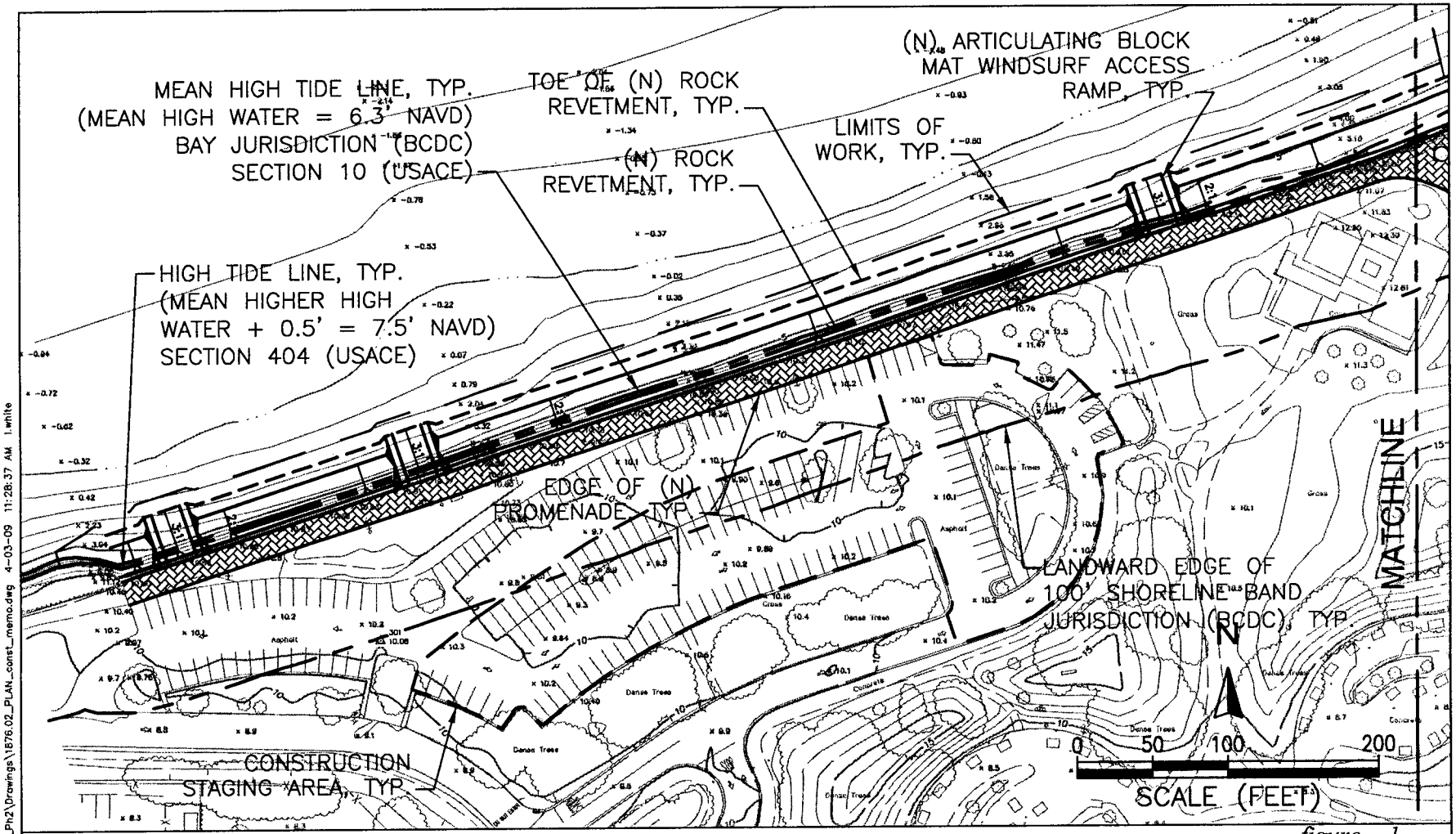

figure 1

Notes: *1 ft Contour Interval*
All elevations referenced to NAVD88

Sources: *HJW Geospatial, 2007*

Coyote Point Recreation Area

Plan View of Proposed Western Shoreline Improvements

PWA

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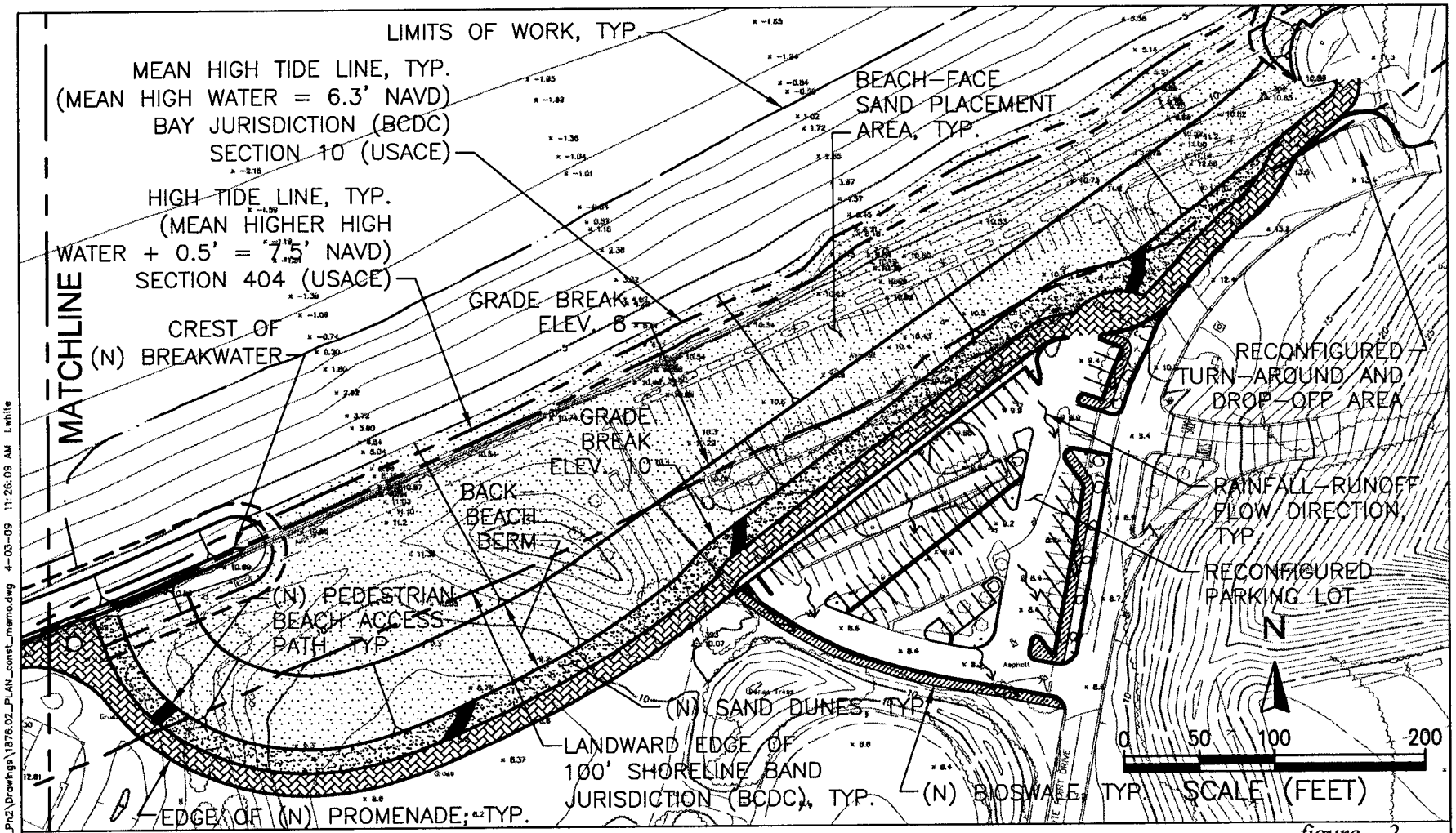

figure 2

Notes: *1 ft Contour Interval*
All elevations referenced to NAVD88

Sources: *HJW Geospatial, 2007*

Coyote Point Recreation Area

Plan View of Proposed Eastern Shoreline Improvements

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Appendix C

Coyote Point Recreation Area
Dune Planting List

Coyote Point Recreation Area
Shoreline and Promenade Improvement Project
Dune Planting List

SCIENTIFIC NAME	COMMON NAME(S)	Ann/ Per/Biennial	Habitat
Abronia latifolia	Yellow Sand Verbena	B	foredune
Abronia umbellata	Pink Sand Verbena	P	foredune
Atriplex leucophylla	Salt Bush	P	foredune
Lathyrus littoralis	Beach Pea	P	foredune
Leymus mollis ssp. mollis	American Dune-Grass	P	foredune
Artemisia pycnocephala	Beach Sagewort	P	foredune, dune scrub
Calystegia soldanella	Beach Morning Glory	P	foredune, dune scrub
Camissonia cherianthifolia ssp cheiranthifolia	Beach Evening Primrose (prostrate form)	B	foredune, dune scrub
Chorizanthe cuspidata var. cuspidata	San Franisco Spineflower	A	foredune, dune scrub
Erigeron glaucus	Seaside Daisy	P	foredune, dune scrub
Fragaria chiloensis	Beach Strawberry	P	foredune, dune scrub
Gilia capitata ssp. chamissonis	dune gilia	A	foredune, dune scrub
Lupinus chamissonis	Chamisso's Lupine	P	foredune, dune scrub
Polygonum paronychia	Dune Knotweed	P	foredune, dune scrub
Tanacetum camphoratum	Dune Tansy	P	foredune, dune scrub
Ambrosia chamissonis	Beach Bur, Silver Beachweed	P	foredune, dune scrub
Armeria maritima	Thrift, Sea Pink	P	foredune, dune scrub

Appendix D

Coyote Point Recreation Area
Beach Berm Response to Sea Level Rise

PWA
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MEMORANDUM

Date:	April 13, 2009
To:	Sam Herzberg
Organization:	San Mateo County Parks Department
From:	Louis White
PWA Project #:	1876.02
PWA Project Name:	Coyote Point Recreation Area Phase 2
Subject:	Beach Berm Response to Sea-Level Rise

This memorandum describes estimates of beach berm retreat in response to sea-level rise for the Coyote Point Recreation Area Shoreline and Promenade Upgrade Project, for which conceptual and preliminary design reports were completed (PWA 2008, PWA 2009). A major component of the project includes realignment of the shoreline to create a crenulate beach or bay by excavating approximately 25,000 cubic yards of artificial fill. Presently an eroded promenade and parking lot are located on the artificial fill, and the project proposes to reorient the promenade around the new crenulate beach, and reconfigure the parking lot (Figure 1). The purpose of this memorandum is to present an estimate of beach berm retreat resulting from a sea-level rise between 0.5 and 1.5 ft. This amount of sea level rise represents a moderately accelerated range that may occur by 2050, a moderately low range estimate for the next 100 years (by 2100), and greatly exceeds the historic rate of sea level rise measured over the last 50 years. In our opinion, this is a reasonable range for planning based on the risk of damage to the park and in recognition that the project implicitly reduces risk by relocating infrastructure landward and restores a sustainable shoreline. There is much uncertainty about the amount of sea level rise which may occur, and the amount to be considered in any given project is presently a judgment call.

Estimates of shoreline response to sea-level rise should not only account for the projected rise in sea-level on the existing topography, but also should account for erosional response based on the future water level and sediment characteristics. The proposed design of the crenulate beach includes a back beach berm that is approximately 50 to 65 ft wide (including minimum 15 ft wide linear dune field), and is located at elevation +10 ft NAVD[1] (see Figures 1 and 2). The design elevation of the berm can be related to elevation of mean higher high water (MHHW) at the site and typical wave runup values. The value of MHHW at Coyote Point is +7 ft NAVD. The beach face slopes down from the berm into the intertidal zone at an approximate average slope of 20:1 (horizontal:vertical) until it catches existing grade near elevation +6 ft NAVD. The 20:1 slope is representative of what would be expected for an open coast beach with sand grain size of 0.3 mm (PWA, 2009). This is considered conservative for application in the

[1] NAVD refers to the North American Vertical Datum of 1988.

more sheltered conditions at Coyote Point, and we expect that 0.3 mm sand could stand steeper at the project site. In response to sea-level rise, we also expect the elevation of the berm to increase. The increase in berm elevation is facilitated by the increase in MHHW and formed by normal wave runup occurring during the year. The elevation of the berm will periodically be overtopped every 1 to 5 years. The following describes how the berm retreat distances were estimated.

Addition of a 0.5 to 1.5 ft rise in sea-level to MHHW yields future values of MHHW:

- $MHHW_{0.5}$ = 0.5 ft + 7 ft NAVD = 7.5 ft NAVD
- $MHHW_{1.5}$ = 1.5 ft + 7 ft NAVD = 8.5 ft NAVD

The minimum distance of berm edge retreat (R) was estimated by shifting the equilibrium beach profile on a 20:1 slope for the vertical amount of expected sea-level rise, as follows:

- $R_{0.5, min}$ = 0.5 ft × 20 ft/ft = 10 ft
- $R_{1.5, min}$ = 1.5 ft × 20 ft/ft = 30 ft

Additional recession of the beach berm was estimated to account for the sand required to build the beach berm up to higher elevations. We assumed that the sand near the beach-mudflat interface (~ elevation 0 ft NAVD) will be lost offshore, and that erosion on the beach face was the source of material for the higher beach berm. It is likely that most of the sand will not be lost offshore, but this assumption facilitates a simplified analysis and result not likely to be exceeded. Based on the volume per square foot of beach [v^*=h /(27 cf/cy), where h is the height of the profile above the point of closure (10.5 ft for 0.5 ft rise in sea-level and 11.5 ft for 1.5 ft rise in sea level)] and the change in volume of the beach berm (Δv), the additional berm retreat distance (R) was estimated:

- $R_{0.5, add} = (\Delta v/v^*)$ = (3.6 cy/ft) / (0.39 cy/sf) = 9.2 ft, use 10 ft
- $R_{1.5, add} = (\Delta v/v^*)$ = (8.2 cy/ft) / (0.43 cy/sf) = 19.1 ft, use 20 ft

Accounting for the additional recession of the equilibrium profile, the maximum distance of berm retreat is the sum of the minimum and additional distances:

- $R_{0.5, max} = R_{0.5, min} + R_{0.5, add}$ = 10 ft + 10 ft = 20 ft
- $R_{1.5, max} = R_{1.5, min} + R_{1.5, add}$ = 30 ft + 20 ft = 50 ft

Figure 1 presents a plan view of the proposed beach area, with the design berm edge location (solid line) and the retreated berm edge locations for sea-level rise of 0.5 and 1.5 ft. The estimated existing and future MHHW lines are also shown in Figure 1, indicating that over 70 to 90 ft of dry beach will be present at water elevations equal to Mean Higher High Water (MHHW). Since water levels are lower than MHHW about 90% of the time, the actual beach widths are expected to be greater than 70 ft more 90% of the time. Figure 2 presents a schematic section of the recession of the equilibrium profiles due to sea-level

rise. With greater amounts of sea-level rise and recession, the linear row of dunes may not be sustainable without additional sand placement and or other future actions. Note that re-nourishment of sand to replace any sand "lost" during storms is assumed.

In summary, a sea-level rise of 0.5 to 1.5 ft will result in a receded equilibrium beach profile. The maximum expected distance of berm recession is approximately 50 ft, but the width of beach above MHHW is still at least 70 ft for the worst-case conditions. To mitigate effects of sea-level rise, periodic nourishment of the beach will be necessary to sustain the linear dune-field against the promenade. However, a monitoring plan should be developed to define criteria or trigger points to determine the timing and amount of beach re-nourishment.

References

PWA, 2008, Draft Coyote Point Recreation Area Conceptual Design Report, Prepared for San Mateo County Parks and Recreation Department, April 2008.

PWA, 2009, Coyote Point Recreation Area Phase 2 – Preliminary Design Report, Prepared for San Mateo County Parks Department, March 2009.

Attachments

Figure 1. Plan View of Beach Area Improvements and Projected Sea Level Rise
Figure 2. Schematic Beach Profile Illustrating Berm Retreat Responding to SLR

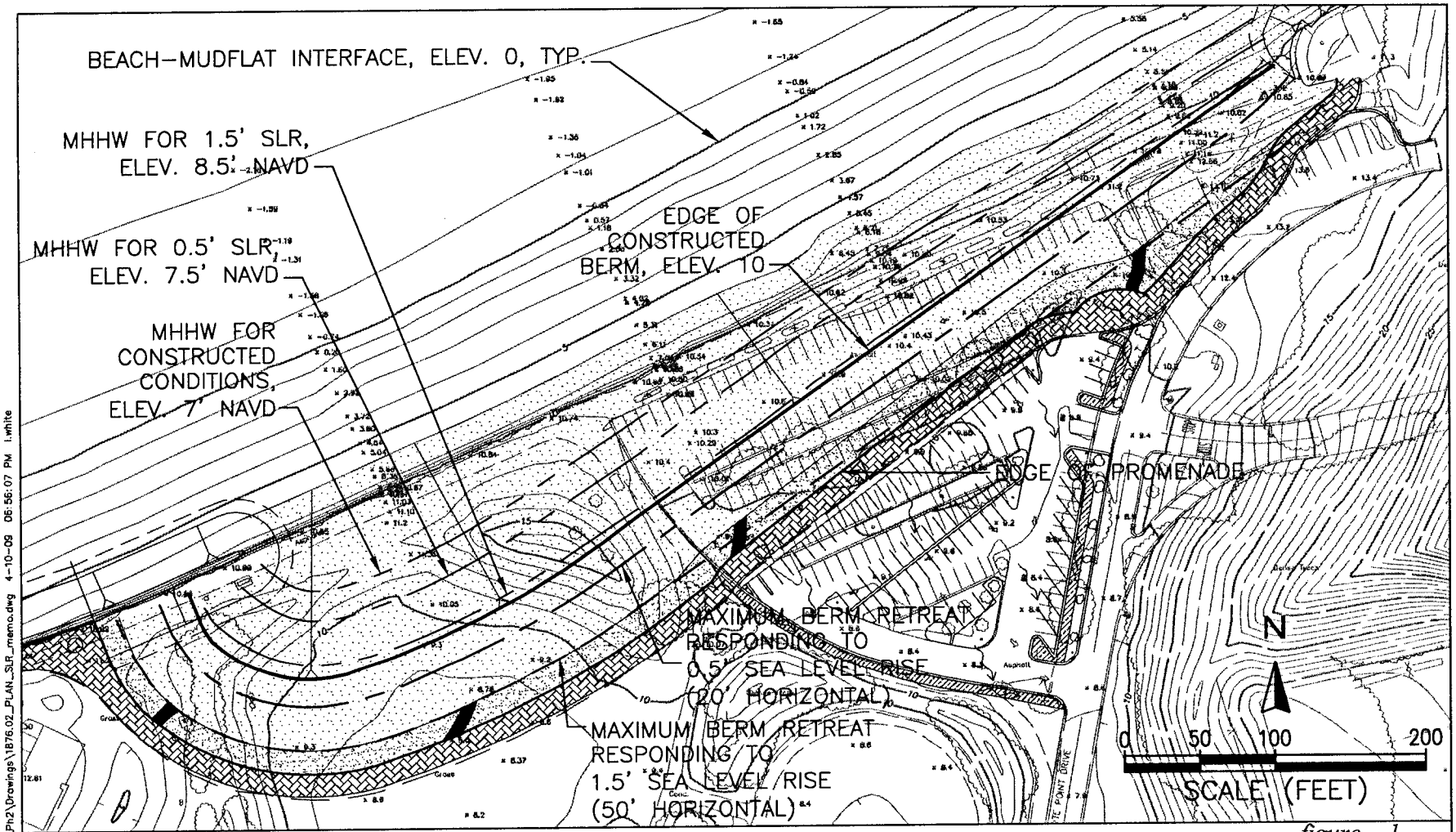

figure 1

Notes: *1 ft Contour Interval*
All elevations referenced to NAVD88

Sources: *HJW Geospatial, 2007*

Coyote Point Recreation Area

Plan View of Beach Area Improvements and Projected Sea Level Rise

PWA

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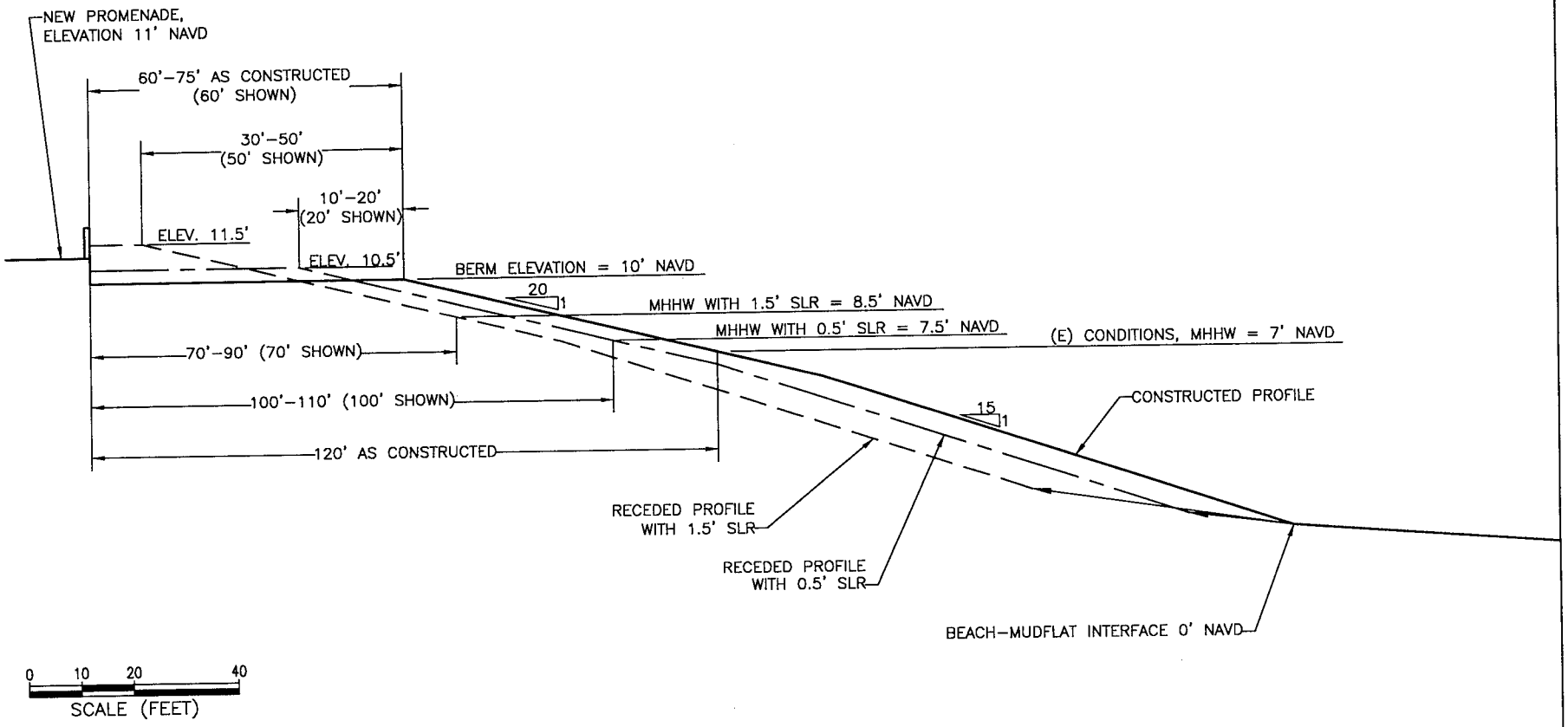

figure 2

Coyote Point Recreation Area

Schematic Beach Profile Illustrating Berm Retreat Responding to SLR

PWA Ref. # 1876.02

PWA

Notes: *Scale: 1"=20'*
5x Vertical Exageration
SLR = SEA-LEVEL RISE

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