ATTACHMENT 3

# TALBERT
## REGIONAL PARK
### Final Habitat Restoration Plan

Prepared for:

OCparks

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December 2015

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# 1 Introduction

Talbert Regional Park (the Park) is located north and south of Victoria Street in Costa Mesa, California, just east of the Santa Ana River. The park area north of Victoria Street (North Talbert) consists of 91.5 acres. The park area south of Victoria Street (South Talbert) is approximately 88.5 acres. For a map of the project site, see Figure 1.

The Park contains functioning wetland habitat impacted by non-native and invasive plant species. Conceptual restoration planning is needed to: 1) address removal of exotic plant species; 2) restore native habitat; and 3) accommodate public access and recreation.

The Talbert Regional Park Habitat Restoration Plan (the Plan) comprises a planning document that identifies park enhancement opportunities and specifies needs and recommended actions. The Plan targets those areas most impacted by invasive exotics as identified within the *Fairview & Talbert Regional Park Master Plan* (EDAW 1991) and by field inspection. The Plan specifically identifies areas within the Park for removal of exotic invasive plants. Some of that work has occurred, and more is planned for the future. As clearing of the invasive species moves forward, a comprehensive plan is needed to identify opportunities and constraints for restoration of the Wetland Zone. Upon completion, additional projects can move forward toward improving the balance and function of ecosystem services and public use of the area.

This Plan addresses natural preservation through non-native plant removal, habitat restoration, passive recreation and public use of multiple interest areas (Victoria Pond and a BMX bicycle area). Highlights of the Plan address the water resources of the Park within South Talbert containing elements of riparian woodland and mulefat scrub, and North Talbert along an area referred to as Placentia Drain. Placentia Drain is located along the eastern edge of North Talbert and runs along the base of the adjacent bluffs, until it fans out and drains into the Greenville-Banning channel through a culvert. The Drain is a natural open channel and the low spot which collects runoff and seepage from Fairview and Talbert Park and the bluffs. Placentia Drain has a historic connection to the Santa Ana River in that it is a remnant channel of the river - dating back to a time when urbanization and flood control along the river did not exist. It is approximately 2.5 acres.

A large number of stakeholders are interested in the site, so close coordination with stakeholders is appropriate. Important elements of the Plan include a description of existing conditions, analysis of restoration alternatives, maintenance needs, construction costs, and conclusions.

**Figure 1: Talbert Regional Park Project Site**

# 2 Scope of Work

This planning effort was made possible with funding provided through a Coastal Impact Assistance Program (CIAP) grant administered by U.S. Fish and Wildlife Services (USFWS).
The scope of work for the project is listed below.

a. Conduct Site Visit/Field Reconnaissance
b. Describe Existing Conditions
c. Conduct Public Stakeholder Meetings
d. Develop Draft Restoration Concepts
e. Evaluate Draft Restoration Concepts for:
    i. Hydrology and Water Quality
    ii. Habitat
    iii. Public Access
    iv. Construction
    v. Maintenance and
    vi. Costs for design, permitting, construction and maintenance.
f. Specify Next Steps and
g. Prepare Draft and Final Restoration Plan Documents

# 3 Habitat Restoration Plan

The purpose of this Plan is to evaluate a range of restoration concepts against baseline conditions of the Park. This Plan will be used to detail restoration needs within the Park and recommend specific actions for Park restoration. The Plan also identifies opportunities and constraints for restoration and will include analysis of several restoration alternatives.

## *3.1 Existing Conditions*

Understanding the existing baseline conditions of the Park is a prerequisite before restoration of the Park begins. Baseline conditions of the Park are described below. The County's consulting team (Moffatt & Nichol or M&N) performed a review of existing literature, surveys, and studies for Talbert Regional Park. Based upon this review, the existing site conditions are described below. In addition to review of existing data from prior studies, biological surveys were conducted to obtain updated information on vegetation communities and wildlife. A water quality analysis of Victoria Pond was also conducted to review conditions for possible introduction of fish. A summary of the existing conditions in the Park is summarized below.

### 3.1.1 Site Visit/Field Reconnaissance

On June 30, 2014, Chambers Group, Inc. (Chambers) performed a biological survey to assess current conditions and identify opportunities and constraints for restoration at Talbert Regional Park. Chambers mapped existing vegetation communities within Placentia Drain and South Talbert and assessed each area's potential to support sensitive species. Observations of wildlife and sensitive species were documented; however, more focused surveys for sensitive species were beyond this scope of work. Focused surveys may be required during any restoration work.

Water quality samples were also collected at Victoria Pond on June 30, 2014. The results indicate relatively low salinity and normal pH levels for the pond. However, high water temperatures and fairly low dissolved oxygen (DO) levels were also measured. Additional DO measurements should be taken within the pond to determine if the existing fish population in Victoria Pond can be increased without depleting ambient oxygen levels (Chambers 2014).

Subsequent to this field effort additional water quality data was collected by the County from August 2014 to February 2015 (County of Orange 2015) and is included in Appendix C. It confirms the conditions documented by Chambers.

### 3.1.2 Site Topography and Pond Bathymetry

Topographic data were obtained from surveys provided by the City of Costa Mesa and the County of Orange. Aerial surveys were conducted for North Talbert and South Talbert in 2005 and 2006 respectively. The survey data helped characterize the general topographic conditions of Talbert Regional Park. See Figure 2 and Figure 3 for topographic conditions of North and South Talbert Regional Park, respectively. A general description of the surface of each area is provided below.

- North Talbert - Topographic data were obtained from topographic files provided by the City of Costa Mesa. See Figure 2 for a topographic map of North Talbert. The topographic map was produced in 2005 from an aerial flown survey and has a contour interval of one foot. The topographic map includes existing ground conditions of Fairview Park, Placentia Drain, and the northern and eastern areas of North Talbert and the adjacent upland mesa. Specific features of interest are described below.
    - Fairview Park adjoins Talbert Regional Park to the north. The average elevation at Fairview Park is approximately +11 feet National Geodetic Vertical Datum 1929 (NGVD). Newport Mesa is an upland mesa located on the eastern edge of the site. The elevation at the top of the mesa is +80 feet NGVD. Placentia Drain is a linear feature at the base of the bluffs that drains Fairview and Talbert Parks. Elevations in the drain from north to south range from +10 to +5 feet NGVD.
    - The Santa Ana River is located along the western edge of the site. A flood control levee separates the river from the park. The elevation at the top of levee is approximately 19.5 feet NGVD.
    - Victoria Street runs along the southern edge of North Talbert. The street bisects the upland mesa and the average elevation of the roadway is +35 feet NGVD.
    - The elevations at North Talbert are greater than elevations at South Talbert and the area slopes downward from the north to the south.
- South Talbert - Topographic data, except for Victoria Pond, were obtained from topographic files provided by the County of Orange. See Figure 3 for a topographic map of South Talbert. The topographic map was produced in 2006 from an aerial flown survey and has a contour interval of one foot. The topographic map includes existing ground conditions at Victoria Pond, the internal BMX area referred to as "Sheephills," a portion of the lower Greenville-Banning Channel (GBC), and the adjacent upland mesas. Specific features of interest are described below.
    - The existing ground at Talbert South gradually slopes downward from the north to the south. Elevations at South Talbert are generally flat and range from 6.6 to 4.6 feet NGVD.
    - Victoria Pond has existing on-site historically, but was expanded for mitigation during construction of the Greenville-Banning Channel in 1991. The pond is currently fenced, which restricts public access to the waterway.
    - A hydrographic survey of Victoria Pond was conducted by Gahagan & Bryant, Inc. on August 20, 2014. Sonar points and transects were used to map depths and the toe of slope from the shoreline. The depth of Victoria Pond is approximately -8.6 feet NGVD. The water surface elevation at Victoria Pond is -1.2 Feet NGVD (Gahagan & Bryant Associates 2014).
    - A residential neighborhood is located to the east of the site atop the adjacent upland mesa. This residential area was historically used as a landfill site. Canyon

Park is located to the east of this residential area. The elevation at the top of this mesa is +20 feet NGVD.

- An unpaved road and utility easement is located along the southern edge of the site and separates South Talbert from the Banning Ranch property.
- In 2009, an experimental swale was constructed in the southwest portion of the site by OC Public Works as mitigation for the San Diego Creek Emergency Project. The purpose of the swale is to create suitable hydrologic conditions for riparian habitat at South Talbert. According to OC Public Works design plans for the swale, a channel was excavated 6 inches below the existing ground with 3:1 (horizontal:vertical) slopes and a top of bank width of 30 feet. The swale is oriented in a sinuous planform and extends roughly north to south.
- The Greenville-Banning Channel and Santa Ana River are located along the western edge of the site. A flood control levee physically separates these channels from the Park. The elevation at the top of levee is approximately 19.5 feet NGVD.
- Figure 4 depicts earthquake faults at the park site. According to the U.S. Geological Survey (USGS) database of earthquake faults, three faults associated with the Inglewood-Newport-Rose Canyon fault zone cross beneath Talbert Regional Park and the adjacent cities of Newport Beach, Costa Mesa, and Huntington Beach. The faults lines are oriented in a northwest/southeast direction.

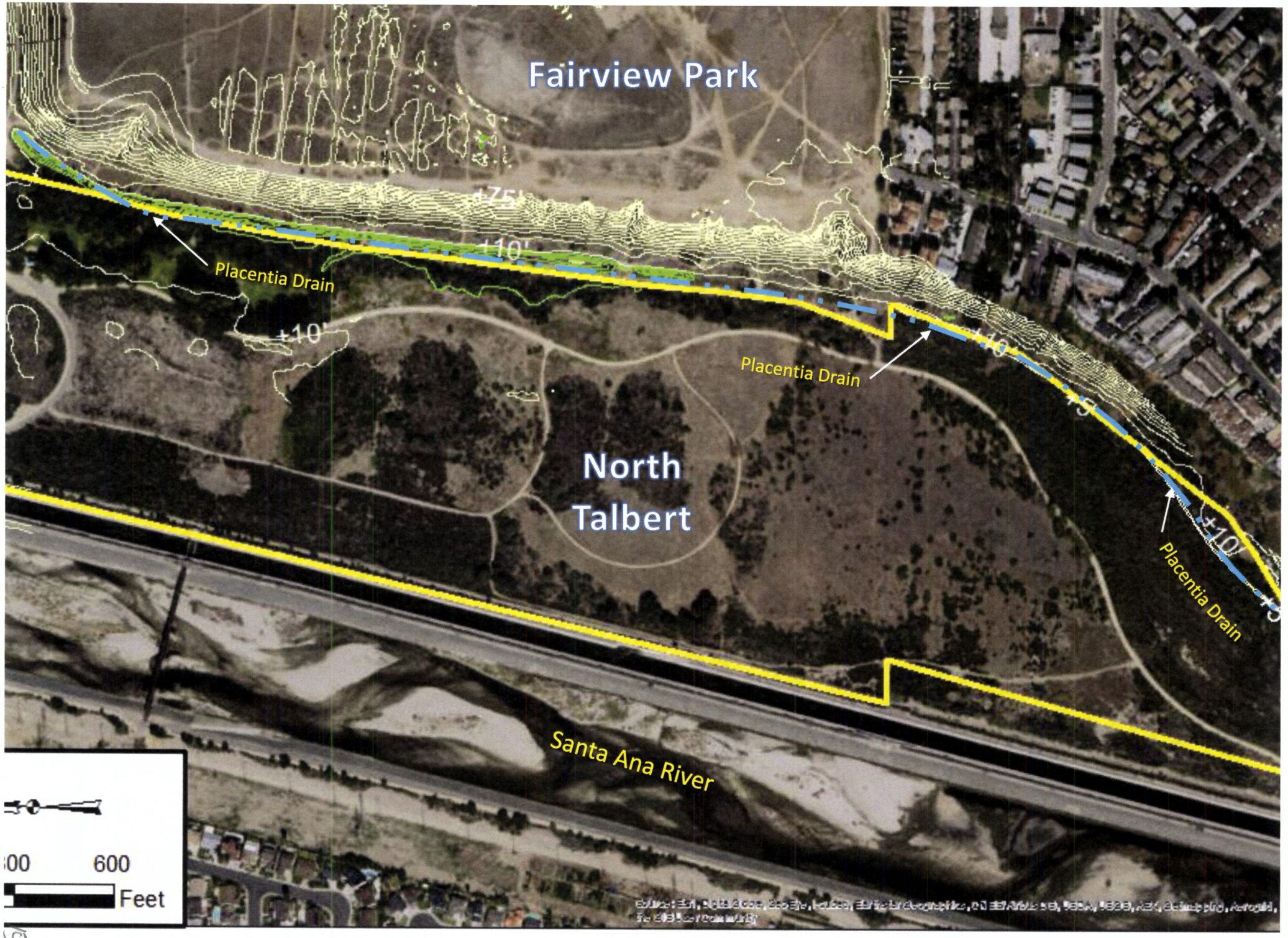
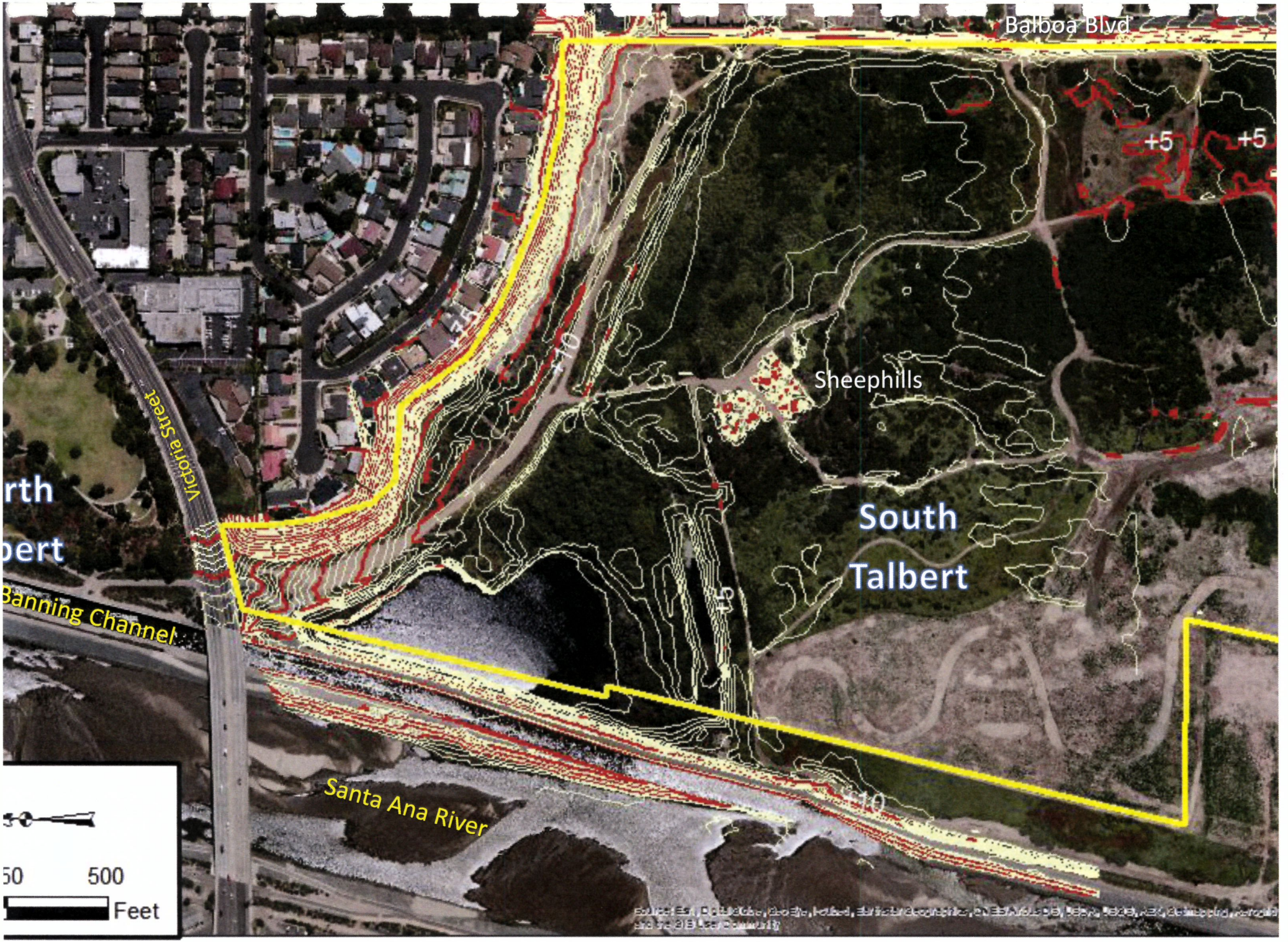



**Figure 2:** Topography of North Talbert Regional Park


Balboa Blvd
+5
+5
Sheephills
South
Talbert
Victoria Street
rth
bert
Banning Channel
Santa Ana River
50
500
Feet

16

**Figure 4: Earthquake Faults**
**(Source: USGS 2014)**



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### 3.1.3 Biology and Habitat

Biology data were obtained from the 1989 EDAW et.al Technical Memo and 2014 Chambers Group Biological Report. These data sources were used to characterize the vegetation communities and habitats at Talbert Regional Park. See Figure 5 and Figure 6 for vegetation and habitat mapping of North Talbert and South Talbert, respectively. The Park consists of various native habitat areas put in place by the County over the last decade. However, the Park also contains disturbed and degraded areas consisting of non-native invasive species (Chambers 2014).

- North Talbert - Quailbush scrub is located along the base of the flood control levee and extends into northwest and central portions of the site, along with Golden Bush and Coyote Brush. Summer Bush Lupine was observed on either side of the paved maintenance road located in the northernmost portion of the site.

  The northeastern portion of the project site supports stands of Coast Live oak and California Sycamore trees, which are also established along the eastern edge of the site and near Placentia Drain. The Placentia Drain, a remnant channel of the river, extends from north to south at the base of the mesa and supports mixed exotic/mule fat scrub. The drain also includes some non-native invasive species (arundo) that is in need of removal (Chambers 2014).

  The southern portion of this site is predominantly Coyote Brush scrub. Mule fat scrub was mapped along the southern portion of the site by Wetland Research Associates in 1989. However, vegetation mapping done by Chambers Group, Inc. in 2014 indicates this area is now dominated by Coyote Brush, Quailbush scrub, and ornamental landscaping. Cottonwood trees, and Willow trees; tree tobacco plants also occur within the southern portion of the site

  Birds are the most common animal species at this site. Although fewer birds were observed in this area than in South Talbert, the habitat at North Talbert is regular foraging grounds for raptors, seed-eating birds, and hummingbirds that feed at tree tobacco plants (EDAW et al. 1989).

- South Talbert - Data were obtained from the 1989 EDAW et al. Technical Memo, the 2014 Chambers Group Biological Report, and the 2014 Fourth Annual Monitoring Report by Dudek. This site contains a mosaic of habitats and plant communities that include a mixture of annual forbs and grasses, non-native/exotic plants, mule fat scrub, stands of willow forest, ornamental landscaping along the top of the mesas, California Bulrush, and freshwater open water habitat at Victoria Pond. The plant communities change periodically due to wetter or dryer weather patterns. Willow stands and mule fat scrub nearest to Victoria Pond are more stable than other areas and less influenced by shifts in weather patterns (EDAW et al. 1989).

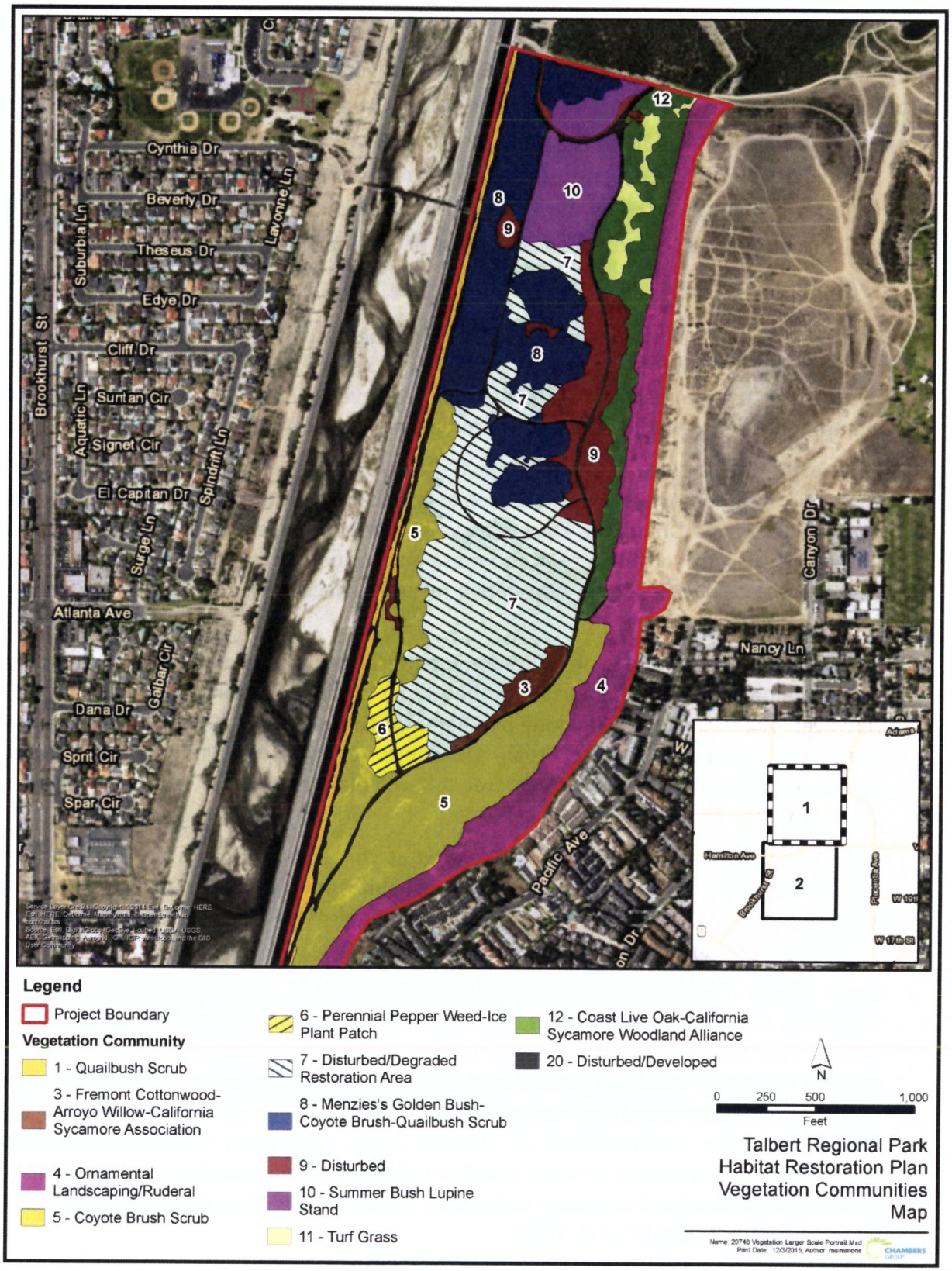



**Figure 5: Vegetation and Habitat Map at Talbert North (Source: Chambers 2014)**

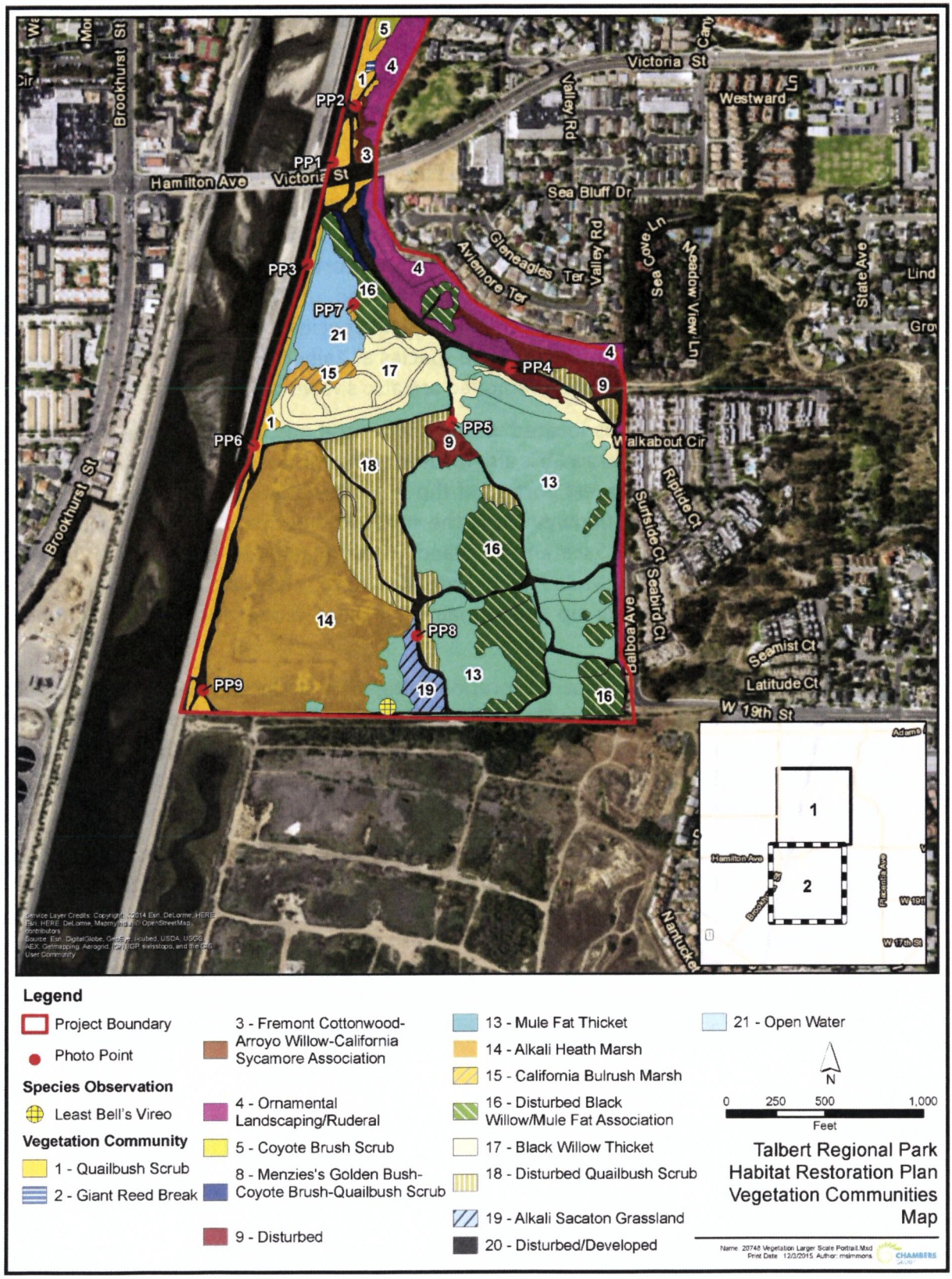



**Figure 6: Vegetation and Habitat Map at Talbert South (Source: Chambers 2014)**

Patches of California Bulrush, which is wetland vegetation typically found in brackish to freshwater marshes, was found along the southern edge of Victoria Pond and to a lesser extent the eastern edge of Victoria Pond. Other riparian habitats include stands of Black Willow and Mule Fat Thicket located in the central, eastern, and southeastern portion of the site. Several non-native plant species were found within the Mule Fat Thicket areas including fennel, shortpod mustard, Aleppo Pine, and pampas grass. Pampas grass, which is a highly invasive species, is interspersed within vegetation communities throughout this site (Chambers 2014). In some disturbed areas pampas grass has been removed by OC Parks and through community based restoration efforts. Large expanses of the exotic species still remain throughout the site however; and, until it is thoroughly eradicated, pampas grass will continue to threaten native plant species and hinder restoration of the Park. Figure 7 and Figure 8 shows invasive species at Talbert Regional Park. Areas where invasive species have largely been removed are also shown on the map.

Disturbed Quailbush scrub is located within the central portion of the site. As with the North Talbert site, Quailbush scrub is also located along the base of the flood control levee at South Talbert. The southwest portion of the site is dominated by a modest expanse of Alkali Heath marsh. About midway along the southern boundary of the project site is a small community of Alkali Sacatan Grassland. The endangered Least Bell's Vireo was observed in a small patch of Mule Fat Thicket adjacent to this area. Stands of Black Willow and Mule Fat Thicket make up the remaining habitat along the southern boundary (Chambers 2014).

There are five existing habitat restoration/mitigation areas at South Talbert. These mitigation areas were created by Orange County Public Works (OCPW) to compensate for (riparian) impacts associated with OCPW San Diego Creek Emergency Repairs and Peters Canyon Channel Bikeway Projects. The five mitigation areas are Sites A, B, C, D, and E. See Figure 9 for OCPW mitigation sites at South Talbert.

At Site A, restoration and monitoring of coastal sage scrub habitat is being done by OCPW. At Sites B, C, D, and E, restoration and monitoring of southern willow scrub habitat is being done by OCPW. Mitigation monitoring reports have been prepared annually since 2010 for these areas (Dudek 2014). As a result of the difficulty in establishing riparian habitat in the southwest part of South Talbert, OCPW is in the process of designating a new area for riparian habitat restoration. This new area is called "Proposed Site B". OC Parks is working closely with OCPW in coordinating restoration efforts at Talbert Regional Park.

**Figure 7: Invasive Plants at North Talbert**
**(Source: California Invasives Plant Council)**

**Figure 8: Invasive Plants at South Talbert**
**(Source: California Invasives Plant Council)**

Of the five mitigation sites, Site C has the best riparian canopy cover. The monitoring results also indicate some favorable progress has been made towards creating the desired habitat for Sites A, D, and E, although most of the progress occurred at the herbaceous level. The monitoring results for Site B suggest creating riparian habitat in this area may be the most challenging. The results for all five mitigation areas are based on quantitative transect data - per vegetative cover data collected in October 2013 - and are summarized in Dudek 2014.

Results from the Chambers' literature review and site survey indicate three (3) plant species (Lewis' Evening Primrose, Gambel's Watercress, and South Coast Branching Phacelia) have moderate potential to occur and three (3) species (Chaparral Sand Verbena, Coulter's Goldfields, and Mud Nama) have high potential to occur at Talbert Regional Park. Southern tarplant was observed on site at the southern end of the site, and Chambers identified other populations in areas at Fairview Park, north of the site, and also in the Banning Ranch area, just south of the site. Findings from Chambers indicate Talbert Preserve is likely to support a self-sustaining population of southern tarplant. Focused surveys should be conducted to determine the extent and number of individuals present on site (Chambers 2014).

Three (3) wildlife species were not observed onsite, but given the type of habitats at Talbert Regional Park, have potential to occur here. These species include: the California gnatcatcher, which has a moderate potential to occur within the Project site; and the burrowing owl and San Diego fairy shrimp, both of which have a high potential to occur within the Project site. Other sensitive wildlife species such as the California least tern, least Bell's vireo, and yellow-breasted chat, were observed on site during the biological survey. To minimize potential impacts to these species, focused surveys and biological monitoring should be conducted. Should any of the above species be identified during focused surveys, measures to avoid or minimize impacts to the species should be submitted to resource agencies for approval prior to construction (Chambers 2014).

The biological assessment from Chambers indicates Talbert Regional Park supports some sensitive species and has potential to become habitat for additional sensitive plant and wildlife species. Several plant species, including Lewis' Evening Primrose, Gambel's Watercress, South Coast Branching Phacelia, Chaparral Sand Verbena, Coulter's Goldfields, and Mud Nama have the potential to establish. The data collected also suggests that Southern tarplant in particular has the potential to establish and thrive at Talbert Regional Park. In addition to plant species, three (3) wildlife species have potential to occur at Talbert Regional Park: the California gnatcatcher, the burrowing owl, and San Diego fairy shrimp. Talbert Regional Park could be designed such that the habitats these species depend on is enhanced or created within the boundary of the Park.

Figure 2 — OCPW Mitigation Sites

### 3.1.4 Hydrology and Water Quality

Hydrologic and water quality data were obtained from the 1989 EDAW et al. Technical Memo, 1991 EDAW Enhancement Plan, U.S. Army Corps of Engineers (USACE) Greenville-Banning Channel Victoria Pond Grading Plans, 2014 Chambers Group Biological Report, and data measured by County staff. Most recently, County staff sampled water at Victoria Pond approximately twice a month from 8/14/14 to 8/17/15. All of these data sources were used to summarize the hydrology and water quality at Talbert Regional Park in the paragraphs that follow.

EDAW reported semi-perched groundwater is located near the surface of the site and Talbert Aquifer underlies the site at approximately 60 to 150 feet beneath the surface. Water in the aquifer is known to have been intruded by seawater in areas located several hundred yards west of the Park. However, groundwater quality testing showed most of the Park to be underlain at shallow depths by brackish water. The shallow groundwater is confined by a silty clay unit at about 10 feet below the ground surface and the saturated zone is confined at elevations approximately between -1 to -5 feet NGVD (EDAW et al. 1991).

EDAW found the groundwater to be predominantly fresh at South Talbert - no saltwater intrusion (EDAW et al. 1989). However, soil testing done in 2012 indicates brackish saltwater may be percolating up through the ground at (previous) Mitigation Site B (Dudek 2014). More groundwater testing in the vicinity of Site B may be required to characterize the groundwater quality and detect any presence of saltwater intrusion. Anecdotal evidence from Site B mitigation monitoring suggests some saltwater or brackish water is infiltrating the (previous) Site B vicinity (Dudek 2014).

Per communications with Dudek, new groundwater monitoring wells were installed at the Park in 2014/2015 and the results of the monitoring data should be available soon. Saltwater intrusion, if detected in the aquifer underneath the Park, could beset any progress to mitigation and restoration of freshwater riparian habitat at the park. Consequently, salt water intrusion will need to be monitored carefully by the County, and restoration plans adjusted accordingly to take it into account.

The groundwater table at Talbert Regional Park fluctuates according to the seasons. The "wet" season is predominantly from November to March/April when rainfall is greatest. The average monthly rainfall during the wet season varies from 1.4 inches to 2.5 inches. During the dry season, rainfall is less than 0.3 inches rainfall per month (EDAW et al. 1989). Park subareas are described in more detail below.

- North Talbert

  Regular flooding does not occur and the groundwater table is not high at this site. Placentia Drain has the lowest elevations. Water from the adjacent parks and bluffs collects in the drain and flows via gravity to a culvert that connects to the Greenville-Banning Channel.

- South Talbert

  The groundwater table at South Talbert is higher than at North Talbert and estimated to be between 0.7 feet and 5 feet below the ground. For an illustration of groundwater contours at South Talbert, see Figure 10. The groundwater contours depict a southwest trend or gradient, with higher groundwater to the northeast and lower groundwater to the southwest. A canyon to the east and interlayered units of silty, clayey sand and gravel soils, inferred to be a buried stream channel or extension of the canyon, seem to be providing some recharge to the local ground water. The groundwater gradient for the site is relatively steep, about a tenth of a foot per hundred feet (EDAW 1991).

- Victoria Pond

  As documented by EDAW, the water in Victoria Pond is perched or semi-perched relative to ground water. Victoria Pond was probably formed by the intersection of the water table with the pond bed and drainage inflows from adjacent urban areas. The pond has a fluctuating water table in response to seasonal changes to inflow and groundwater levels. Surface flows entering the pond dissipate due to evaporation and also by infiltration into the ground water (EDAW 1989 and 1991). The pond was surveyed by Gahagan and Bryant, Inc. on August 20, 2014. The water surface elevation of the pond is -0.9 feet NGVD and the bed (bottom) of the pond ranges from -8.3 to -8.8 feet NGVD.

  The pond also receives water via a 30-inch box culvert or spillway that connects to the adjacent Greenville-Banning Channel. The invert of the culvert is 3.6 feet NGVD (Gahagan and Bryant, Inc. 2014) and is set high relative to the tide range, which means Victoria Pond may only receive tide water during "King" tides. Likewise the pond will only drain into the Greenville-Banning Channel when the water level of the pond is above the culvert invert. The pond is predominantly a fresh water body.

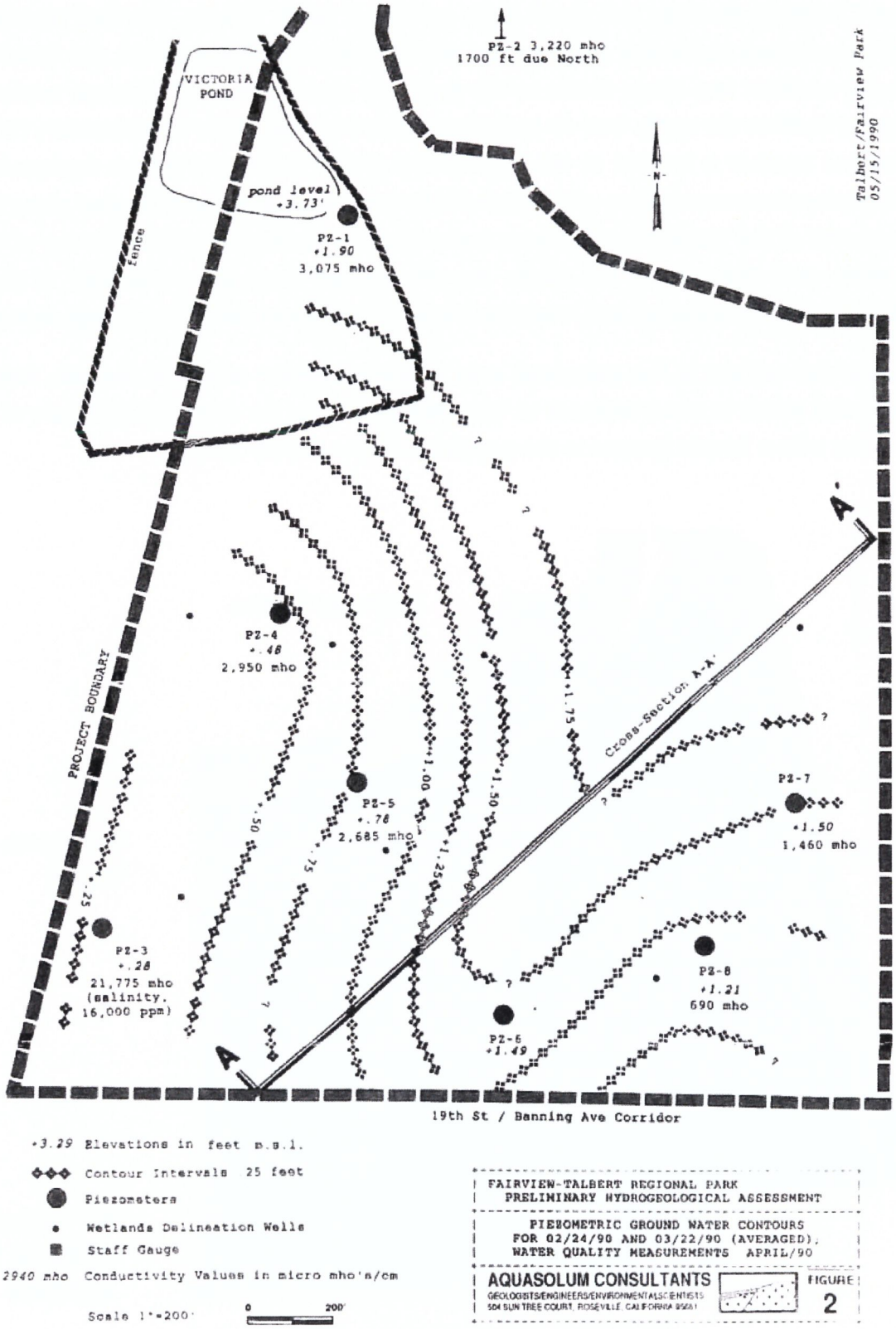



**Figure 10: Groundwater Contours at South Talbert (Source: EDAW 1991)**

Figure 11 depicts drainage and storm drain outfalls at South Talbert. The Park receives runoff from the adjacent residential areas on top of the bluffs. Runoff enters the site from three (3) drainage systems: two storm drains to the east, and a series of small drainage swales located along the bluffs to the north. One 45-inchstorm drain is located at the east boundary (Walkabout Circle) and another is located at the intersection of 19th Street and Balboa Boulevard (EDAW 1991; personal communication with Dudek 2015). Small drainage swales located along the bluffs to the north of the Victoria Pond receive water from the residential area at the top of the bluffs and drain near the base of the bluffs. Runoff received from the outlet east of the site at Walkabout Circle is collected and routed to Victoria Pond by an earthen drainage channel.

Some rainfall collects in the excavated area in the southwest corner of the site. Rainfall also collects and ponds in areas adjacent to Victoria Pond, along the southern boundary of the site, and in the willow forests located in the southeast corner (EDAW 1991).

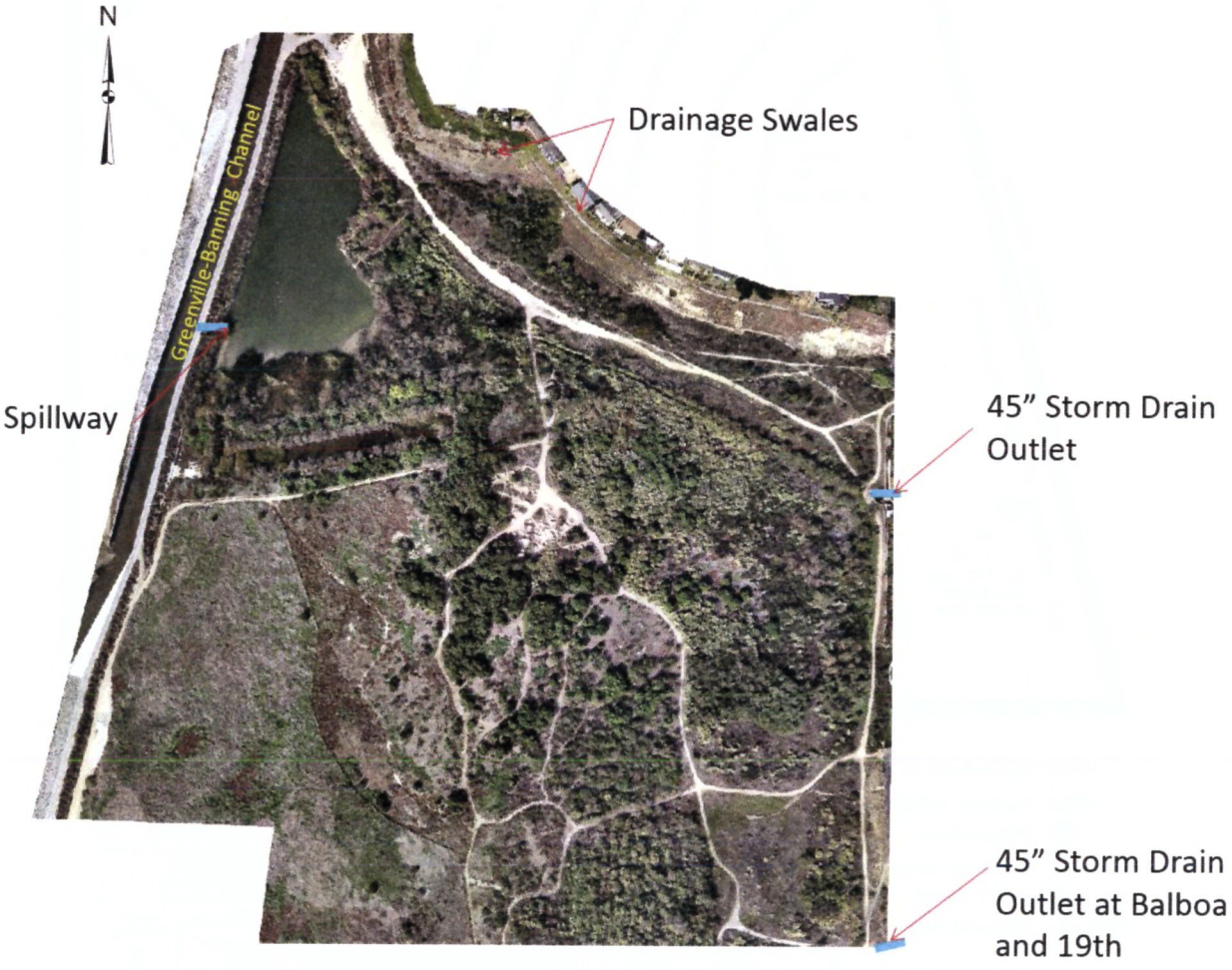



**Figure 11: Site Drainage at South Talbert**

As a result of flood control improvements to the Greenville-Banning Channel in the early 1990's, approximately 4.5 acres of Victoria Pond was eliminated. To mitigate for this impact, the USACE regraded and reconfigured Victoria Pond, expanding the pond to the south/southeast. Figure 12 illustrates modifications that were made to Victoria Pond by the USACE. As shown in the figure, the pond area was graded to include a southern extension to the south. In addition to excavating the pond, the USACE restored 92 acres of salt marsh within the Local Coastal Program (LCP) project area located between the Banning Ranch property and the Santa Ana River (EDAW 1991).

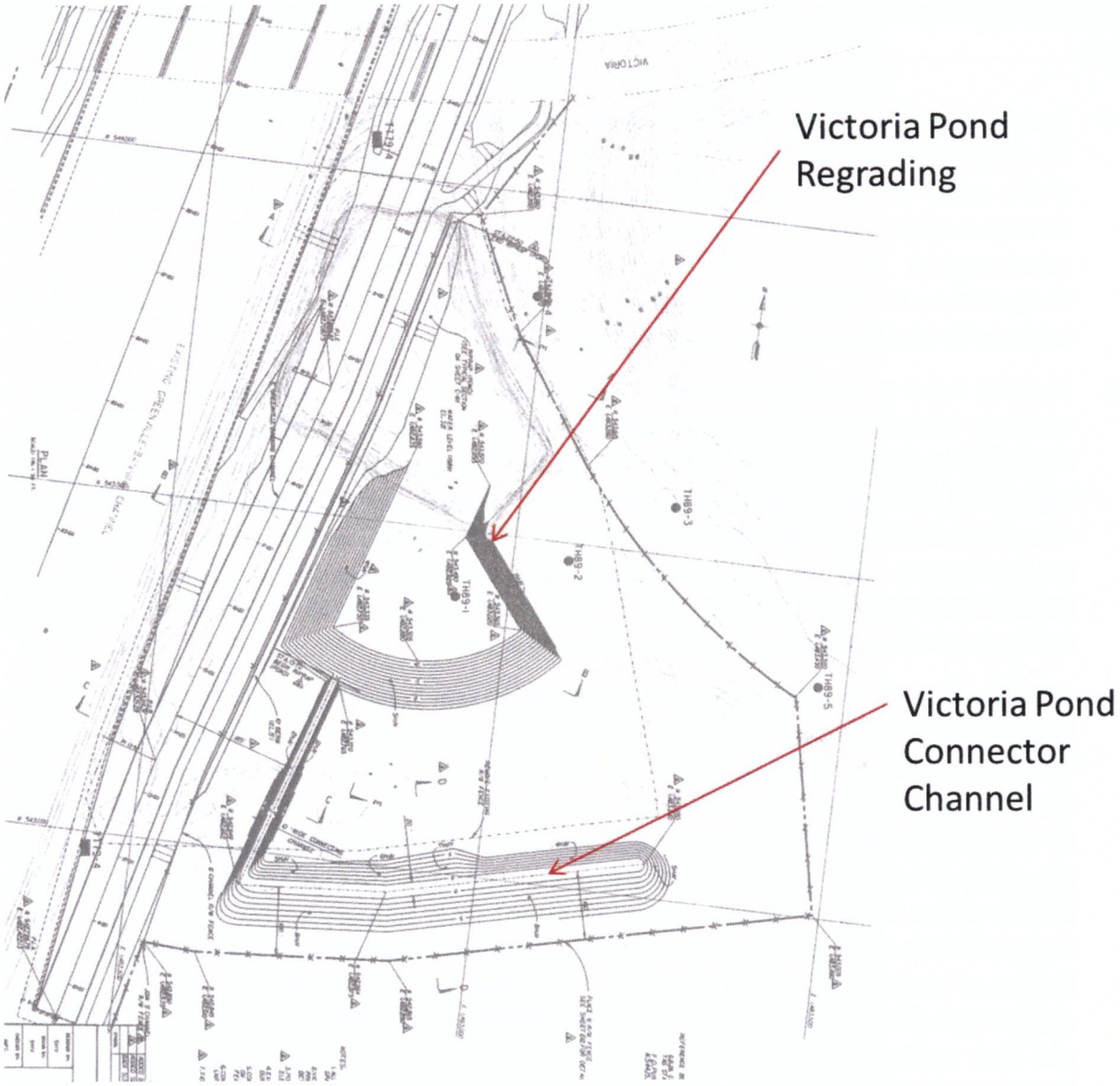



**Figure 12: Victoria Pond Grading Done by USACE (Source: USACE 1991)**

A variety of water sources (groundwater, tidal, surface ponding and others) exist at South Talbert. This means a variety of wetland habitats (freshwater, brackish, and saltwater) could potentially be supported in the Park. The water table is seasonably high at South Talbert and a shallow, semi-perched aquifer underlies most of this site. Further to the south of the site, the USACE installed a culvert connection to the Santa Ana River located upstream of the Pacific Coast Highway bridge. The invert elevation of the pipe is -2.4 feet (MSL). This could potentially be another hydrological connection to South Talbert (EDAW 1991).

At Victoria Pond, water quality measurements were taken by Chambers on June 30, 2014 and monthly by the County from August 14, 2014 to August 15, 2015. The results are summarized below.

- Temperatures taken by Chambers were sampled in the morning hours and ranged from 75 degrees (F) on the northeast side of the pond to 78 degrees (F) at the southwest end of the pond. Similarly, temperatures taken by the County ranged from 52 degrees (F) to 82 degrees (F). The coldest temperature was recorded in late December and the warmest temperatures were recorded in the summer months. The relatively high water temperature in the pond is assumed to be correlated to a small body of water being warmed by the hot summer weather (Chambers 2014).
- Victoria Pond is connected to the tidally influenced Greenville-Banning Channel via a spillway; however, overall water salinity in the pond is low. According to salinity data recorded by Chambers, the water in Victoria Pond appears to be more brackish at the northwest tip than other areas. Salinity was 2 parts per thousand (ppt) at all of the sampling stations except the northwest tip of the pond, where it was 8 ppt. Salinity measurements taken by the County were uniform and ranged from 0.8 to 1.1 ppt. Low salinity readings suggest that whatever tidal water is entering the pond via the spillway is being diluted by freshwater sources (Chambers 2014).
- Values of dissolved oxygen (DO) are presented herein in parts per million (ppm). This unit is equivalent to milligrams per liter (mg/l) that is another way of expressing water quality. DO measurements taken by Chambers ranged from 1.2 parts per million (ppm) on the northeast side of the pond to 4.7 ppm at the northwest corner. DO measurements taken by the County ranged from 2.5 parts per million (ppm) to 14.0 (ppm) at the north end of the pond and ranged from 3.4 parts per million (ppm) to 16.2 (ppm) at the south end. DO measured by the County was above 10 (ppm) from January to the end of June then dropped below 10 (ppm) from July to December. It is typical for DO levels to drop in still bodies of water during the night then rise during the day. Vegetation and fish deplete oxygen and do not produce more by photosynthesis at night (without sunlight). As the sun rises throughout the day, plants photosynthesize and produce oxygen and the DO level rises. Chambers Group recommends additional measurements of the water column be taken in the middle of the pond. If these measurements indicate oxygen levels below 6 ppm throughout the day, then any plans to increase fish densities in the pond should carefully consider the potential for further depletion of oxygen and resultant fish kills (Chambers 2014).

- Measurements of pH taken by Chambers varied from 8.68 at the northeast corner of the pond to 8.76 at the northwest corner. Measurements of pH taken by the County varied from 7.7 to 9.1 at the north end of the pond and from 7.3 to 9.2 at the south end of the pond. Slightly basic pH levels are typical of freshwater systems in Southern California (Chambers 2014).

### 3.1.5 Soils

Soils data were obtained from the 1989 EDAW et al. Technical Memo, 1991 EDAW Enhancement Plan, 2010 and 2011 Annual Mitigation Monitoring Reports by URS, and the 2013 and 2014 Annual Mitigation Monitoring Reports by Dudek. EDAW's characterization of soils is based on a soil survey report published in 1978 by the U.S. Department of Agriculture, Soil Conservation Service. These sources were useful in characterizing the soil types at Talbert Regional Park, and particularly for South Talbert.

For a map of the soils at Talbert Regional Park, see Figure 13. North Talbert is predominantly comprised of Metz loamy sand, moderately fine substratum. The soils at South Talbert consist of a mix of Hueneme fine sandy loam (drained) on the north, Hueneme fine sandy loam on the east, Bolsa silt loam on the south, and a relatively small area of excavated "Pits" on the southeast corner.

Metz loamy sand, moderately fine substratum is poorly level to gently sloping soil, "excessively drained" on floodplains and alluvial fans deposited by the Santa Ana River. In a typical profile the surface layer is pale brown and brown loamy sand approximately 20 inches thick. The underlying layer is stratified pale brown and very pale brown loamy sand, sandy loam, and very fine loam to a depth of 65 inches or more. The soil is moderately alkaline and calcareous throughout and is moderately permeable. The erosion potential of this soil is small (EDAW 1991).

The Hueneme fine sandy loam and Hueneme fine sandy loam drained are nearly level soils which generally occur on large alluvial fans or floodplains. These soils formed in mixed alluvium. In a typical profile the surface layer is light brownish gray fine sandy loam approximately 30 inches thick. The underlying layer is stratified light gray and light brownish gray loamy sand, silt loam, loamy fine sand, fine sandy loam, and silty clay loam. It extends to a depth of 60 inches or more. The soil is moderately alkaline throughout and is calcareous in all but the loamy fine sand horizon. Permeability is moderately rapid. Drainage has been altered by the lowering of the water table and by pumping wells or construction of flood control channels. The erosion potential of this soil is small (EDAW 1991).

The Bolsa silt loam is nearly level soil, poorly drained and generally occurs on large alluvial fans. Typically, the surface layer is light brownish gray silt loam approximately 15 inches thick. The upper 20 inches of the underlying layer is light brownish gray silt loam with some very faint patches. The underlying layer is light brownish gray silty clay loam with common reddish yellow

patches to a depth of 65 inches or more. The soil is moderately alkaline throughout and is calcareous to a depth of approximately 50 inches. It is moderately slowly permeable and the erosion potential is slight (EDAW 1991).

The "Pits" are open excavations from which soil and underlying material, mostly sand and gravel, have been removed for use in construction (EDAW 1991).

The USGS classifies the Park area as an alluvial basin. An alluvial basin contains unconsolidated materials consisting of clay, silt, sand, gravel, and boulders that erode from the mountain slopes and watershed. The soils at Talbert Regional Park were "formed under hydric or seasonally hydric conditions" (EDAW et al. 1989).

Soil testing done at South Talbert in 2012 indicates soil salinity is high at the site. The salinity gradient was highest on the western boundary along the flood control levee. The soils on the eastern half of the site were markedly less saline but showed hydrophobic characteristics in which water collects on top of the soil rather than infiltrating into the ground (Dudek 2014).

Per mitigation monitoring, establishing native riparian vegetation at Site B in South Talbert presents a challenge. In the 1950s and 1960s, Site B was previously used for agricultural purposes. The use of chlorinated pesticides and heavy metals is commonly associated with standard agricultural practices during that period. More recently, the use of organochlorine herbicides may have been used for weed management. However, per soil sampling done by Dudek in 2012, only low levels of organochlorines were found at this site. Dudek determined it was unlikely that the presence of these chemicals suppressed plant growth in this area. Instead, high salinity observed from the 2012 soil testing results is believed to be the more likely explanation (Dudek 2014).

Site-specific descriptions of soil conditions at each portion of Talbert Park is provided below.

- North Talbert

  This area was formed from river alluvium. It primarily consists of loamy sand. This site has a high seepage rate because of sandy texture soil and ponded water is unlikely to occur here. Placentia Drain is the only area of the Park that contains hydric soils (EDAW 1989). Hydric soils are soils that are saturated at or near the surface and usually frequent and long enough to promote conditions which are favorable to wetland vegetation.

- South Talbert

  This area was also formed from river alluvium; however, it consists of fine sandy loam and its sandy texture results in moderate to high permeability. It also consists of Bolsa silty loam, which has somewhat slower, though moderate, permeability. This area is not expected to function as hydric soils unless flooded by surface flows. Soils could possibly be hydric if high groundwater is a normal condition (EDAW et al. 1989).

Hyper-saline soils found at South Talbert are possess greater salt content at the surface than at depth. However, this site has no presence of salt panne areas (EDAW et al. 1989).

**Figure 13: Soil Types Found at Talbert Regional Park (Source: EDAW 1989 & 1991)**

### 3.1.6 Site Access and Use

Site access research included aerial imagery from Google Earth and Bing Maps, site visits by M&N, the 1991 EDAW Enhancement Plan, and the Talbert Nature Preserve trail map. Talbert Regional Park appears to be used predominantly by hikers, nature watchers, casual bicyclists, and BMX bicyclists. Sheephills is a popular and well maintained BMX area within the Park.

Figure 14 and Figure 15 depict the existing trails at Talbert Regional Park. Both North Talbert and South Talbert have extensive trail networks, which are accessible to the public by foot and bike. A mixture of decomposed granite trails that transition to dirt trails and asphalt trails near the flood control levee make up the trails at Talbert North while the trails at South Talbert are predominantly earthen trails. Access to Talbert Regional Park currently consists of the trails and parking areas identified in Figure 15.

North Talbert has a parking lot located off Placentia Avenue at Fairview Park, approximately 1,500 feet east of North Talbert. Talbert North is accessible by foot or on bike from the parking lot and from Victoria Avenue. Vista Park and Fairview Park are adjacent to the North Talbert site. Vista Park and Fairview Park are owned and operated by the City of Costa Mesa.

South Talbert has approximately 2.9 miles of trails with limited street parking available on Balboa Boulevard and at the terminus of West 19$^{th}$ Street. Americans with Disabilities (ADA) access is very limited in South Talbert. Canyon Park is adjacent to South Talbert to the east and is owned and operated by Costa Mesa. The Canyon Park Master Plan provides pedestrian access to South Talbert. The interior trails at South Talbert are natural earthen and loamy trails that become slick and challenging to use during and after rainy weather.

As shown in Figure 16, a strip of land along the flood control levee and lower southwest corner of South Talbert is maintained by Orange County Flood Control District. OCPW is proposing to use this strip of land as a mitigation area for the Edinger Avenue Bridge project in Orange County. A maintenance access road runs east and west from the southwest corner of the site towards Balboa Boulevard then turns north at the east Park boundary near Balboa Blvd and continues north within the Park hugging the base of the bluffs until it reaches Victoria Street.

A paved multi-use trail is located atop the Santa Ana River flood control levee and is frequently used by pedestrians, joggers, and bicyclists. This trail provides access to both North Talbert and South Talbert and is available to the public from the flood control levee along the Greenville-Banning Channel. Victoria Pond is visible from Victoria Avenue and the channel levee (see Figure 17). The pond is a scenic natural resource and supports fish, however access to the pond is restricted by a fence along its perimeter. Despite the fence, unauthorized fishing has been observed at Victoria Pond. Trails A, B and C are located just outside the fence surrounding Victoria Pond.

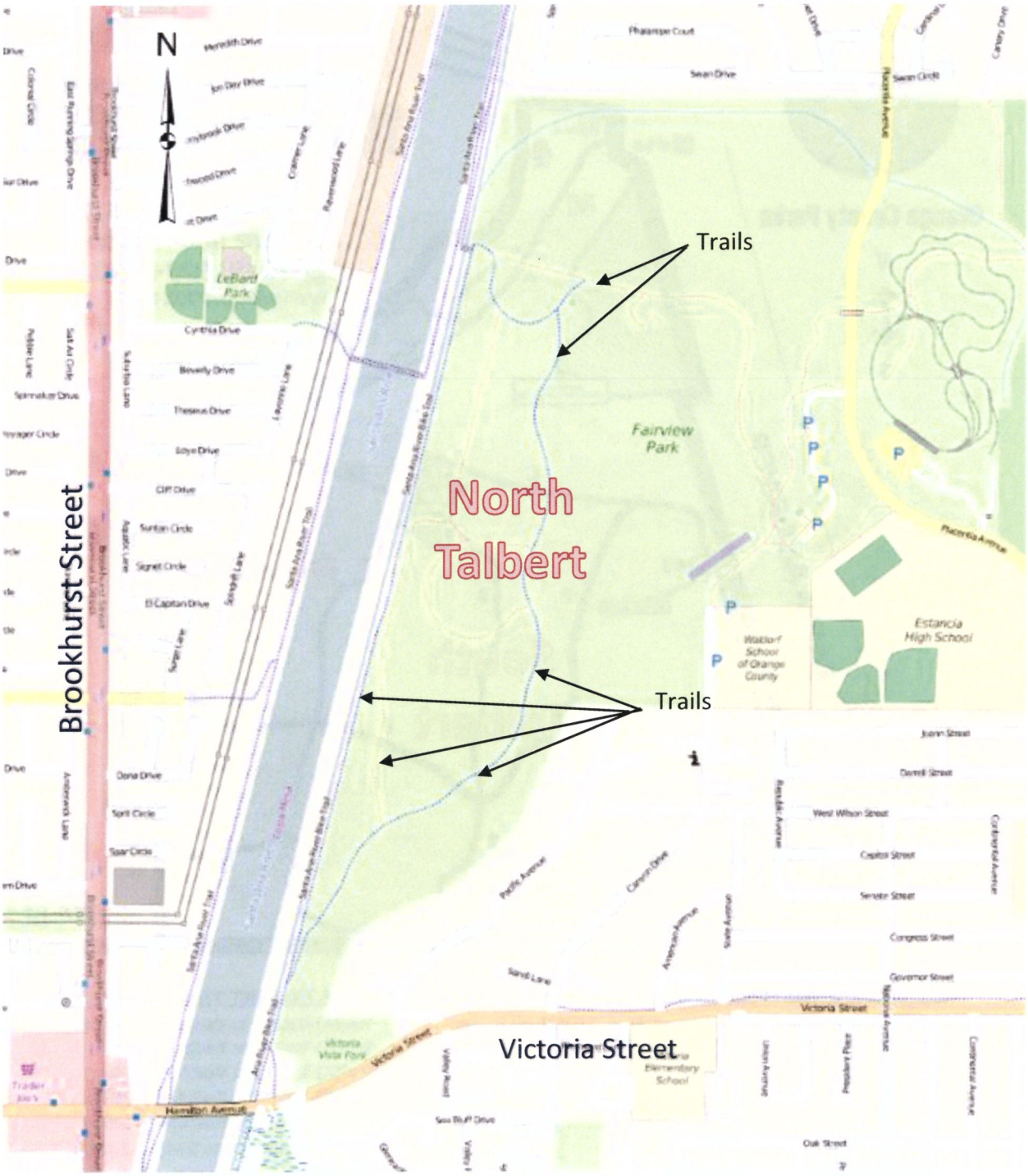



**Figure 14: Trails at North Talbert**
**(Source: ESRI Streetmap 2015)**

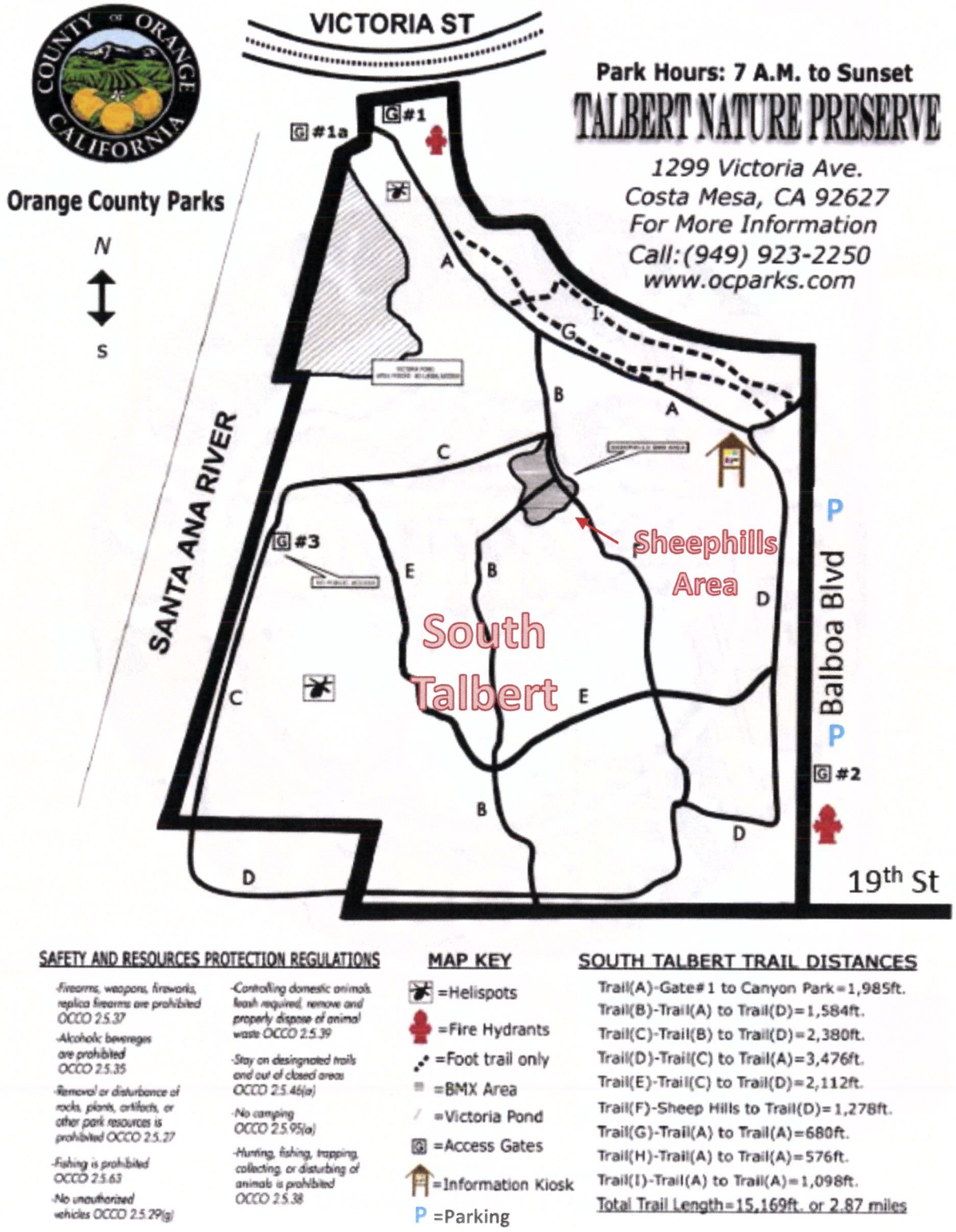



**Figure 15: Trails at South Talbert**
**(Source: OC Parks Website)**

**Figure 16: Land Ownership at South Talbert (Source: OCPW 2014)**

**Figure 17: View of Victoria Pond from Victoria Street (Source: Google Street View)**

### 3.1.7 Utility Easements

Existing utility data were obtained from the 1989 EDAW et al. Technical Memo. See Figure 18 and Figure 19 for existing utility easements at North Talbert and South Talbert respectively. There are two (2) existing easements at North Talbert and four (4) located at South Talbert. In addition, the Orange County Sanitation District (OCSD) is proposing to install one (1) new sewer main (Trunk Sewer Project) near the existing Southern California Edison (SCE) 40-foot easement on the southern boundary of South Talbert. These easements are not anticipated to be prohibitive to restoration. However, restoration within the Park needs to be done considering the need to allow utility owners access to their lines for future repair.

EDAW reported existing utilities could be a source of potable water for the site. A 30-inch municipal water line owned by Mesa Consolidated Water District (MCWD) passes underneath Victoria Avenue to Talbert Regional Park and could potentially service the Park with additional water supply. The County should note however that the primary purposes of the water pipe is to supply water to fire hydrants, which could be a constraint and safety hazard due to competing interests. A 40-foot-wide easement located along the toe of the bluffs is maintained for access to that line. The pipe parallels the foot of the bluffs and then continues southeast to Balboa Boulevard and West 19$^{th}$ Street. Specific easements by site include:

- North Talbert

  At North Talbert, a 40-foot easement for SCE and Southern Counties Gas Company runs parallel to Victoria Street.

- South Talbert

  A 40-foot easement runs along the southern boundary of South Talbert Park. This easement is used by SCE. Overhead power lines exist within this easement.

  Another 80-foot-wide easement, consisting of two 40-foot-wide easements runs along the toe of the bluffs located on the eastern edge of South Talbert then angles along the

toe of slope up to an area near Victoria Street. This is a combined easement used by both SCE and the City of Costa Mesa (EDAW et al. 1989).

A 10-foot wide easement for a storm drain facility is located along the top of the upland mesa to the north of the site.

A 30-foot wide pipeline easement is also located along the top of the upland mesa. The easement is due south of Victoria Avenue.

A permanent 30-foot wide easement is proposed for the Trunk Sewer Project. This is a sewer project that would be constructed from the existing Newport Beach Pump Station site at the west end of Walkabout Circle to the OCSD Interplant Line in Brookhurst Street (within the City of Huntington Beach). Approximately 3,500 linear feet of a 24-inch gravity sewer pipe would be constructed along the eastern border of Talbert Regional Park from Walkabout Circle to the western terminus of 19th Street and then along the southern boundary towards the Santa Ana River. A 14-inch inverted sewer siphon will be constructed beneath the Santa Ana River to connect the sewer line to the OCSD Interplant Line in Brookhurst Street (Dudek 2013).

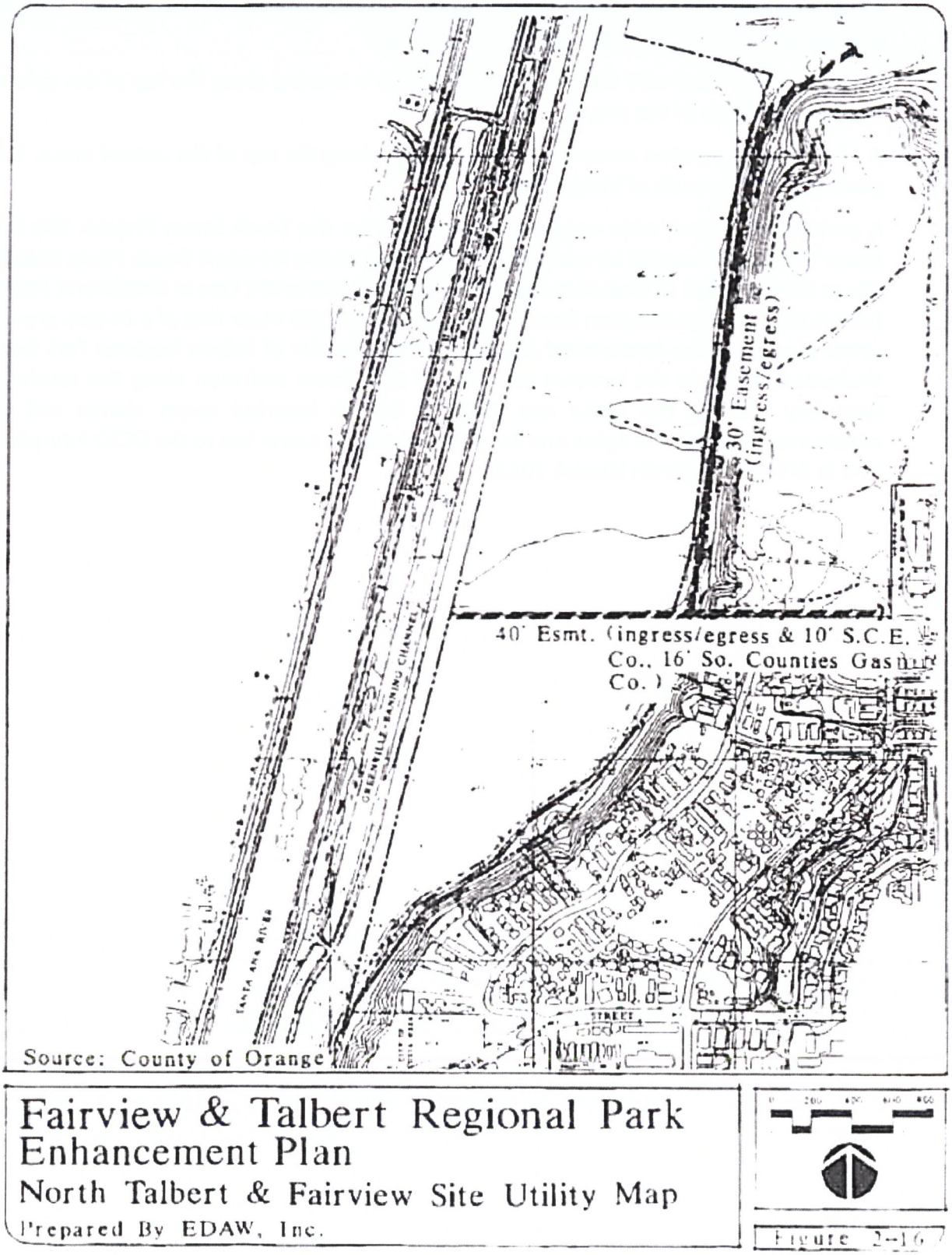



**Figure 18: Existing Utility Easements at North Talbert (Source: EDAW 1991)**

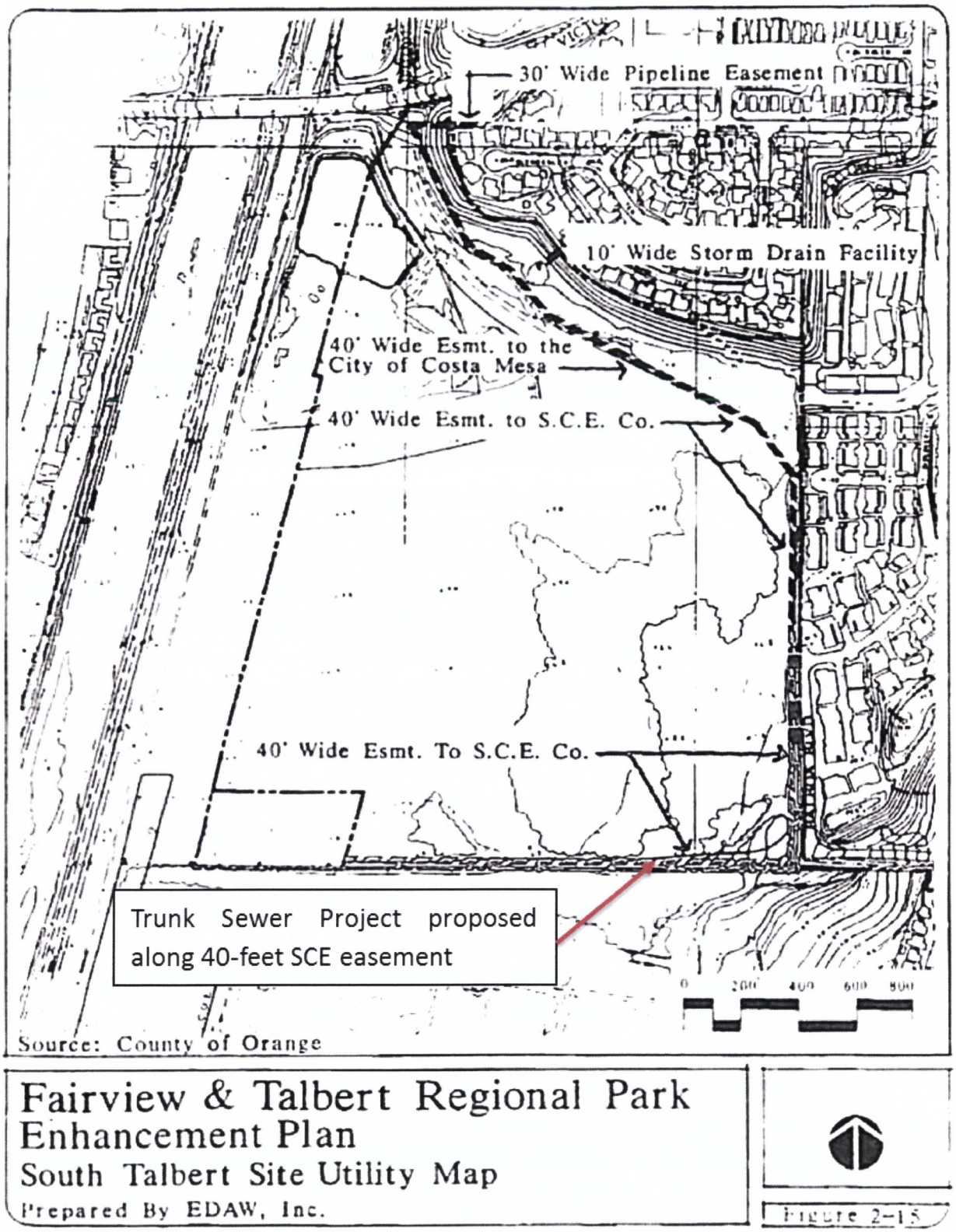



**Figure 19: Existing Utility Easements at South Talbert (Source: EDAW 1991)**

### 3.1.8 Opportunities and Constraints

Existing data were obtained from 1989 EDAW et al. Technical Memo and M&N site visits to identify opportunities and constraints to restoration at Talbert Regional Park. Each category is summarized in the paragraphs that follow below.

**Opportunities**

Based on a review of the data, the following opportunities were noted:

1. Habitat - Placentia Drain at North Talbert can intercept urban runoff from the adjacent mesa and presents an opportunity for a bioswale or improved freshwater riparian habitat.
2. Restoration - South Talbert presents an opportunity to design for a variety of habitats (salt marsh, emergent marsh, alkali meadows, freshwater riparian, grasslands, vernal pools). The high water table at South Talbert presents an opportunity to design additional freshwater habitat, i.e., emergent marsh or freshwater riparian habitat.
3. Hydrology - The southern boundary at South Talbert adjoins the USACE Mainstem North Marsh Project, a wetland mitigation project, which presents an opportunity for a hydrologic connection to the USACE Project. The USACE has a two culvert connections to the Santa Ana River located just upstream of Pacific Coast Highway Bridge. There is potential to create salt marsh habitat at South Talbert through a connection to the USACE salt marsh – either through an open channel or a culvert.

   Alternatively, a new hydrologic connection to either the Greenville-Banning Channel or the Santa Ana River could be constructed to convey water from the river to South Talbert, which presents an opportunity for wetland restoration, i.e., salt marsh or brackish marsh.
4. Soils - Saline soils, particularly in the southwest areas of South Talbert, appear to be more conducive to establishing salt marsh habitat than freshwater riparian habitat. This further supports the opportunity to create salt marsh habitat within the Park.
5. Mitigation by others - The proposed Trunk Sewer Project presents a potential mitigation opportunity at Talbert Regional Park.
6. Mitigation by others - Areas previously mitigated by others could potentially be re-mitigated, or re-restored if that mitigation was not successful.
7. Restoration - Talbert Regional Park is not heavily constrained by adjacent land uses. The urbanized areas are restricted to the upland bluffs/mesas.
8. Restoration - Because of the combination of the low relief and high ground water table at South Talbert, only minor to modest engineering and construction would be required to create and/or expand wetlands at South Talbert. No substantial excavation costs are anticipated for wetlands restoration; however other project components may require higher costs to implement.
9. Restoration - The 2009 swale constructed by OCPW at South Talbert presents an opportunity to create brackish marsh/salt marsh by introducing tidally-influenced water

from the Greenville-Banning Channel/Santa Ana River into the swale and converting it to a tidal channel. This could be achieved by excavating the existing swale and constructing a new culvert connecting it to the USACE North Marsh site, or through the existing flood control levee to establish a tidal connection.

Alternatively, the existing swale and southwest portion of South Talbert could potentially be enhanced to facilitate riparian habitat. However, Dudek reported Site B Mitigation Area baseline conditions are not favorable to establishing riparian vegetation in its 2013 monitoring results. This is due to the high soil salinity at this location which would require a combination of grading, ground water pumping, soil enhancements, and additional irrigation to encourage soil leaching.

10. Habitat - Victoria Pond is a significant freshwater wetland at South Talbert and presents an opportunity for wetland expansion. Additional waterways could be designed around it and connected to the pond.

11. Habitat – Three (3) wildlife species have the potential to occur at South Talbert Regional Park: the California gnatcatcher, the burrowing owl, and San Diego fairy shrimp. The habitats these species require could be enhanced and designed at South Talbert Regional Park such that these species either take residency or spend some part of their life history inside the park.

12. Habitat - An increase in riparian habitat, such as native willow and mule fat, would improve the quality and quantity of available riparian habitat for riparian birds including the endangered least Bell's vireo and yellow breasted chat, a California Species of Special Concern.

    The California least tern, least Bell's vireo, and yellow-breasted chat were observed on site during the biological survey. Focused surveys should be performed to determine the numbers of these species. However, the riparian habitats required by the least Bell's vireo and yellow-breasted chat could be enhanced and expanded at both North Talbert and South Talbert such that the number of these species increase inside the park.

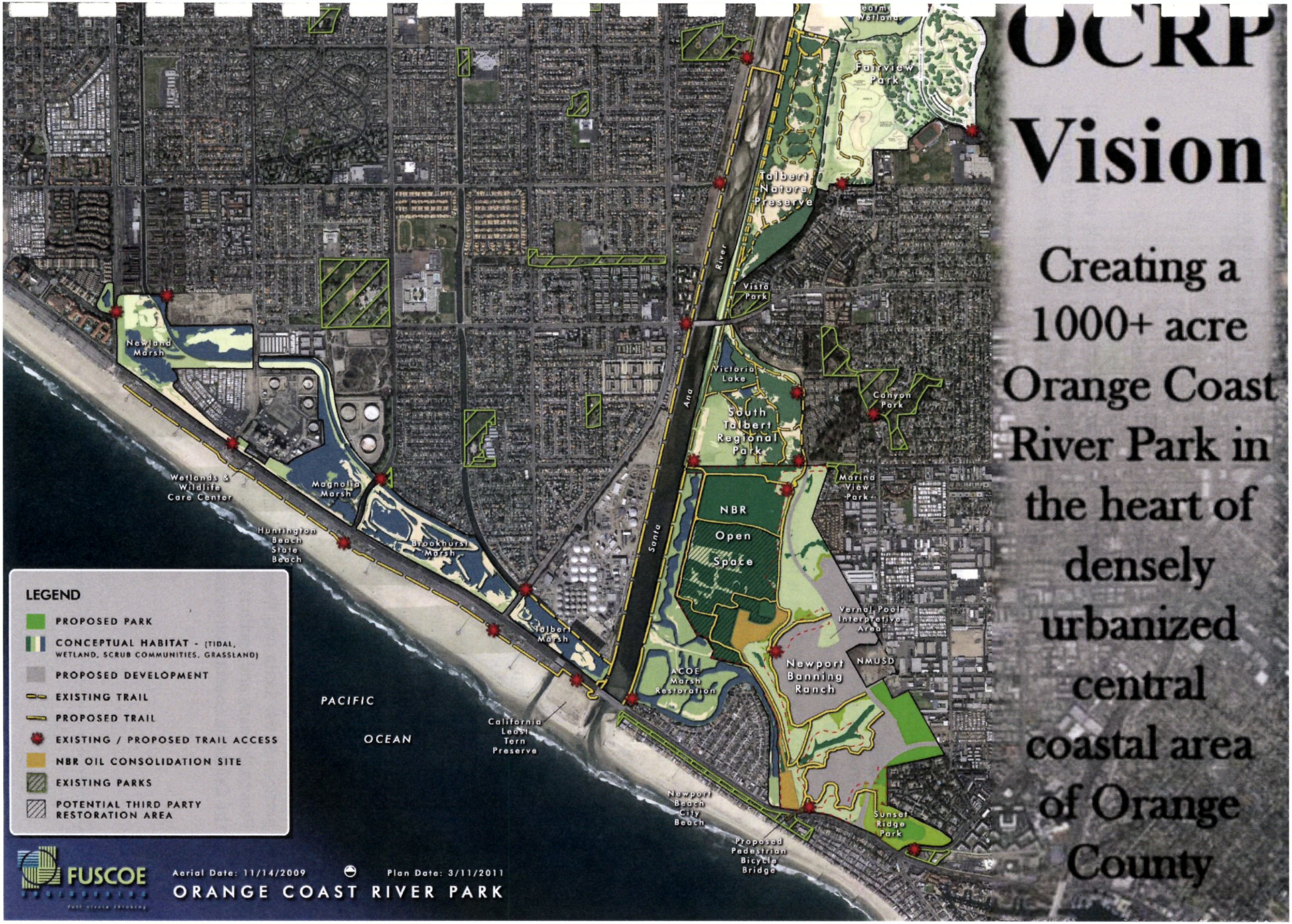
    For least terns, an increase in water bodies with small fish (prey species) would attract this species to the Park. Wetland features such as saltwater channels would provide the least terns with foraging opportunities.

13. Public access and recreation - The existing trail system and Victoria Pond presents a unique opportunity to create a focal point at Talbert Regional Park and provide the public with opportunities to passively enjoy the Park's scenery and aquatic resources. The existing network of Park trails present an opportunity for interpretive trails and public education of the natural resources at Talbert Regional Park.

14. Public access and recreation – The existing trails at Talbert Regional Park provide a natural linkage to other trail systems in the vicinity of Talbert Regional Park. The Orange Coast River Park is a conceptual plan in which all parks along the lower reach of the Santa Ana River are connected. The vision of this Plan is to create 1,000 acres of park space in the densely urbanized setting of coastal Orange County. See Figure 20 for a Conceptual Grand Plan that illustrates how regional trails could be linked together and collectively become

the Orange Coast River Park. The proposed public access trails at Newport Banning Ranch are planned to create a connection with South Talbert, as are the 19th Street improvement projects being undertaken by the City of Costa Mesa.

15. Water supply – EDAW reported a 30-inch water pipe owned by MCWD crosses beneath Victoria Street into South Talbert and could potentially become a source of water for the Park. Currently the pipe is used to supply water to fire hydrants, however, and this poses a constraint to its use. A perpetual water shortage in Southern California also suggests judicious use of potable or reclaimed water for restoration.
16. Recreation - Sheephills is a unique recreational amenity that is a popular destination for BMX riders. The BMX trails and jumps appear to be well maintained by the BMX rider community. This group appears to also serve as stewards of the site over time.


OCRP Vision
Creating a 1000+ acre Orange Coast River Park in the heart of densely urbanized central coastal area of Orange County
Farm Wetland
Fairview Park
Talbert Nature Preserve
Santa Ana River
Vista Park
Victoria Lake
Canyon Park
South Talbert Regional Park
Marina View Park
NBR Open Space
Vernal Pool Interpretive Area
NMUSD
Newport Banning Ranch
ACOE Marsh Restoration
Talbert Marsh
Brookhurst Marsh
Magnolia Marsh
Newland Marsh
Wetlands & Wildlife Care Center
Huntington Beach State Beach
PACIFIC OCEAN
California Least Tern Preserve
Newport Beach City Beach
Sunset Ridge Park
Proposed Pedestrian Bicycle Bridge
LEGEND
PROPOSED PARK
CONCEPTUAL HABITAT - (TIDAL, WETLAND, SCRUB COMMUNITIES, GRASSLAND)
PROPOSED DEVELOPMENT
EXISTING TRAIL
PROPOSED TRAIL
EXISTING / PROPOSED TRAIL ACCESS
NBR OIL CONSOLIDATION SITE
EXISTING PARKS
POTENTIAL THIRD PARTY RESTORATION AREA
FUSCOE
Aerial Date: 11/14/2009
Plan Date: 3/11/2011
ORANGE COAST RIVER PARK

Ho

**Constraints**

Based on a review of the data, the following constraints were noted:

1. Utilities - Seven (7) utility easements are located at Talbert Regional Park, with three (3) at North Talbert and four (4) at South Talbert. A new permanent 30-foot-wide easement is being proposed at South Talbert for the construction of the Trunk Sewer Project along the south border of the Park.
2. Restoration – Approximately 5 acres of land located in the southwest corner of South Talbert is owned by OCFCD. The site was formerly owned by Pauley Petroleum Property Access. OCPW and OCFCD have an operational easement for this part of the park, and it is available for integration into restoration concepts.
3. Restoration – The steep slopes from the adjacent bluffs drain urban runoff into the park. The steep slopes could also potentially pose an erosion problem if the bluffs are overwatered or saturated with water during rain events.
4. Restoration - South Talbert is impacted by highly aggressive and invasive species (e.g. pampas grass and others). This will require an active weed abatement program that might entail mechanical removal and active management and monitoring of the site.
5. Restoration – Existing site elevations may require modification to achieve the desired habitats and improvements. Excavation to groundwater is more feasible at South Talbert due to the low relief and relatively high groundwater conditions.
6. Restoration - The high soil salinities recorded at the previous Mitigation Site B in South Talbert are an impediment to establishing riparian habitat.
7. Restoration - New groundwater monitoring wells were installed at the Park in 2014/2015 and the results of the monitoring data may show evidence of saltwater intrusion. Seawater intrusion of the aquifer underneath the Park could hinder any progress to mitigation and restoration of freshwater riparian habitat at the park.
8. Restoration - Homeless encampments and unauthorized off-trail access has been documented at the site and may require enforcement.
9. Public Access – No off-street public parking dedicated to Talbert Regional Park exists, nor does any ADA-compliant access to the existing trails from within the South Park boundary.
10. Permitting – There is no LCP for Talbert Regional Park and South Talbert falls within the Coastal Zone boundary and the California Coastal Commission's jurisdiction. The boundary of the Coastal Zone was created in 1972 and modified in 1976 to include portions of the Santa Ana River lowlands south of Victoria Street, a majority of Canyon Park to the east, and portions of the adjacent bluff properties (EDAW 1991). For a map of the California Coastal Commission's jurisdiction, see Figure 21.

**Figure 21: Coastal Commission Jurisdiction**

## 3.2 Description of Alternatives

In coordination with OC Parks, three alternative restoration concepts were developed in addition to the no project alternative. The concept restoration plans range from minimal site modifications to variations of construction involving excavation and site grading designed for pond shoreline improvements, riparian enhancement, and the creation of salt marsh habitat. The three concept restoration plans also address public access improvements and interpretive opportunities.

On September 10, 2014, a public meeting was held to introduce the project, discuss restoration goals, and solicit restoration ideas from the public. Feedback received from the public, the City of Costa Mesa, and OC Parks was used to develop the restoration alternatives.

On June 4, 2015, a second public meeting was held to present the restoration alternatives and get input from the public. Public input from the meeting and feedback from the City of Costa Mesa and OC Parks staff was used to refine and further develop the restoration alternatives.

The restoration alternatives are described below. With the exception of No Project, the restoration alternatives for Talbert Regional Park consist of components that can be implemented individually, incrementally, or as a whole. Also, basic components of each alternative are the same, but with more components included as the complexity of alternatives increases. For example, Alternative 1 stands on its own. However, Alternative 2 includes all components of Alternative 1, plus additional items. Similarly, Alternative 3 includes all components of Alternatives 1 and 2 plus additional items. Implementation of components may depend on funding, approvals, need, public input, and agency preferences.

## 3.3 No Project Alternative

Under this alternative the existing site conditions remain. No excavation, vegetative plantings, or improvements to trails and access would occur. No site improvements would occur under this alternative other than the ongoing restoration activity currently carried out by others (OCPW). The existing trails would remain in their current arrangement and condition. Access to the site is primarily available from Victoria Street, Balboa Boulevard, the Canyon Park trail, and the Greenville-Banning Channel/Santa Ana River levee. The No Project Alternative is shown in Figure 22.

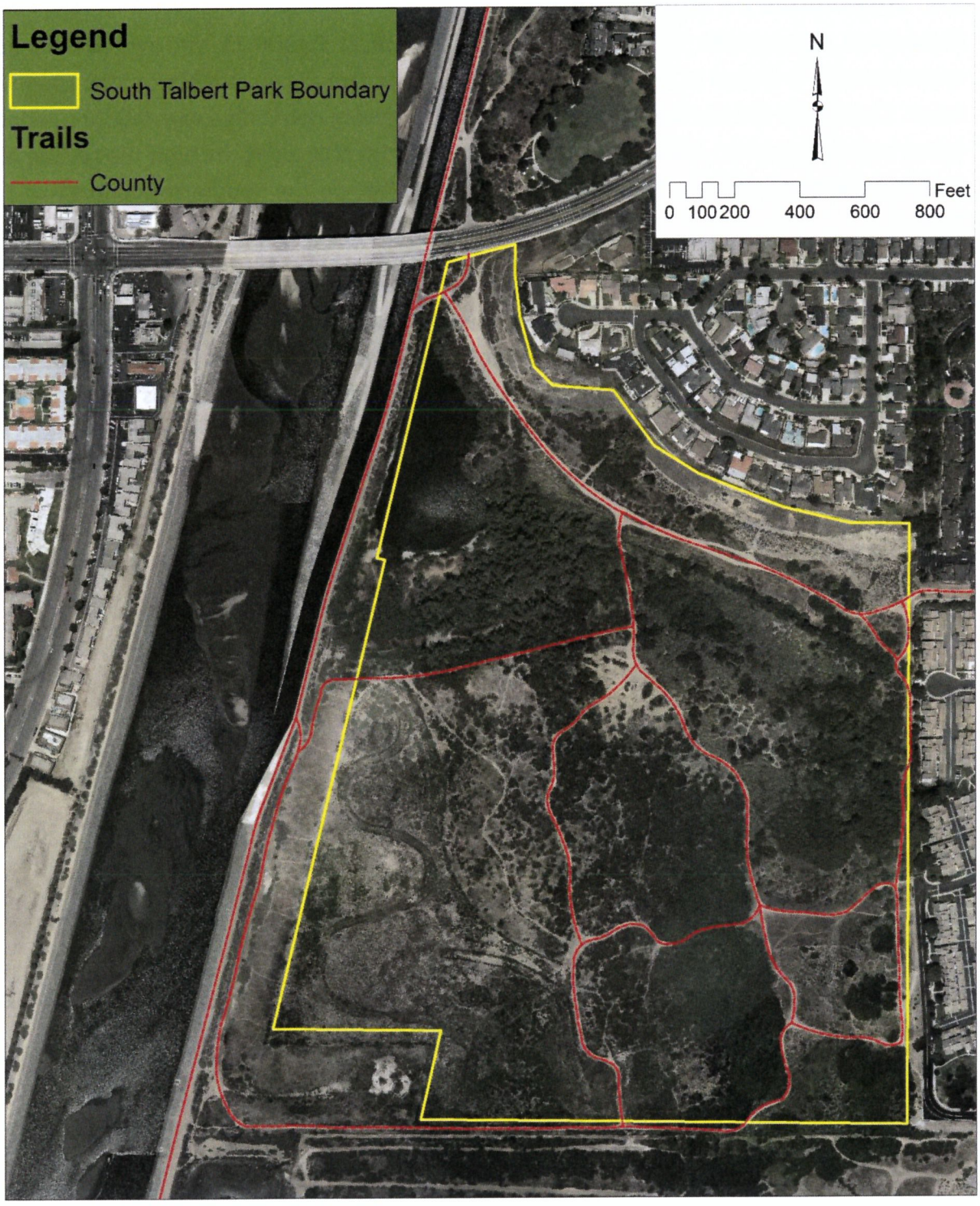



**Figure 22: No Project Alternative**

## *3.4 Alternative 1 – Minimum Touch*

Restoration components for Alternative 1 are shown in Figure 23. An overview of access improvements is shown in Figure 24. Under this alternative only minimal site alteration would occur. Changes to the site would primarily include removing non-native vegetation, clearing out dense vegetation areas, adding signage to trails, plantings only along the bluff top (at Site A) and trail coordination with the 19th Street bike trail project on the southern boundary of South Talbert.

All existing trails and the Sheephills BMX recreational area remain "as-is" under this alternative. For trail map see Figure 15. Access improvements include adding stairway and ramp access to Balboa Boulevard and to the Santa Ana River Levee/Banning Bike Trail. A new trail around the perimeter of Victoria Pond is also proposed to provide the public with access to the pond, and the perimeter fence is removed. Design components proposed for this alternative are listed below:

- No grading, minimum changes to the site only
- Remove non-natives
    - Placentia Drain at North Talbert
    - Throughout the site at South Talbert
- Reserve areas for salt marsh and freshwater plantings
- Do not alter restoration sites (B thru E)
- Plantings at the top of bluffs only (Site A)
- Improve the main entrance access at Balboa Boulevard
- No existing trail alterations, add interpretive signs only
- New loop trail around Victoria Pond
- No additional parking, kiosks, or overlooks
- No alterations to Sheephills /protect "as-is"

For a detailed description and analysis of access and trail improvements, see *Analysis of Alternatives* in the subsequent sections of this report.

**Figure 23: Alternative 1**

**Figure 24: Overview of Public Access for Alternative 1**

## *3.5 Alternative 2 – Moderate Touch*

Restoration components for Alternative 2 are shown in Figure 25. An overview of access improvements is shown in Figure 26. This alternative represents a mix of features proposed for the minimum and maximum alternatives. Under this alternative a moderate amount of site improvements and alteration would occur. Changes to the site would include removing non-native vegetation, plantings of coastal sage and riparian tree species, expanding the existing mitigation/restoration areas (increase coverage in square feet or acres), deepening the swale in the southwest corner by excavation, and plantings of salt marsh vegetation. Other changes include clearing out dense vegetation areas, adding ADA access ramps and trail amenities such as signs and kiosks, delineating trail edges, making improvements at the main Balboa Boulevard entrance, and trail coordination with the 19$^{th}$ Street bike trail project on the southern boundary of South Talbert. Design components proposed for this alternative are listed below:

- Provide bike trail access from 19th St to the Santa Ana River (SAR) levee along the southern boundary
- Improved entrance(s) to the park along Balboa Boulevard
- Salt marsh plantings in southwest portion of site
- Maintain and lower the existing channel depression in the southwest area
- Plant the bluff top with coastal sage and manage the slope for erosion

- Expand the acreage and tree canopy cover in restoration sites C, D and E
- Non-native removal and plantings of riparian habitat
    - Placentia Drain at North Talbert
    - Throughout the site at South Talbert
- Grading the transitional slope for salt marsh wetlands
- Add an ADA compliant loop trail
- Remove the fence around the pond or reconfigure it to allow greater access
- Pier (option) over Victoria Pond
- Stock the pond with fish
- Sheephills will have perimeter grading only for pedestrian traffic

For a detailed description and analysis of access and trail improvements, see *Analysis of Alternatives* in the subsequent sections of this report.

**Figure 25: Alternative 2**

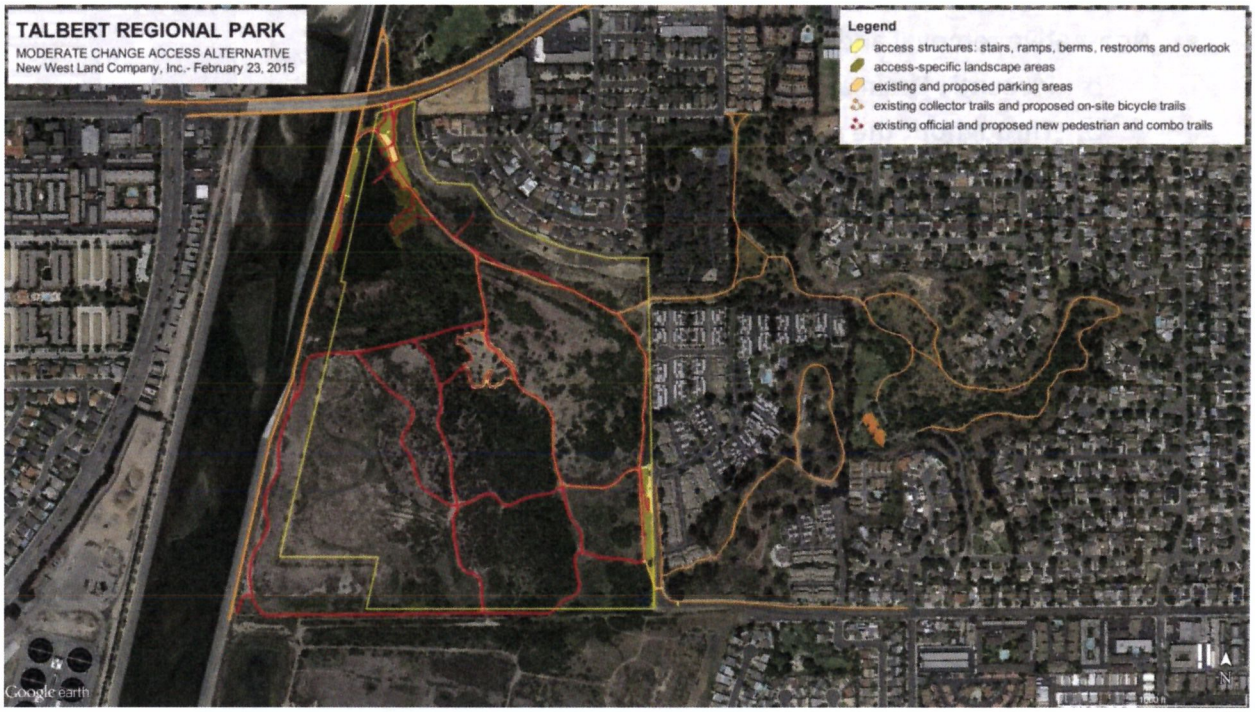



**Figure 26: Overview of Public Access for Alternative 2**

## *3.6 Alternative 3 – Maximum Touch*

Restoration components for Alternative 3 are shown in Figure 27. Access improvements are shown in Figure 28. This alternative introduces the maximum amount of site improvements and alteration to address restoration needs and maximize habitat diversity at the park. Changes to the site would include channel excavation for salt marsh habitat, excavation along the southern edges for expansion of the pond, planting coastal sage along the bluff top, restoring riparian habitat, and bioswale/drainage design. Other changes include clearing out dense vegetation areas, adding ADA access ramps and trail amenities such as signs and kiosks, delineating trail edges, making improvements at the main entrance and trail coordination with the 19th Street bike trail project on the southern boundary of South Talbert. Design components proposed for this alternative include:

- Site grading to create salt marsh and wetland transitional habitat
- Site grading to naturalize the existing drainage channel and improve riparian habitat along
- Bike trail access from 19th Street to the Santa Ana River (SAR) levee along the southern boundary
- Improved entrance(s) to the park along Balboa Boulevard
- Pond is enlarged
- Pond is stocked with fish
- Tidal connection and salt marsh (southwest portion only)

- Grade existing channel depression in southwest area, add new feeder channels
- Grade drainage channel east of pond and naturalize it
- Non-native removal and plantings of riparian habitat
    - Placentia Drain at North Talbert
    - Throughout the site at South Talbert
- ADA compliant trails
- Boardwalk over Victoria Pond
- Small footbridges over peripheral waterways connecting to Victoria Pond
- Sheephills perimeter grading only for pedestrian traffic

For a detailed description and analysis of access and trail improvements, see *Analysis of Alternatives* in the subsequent sections of this report.

**Figure 27: Alternative 3**

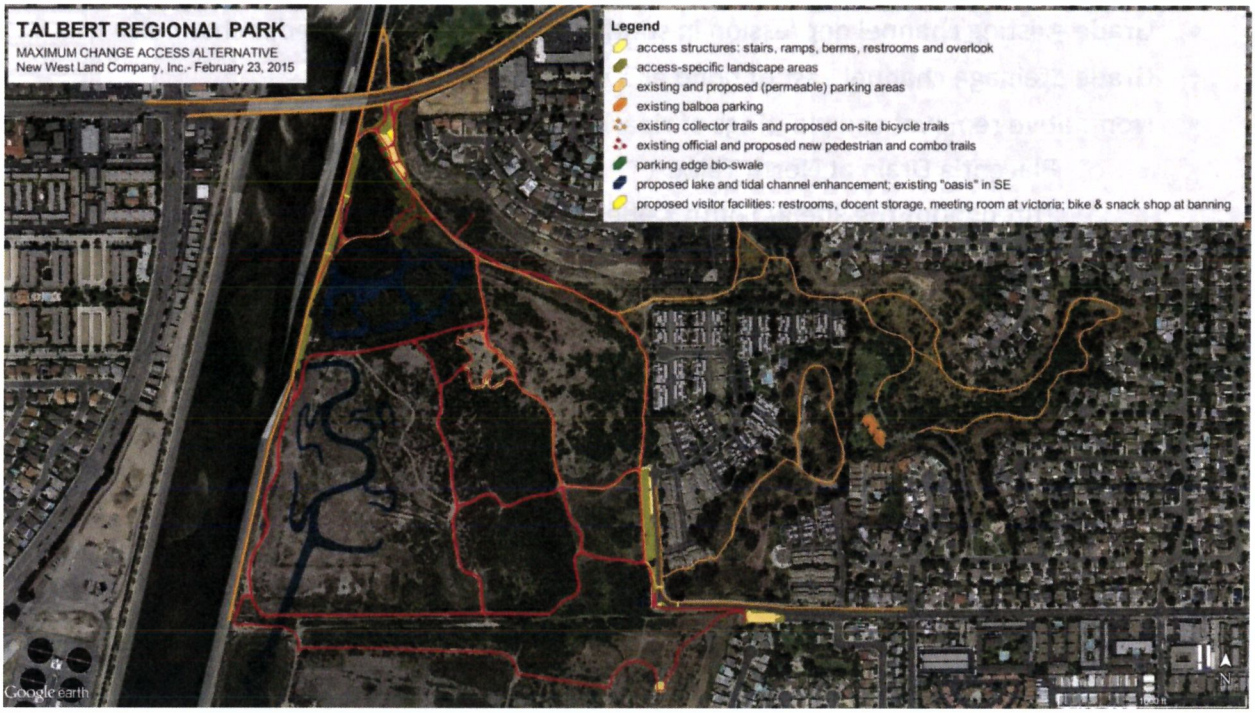



**Figure 28: Overview of Public Access for Alternative 3**

## *3.7 Analysis of Alternatives*

Each alternative is analyzed in detail in this section of the report relative to hydrology and water quality, habitat, public access, construction, maintenance, and costs. Analyses and results are presented below.

### 3.7.1 Hydrology and Water Quality

#### *3.7.1.1 Alternative 1 – Minimum Touch*

Hydrology under this alternative will mimic existing conditions. Rain water will infiltrate the soils and the groundwater table at Talbert Regional Park will fluctuate according to the seasons. The "wet" season occurs primarily between November and March/April when rainfall is greatest.

Three storm drain outfalls: one from the north terrace; one from the terminus of Walkabout Circle; and one from the intersection of Balboa Avenue and 19th Street will continue to convey storm water into the park as they do under existing conditions. The storm drain at Walkabout Circle carries runoff and water into the park through a straight earthen channel. This earthen channel is located approximately 85 feet south of Trail A and appears to convey storm water directly towards Victoria Pond.

Victoria Pond is a large body of standing water along the west portion of the site that will remain in place with no modifications.

### *3.7.1.2 Alternative 2 – Moderate Touch*

Hydrology under this alternative will be the same as Alternative 1, except, under this alternative the existing experimental swale in the southwest portion of the Park is proposed to be excavated. This action will allow for greater groundwater percolation inside the swale and facilitate salt tolerant plant species such as bulrush or pickleweed. Currently the swale is too shallow in depth and could be deepened to three or four feet beneath the existing surface. This would result in greater groundwater infiltration and could enhance the existing wetland habitat that surrounds the swale.

Due to positive public feedback, the southern perimeter of Victoria Pond could also be excavated to increase aquatic habitat and the surface water area of the pond. This concept was originally developed for Alternative 3 but could be implemented under this alternative as well. The County may need to determine if re-grading the entire shoreline of the pond is necessary, as the slopes of the existing shoreline vary. The existing slopes vary from 5 to 6 feet run over 1 foot of rise on the west (5:1 to 6:1), east and north shore and vary from 6 to 8 feet run over 1 foot of rise on the south shore (6:1 to 8:1).

### *3.7.1.3 Alternative 3 – Maximum Touch*

The existing earthen drainage channel which conveys storm water from Walkabout Circle to Victoria Pond is proposed to be modified under this alternative. Using earth moving equipment, the channel will be excavated and converted from a straight channel into a meandering channel. This will give the drainage channel a naturalized look while still conveying flood flows from Walkabout Circle to Victoria Pond.

The southern portion of Victoria Pond is proposed to be excavated to increase aquatic habitat and the surface water area of the pond. This action will provide small channels along the southern portion of the pond and create small islands for birds and other wildlife. The County will need to determine if re-grading the entire shoreline of the pond is necessary, as the slopes of the existing shoreline vary. The existing slopes vary from 5 to 6 feet run over 1 foot of rise on the west (5:1 to 6:1), east and north shore and vary from 6 to 8 feet run over 1 foot of rise on the south shore (6:1 to 8:1).

Under this alternative, tidal hydrology is introduced in the southwest area and the tidal hydrology influences the establishment of tidal wetland habitats to a large extent. Assuming other factors such as soils are adequate for habitat, the frequency that tidal wetlands are inundated by tides, called tidal inundation frequency, determines the type of habitat that colonizes a particular location. Tidal hydrology will vary throughout a site depending on tidal conveyance, seawater supply, and site topography/bathymetry. Site topography is above-water elevation, while bathymetry is below-water elevation.

Figure 29 shows a conceptual hydrological connection to a salt marsh, which is proposed under the Alternative 3 - Maximum Touch Alternative. Hydrology and water quality were analyzed for the Maximum Touch Alternative and the results are presented below.

As shown in Figure 29, a tidal connection is proposed at the USACE North Marsh project or near the confluence of the Greenville-Banning Channel (GBC) and Santa Ana River. Tidal flow could be brought into the park from either location - the GBC/Santa Ana River or North Marsh – and be conveyed through either an open channel or a large culvert. Tidal flow would then be conveyed to the southwest portion of the park through a main channel and small feeder channels branching off the main channel. The water level of the channels will fluctuate with the ocean tide conditions. Therefore, during low tide cycles, the water level of the channels will be low; during high tide cycles, the water level of the channels will be high.

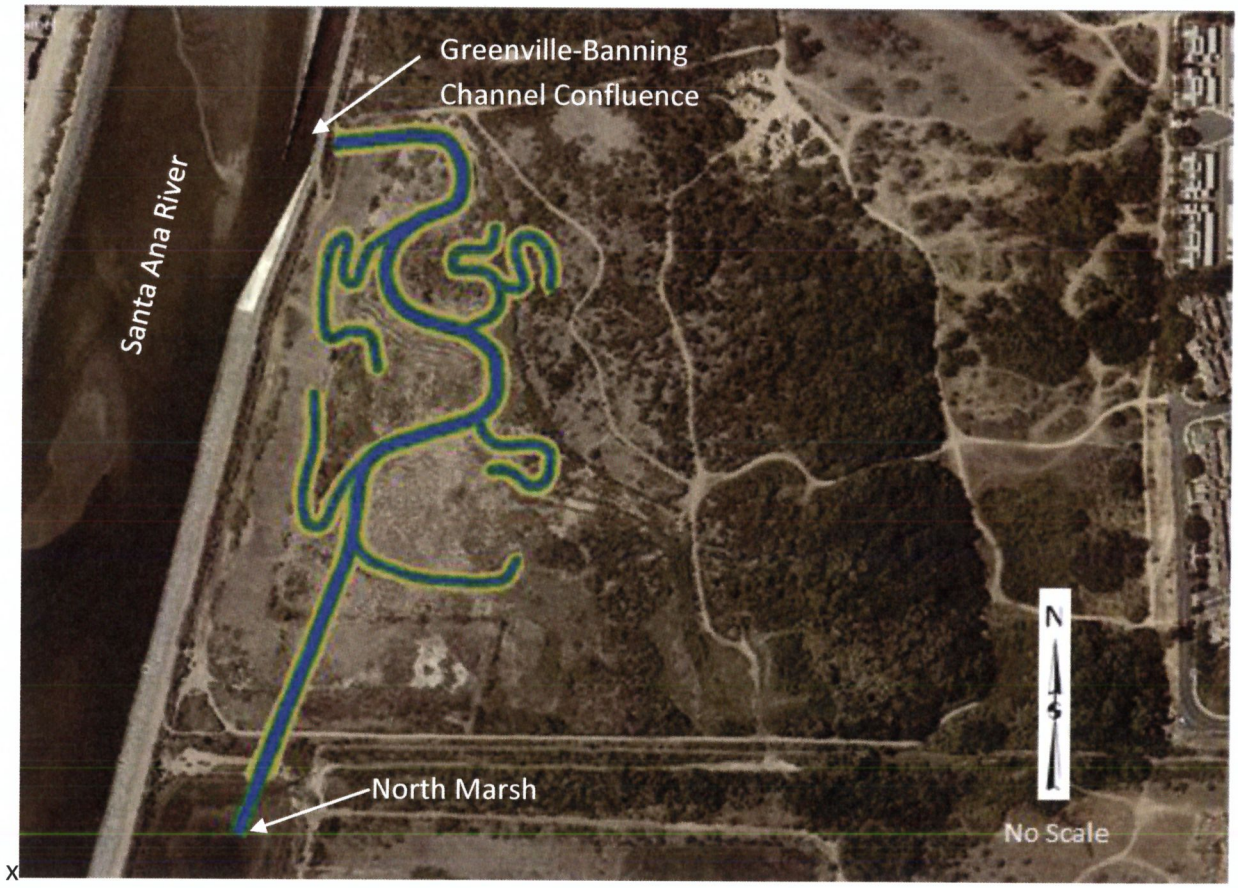



**Figure 29: Proposed Tidal Connection and Tidal Channels for the Salt Marsh**

The channels are proposed to be excavated down to an elevation of -2 feet NGVD. This ensures the tidal channels always have a minimum of 2 feet of water in them at all times for fish survival. Figure 30 depicts a typical cross-section of the tidal channels proposed for Alternative 3. The bottom side slopes of the channels are proposed to be excavated at a steep slope of 1.5 feet run

over 1 foot of rise (1.5:1), and then the slope changes to a flatter slope of 3 feet run to 1 foot of rise (3:1) higher on the bank. The tops of the slopes are not expected to be overtopped by seawater due to the high elevation of the existing ground. Tide water will saturate the adjacent soils however, and enhance any salt marsh vegetation or salt tolerant plant species in the area. The channels will drain during low tides through the tidal connection at either North Marsh or the GBC/Santa Ana River.

As mean sea level and high tides are anticipated to rise over the coming decades, the tide level of the channels will also increase in elevation. Gradually, over time, the top of the slopes will be overtopped by tidal waters. For example, a 1.5 foot increase in mean sea level will likely result in the channels being overtopped and tidal water flowing over the adjacent existing ground. This is a desirable condition for salt marshes and would result in positive effects to habitat.

Alternatively, the existing ground surrounding the tidal channels could be excavated down from the existing elevation of +6 feet NGVD to an elevation between +2 and +3 feet NGVD. This would create a fully functioning tidal salt marsh that more closely resembles existing salt marshes in the Park vicinity such as North Marsh, Semeniuk Slough, and Huntington Beach Wetlands (Talbert, Brookhurst and Magnolia Marshes). The trade-off however, is that as sea level and high tides increase over time, the salt marsh will become submerged, i.e. the subtidal channel area will expand and the marsh vegetation area will decrease. To lower the elevation of the adjacent ground would also require more substantial excavation which will increase the cost of the project. The decision to excavate only tidal channels or the entire southwest area can be evaluated further when OC Parks selects a preferred alternative.

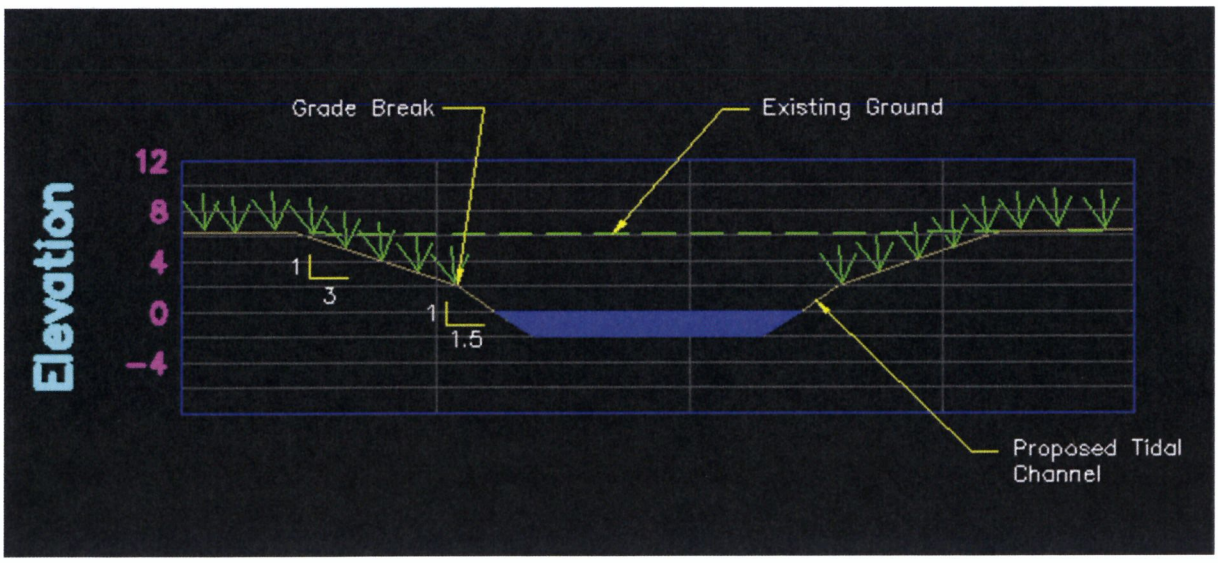



**Figure 30: Typical Cross-section of Tidal Channel**

Determining tidal hydrology at Talbert Regional Park required the use of a hydrodynamic numerical model to calculate tidal elevations and water quality. As shown in Figure 31, modeling was previously done for the North Marsh project using a 1-dimensional model referred to as "link-node." Link-node networks are widely used in flow models and are helpful in analyzing wetland hydraulics and seawater residence time for water quality implications.

In a link-node network, a waterway is divided into a number of nodes that are connected by links. A channel must have two nodes associated with it (at its upstream and downstream ends). Nodes, on the other hand, can have one or more channels flowing into them. The links and nodes can be connected in a variety of ways, allowing computerized simulation of complex networks, which constitutes the main advantage of the link-node model (Martin et al 1999).

Tidal hydrology modeling was completed for this project to set-up a method to quantify proposed conditions for Alternative 3 – Maximum Touch Alternative. Figure 32 shows the link-node model set-up for Talbert Regional Park.

Figure 33 and Figure 34 show the existing tide gate connection and culvert respectively at North Marsh as an example. A range of tidal connection scenarios for Talbert Regional Park were modeled and evaluated. The tidal connection scenarios modeled at the park included:

1. South Talbert connected to the GBC/Santa Ana River by one or more large culverts (pipes) with flood gates - The culverts tested with the model are 36-inches in diameter, and the modeling tested a combination of one, two and three pipes. Flood gates are intended to allow closure of the system during high stormflow events on the GBC/Santa Ana River to prevent runoff from "backing" into the pipes and inundating South Talbert and other areas. A variation on this option would be to install a very large culvert to the GBC/Santa Ana River similar to the one existing at North Marsh and the River.

2. South Talbert connected to the existing North Marsh with an open channel.

3. South Talbert connected to both North Marsh with an open channel and to the GBC/Santa Ana River with one or more large culverts and flood gates. A variation on this option would be to install a very large culvert to the GBC/Santa Ana River similar to the one existing at North Marsh and the River.

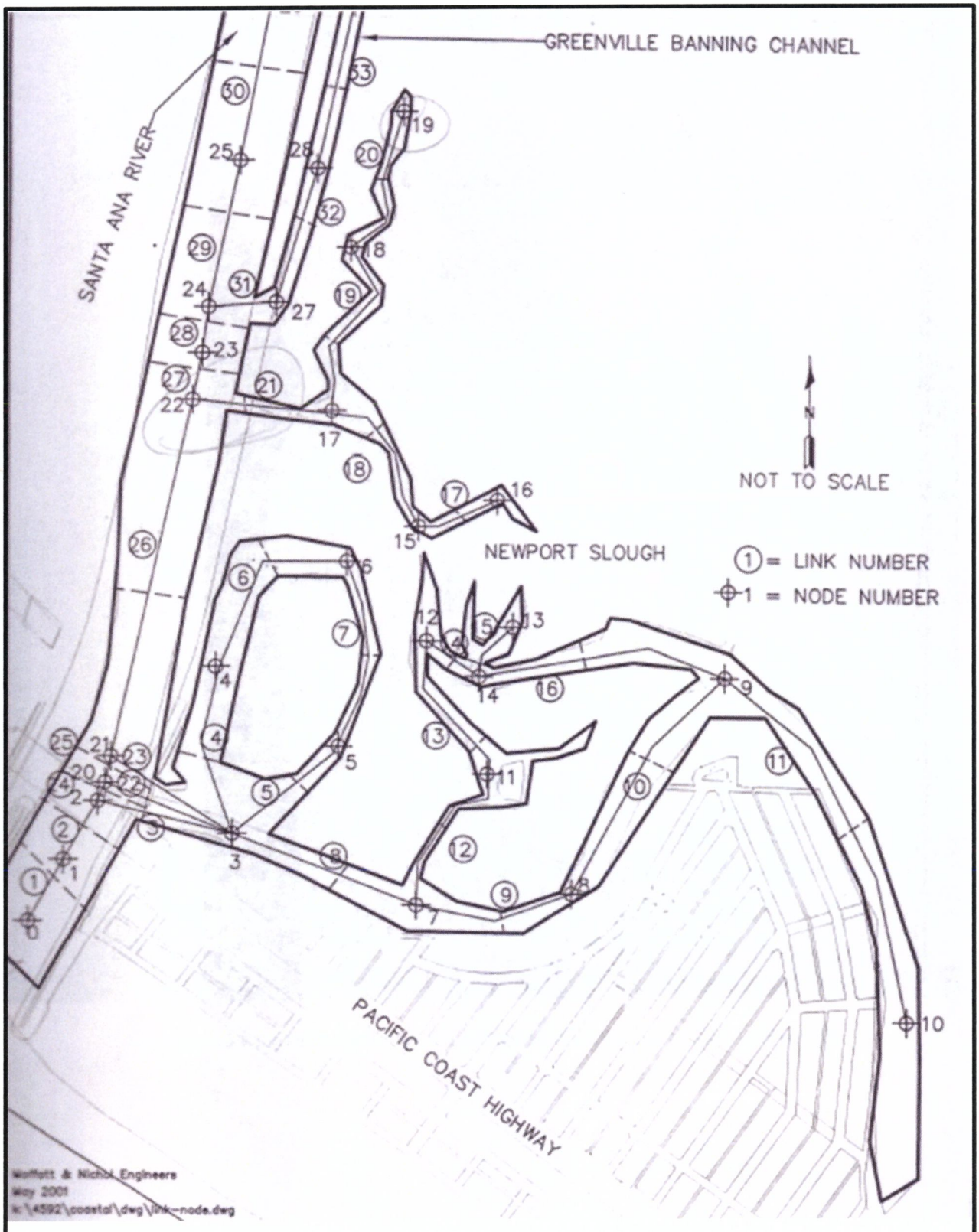



**Figure 31: Previous Modeling of Existing North Marsh**



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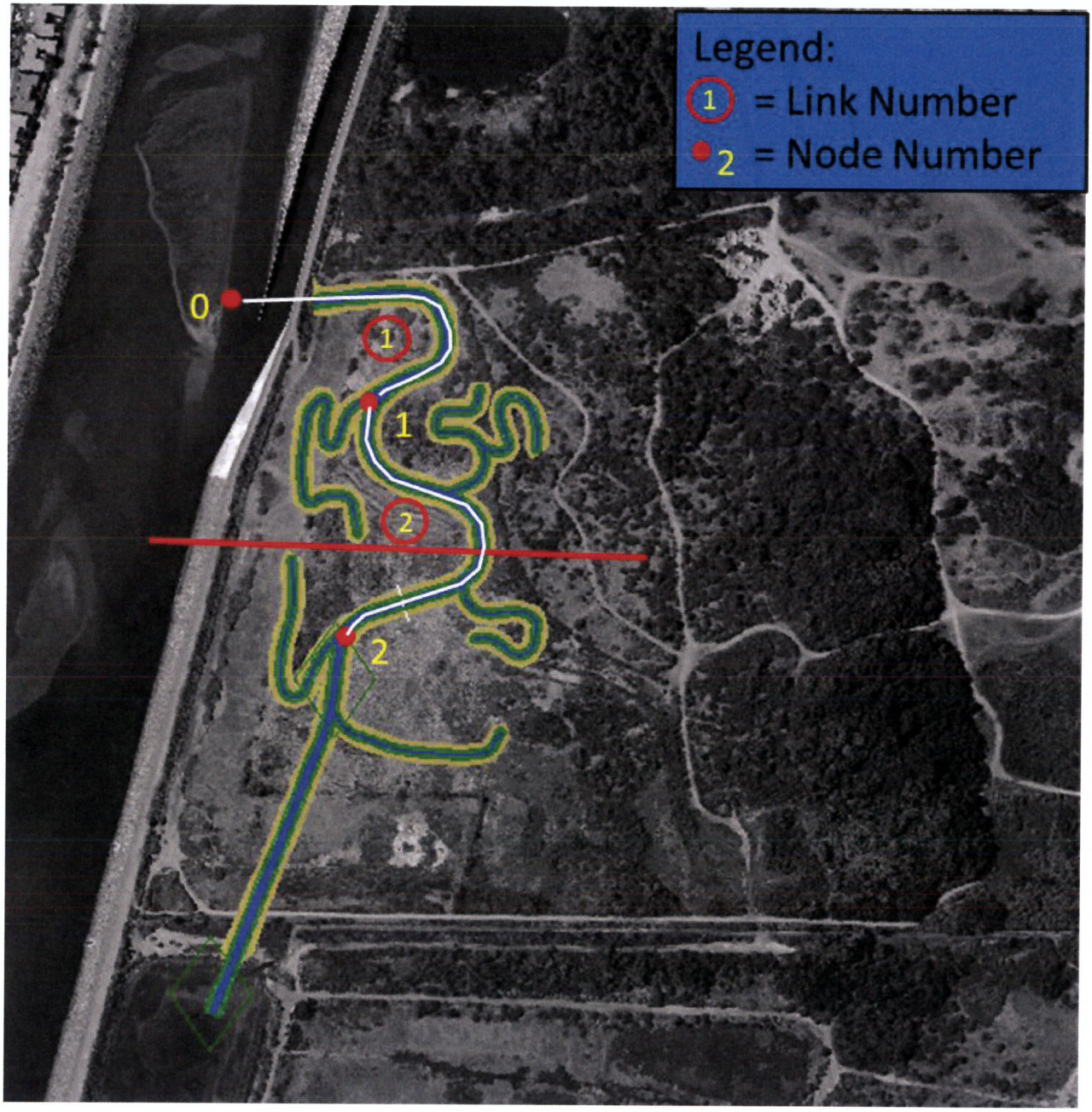


**Figure 32: Model Set-up for Alternative 3 Assuming a Northern Connection**

**Figure 33: Existing Tide Gate at North Marsh**

**Figure 34: View through Culvert at North Marsh**

Figure 35 shows the predicted tide range for the proposed tidal channels at Talbert Regional Park in comparison to the tide range of the Santa Ana River, assuming culvert connections using one, two and three pipes. As shown in the figure, Talbert Regional Park could receive tidal elevations muted from those in the GBC/Santa Ana River on the high and low tides, but sufficient to provide suitable hydrology to the new marsh. The benefit of using culverts is that the tidal elevations can be controlled to address site constraints, and the pipes can be more readily closed during extreme storm flow events on the River.

Figure 36 shows tides at North Marsh and the Santa Ana River with the existing tidal connection. South Talbert would experience the same tidal range as North Marsh with a direct open channel connection. South Talbert would also experience the same tidal range as the GBC/Santa Ana River with a direct open channel connection, and with a connection sized equal to that presently at North Marsh.

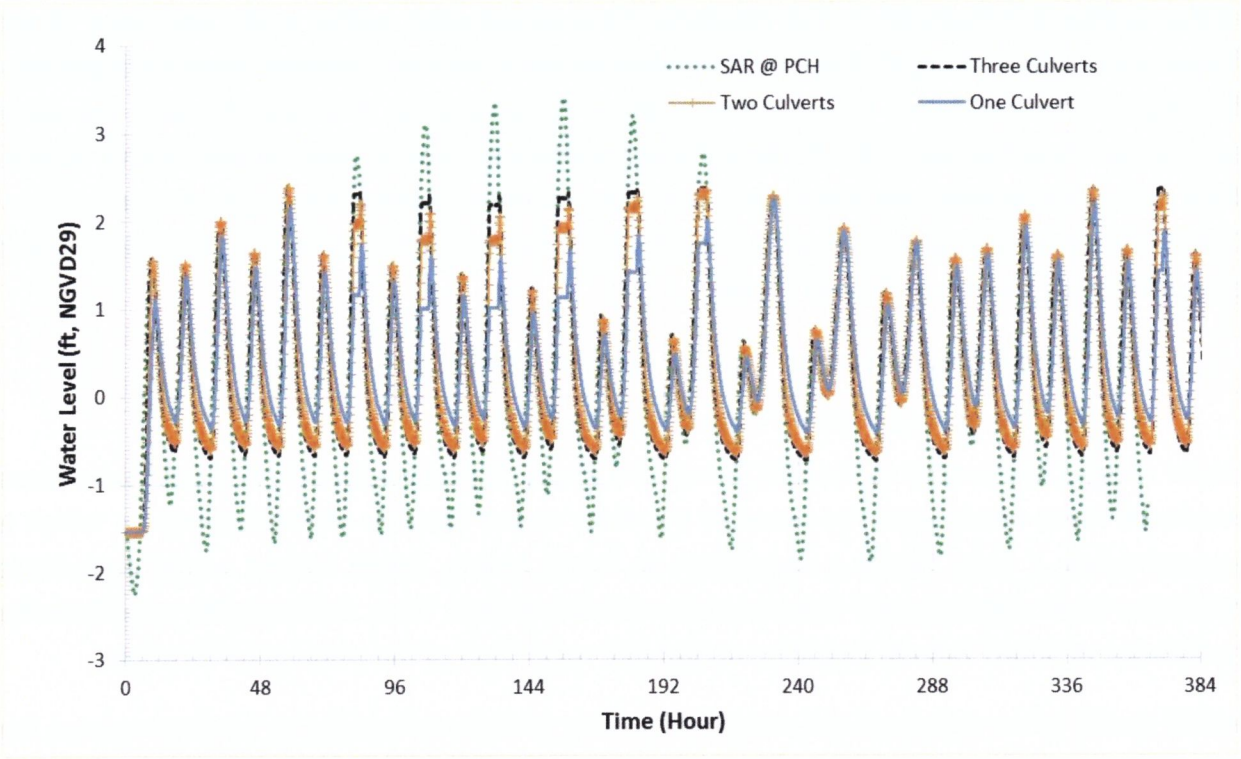


**Figure 35: Tide Range in Talbert Park With Culverts Connecting to the GBC/Santa Ana River Only**

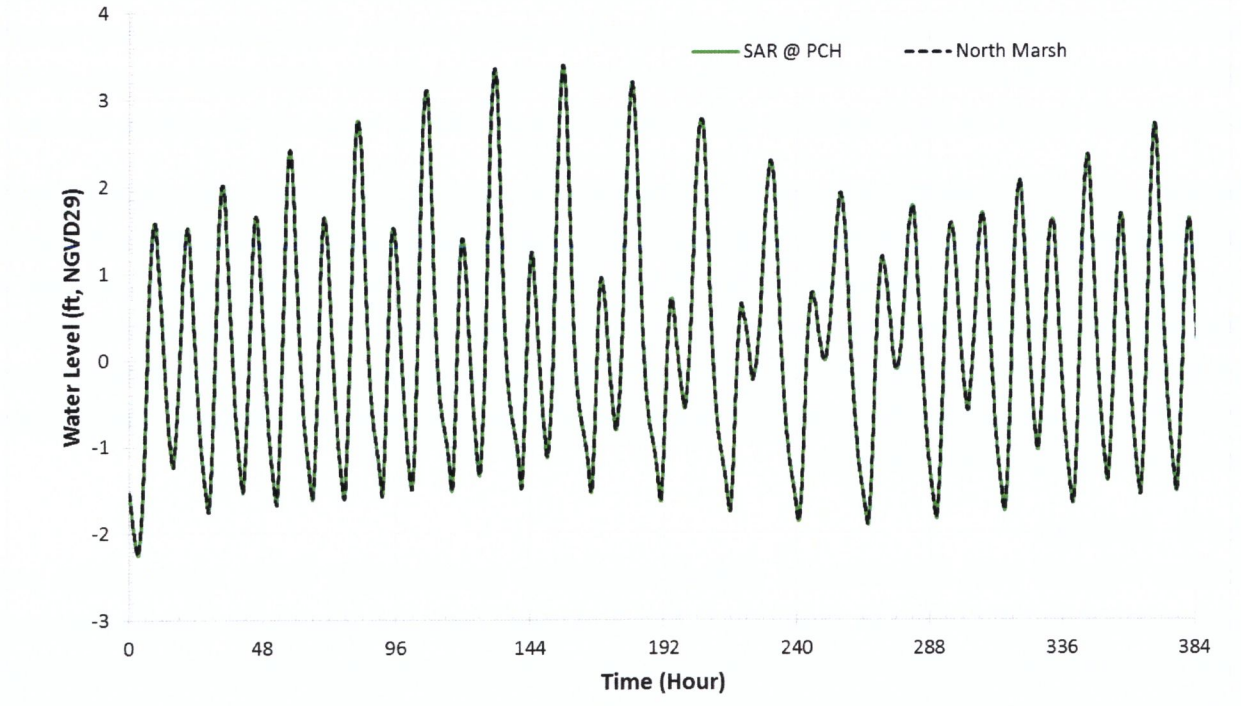


**Figure 36: Tide Range in the Existing North Marsh as Connected to the Santa Ana River**

Water quality is influenced by the residence time of seawater within a site (indicator of the frequency of tidal exchange). Assuming contaminant loads are held constant, more frequent tidal flushing (shorter residence times) indicate higher water quality. Alternatively, with the same assumptions less frequent tidal flushing (longer residence times) indicate poorer water quality. Tidal hydraulics analyses are used as a quantitative method to determine tidal residence times. Criteria for residence time analyses, as applied to other wetland projects, are listed below and provided by the County of Orange (1996).

- Residence time shorter than 7 days is desirable; and
- Residence time longer than 7 days is less desirable.

Under a direct connection to the GBC/Santa Ana River, Talbert Regional Park would experience residence times nearly equal to those of the River at the location of the connection which is approximately 2 days. Under a connection to North Marsh, South Talbert would experience residence times slightly longer than that site, which is 4 days. Thus, water quality conditions for restoration at South Talbert should be acceptable regardless of the connection location.

Water quality of the proposed salt marsh will be very strongly influenced by its water source. For this project the source of water will come from either the North Marsh or the Santa Ana River. The residence time of the marsh may also be affected by shoaling at the Santa Ana River mouth. A closed River mouth will inhibit water circulation and lead to poor upstream water quality. An open river mouth facilitates circulation and is good for water quality. The Santa Ana River mouth rarely closes. If it closes, then the County tends to re-open it swiftly. Prolonged closure of the River mouth would be detrimental to upstream salt marsh habitat areas and should be avoided.

Because of the proposed salt marsh's proximity to Victoria Pond, this plan recommends groundwater modeling be done to understand potential groundwater effects of the salt marsh on the pond and the underlying aquifer, if any. The purpose of the modeling is to provide a scientific basis for determining whether or not the salt marsh would have any detrimental effect on the water quality of the pond or surrounding riparian areas. Results from the groundwater modeling will be used to inform decision makers at OC Parks and make adjustments, if necessary, to the final design of the salt marsh.

### 3.7.2 Habitat

Talbert Regional Park has nineteen distinct vegetation communities. These communities are documented and described in Appendix B, the Biological Technical Report for Talbert Regional Park prepared by Chambers (2014). In the sections that follow, habitat is evaluated in terms of habitat quantity, needs, value, function, diversity and connectivity for each restoration alternative. Due to the potential volume of information to be conveyed, this section is formatted differently than the rest of the document to most efficiently convey multiple messages. It is primarily bulleted to reduce verbiage.

### *3.7.2.1 Alternative 1 - Minimum Touch*

The habitat discussion for Alternative 1 is provided below by the project biologist.

Value (Quality) – Alternative 1 possesses the following characteristics with regards to habitat value/quality:

- Removal of non-natives intrinsically improves habitat quality.
- Planting of Coastal Sage Scrub improves habitat quality by supporting native associated species, and reducing hillside erosion.
- The increase in native willow and mule fat would improve the quality and quantity of riparian habitat for riparian birds including the endangered least Bell's vireo and yellow breasted chat, a California Species of Special Concern. The higher quality habitat with varying layers of structural diversity may support more breeding pairs of these and other riparian bird species. Furthermore, by removing non-native plant species from a riparian woodland, a native understory can recover and will lead to natural recruitment of willow saplings and other native plant seedlings which are vital to replacing older senescent vegetation.
- Stocking the pond with game fish such as catfish, largemouth bass, and sunfish would improve habitat quality for fish-eating birds like ospreys, herons, egrets and other birds of prey

Quantity – Alternative 1 possesses the following characteristics with regards to habitat quality:

- Increases high quality Black Willow/Mulefat habitat by 10.5 acres.
- Adds 5 acres of California Sagebrush/California Buckwheat Scrub habitat.
- Removal of non-native plant species would convert 10.5 acres of Disturbed Black Willow/Mule Fat Association as well as some ornamental landscaping to high quality Black Willow/Mule Fat Association dominated by native species.

Needs – Alternative 1 possesses the following characteristics with regards to habitat needs:

- Removes invasive species and restores riparian habitat.
- Provides erosion control on hillsides.
- Provides habitat for sensitive species.
- Increases habitat and structural diversity.

Function – Alternative 1 possesses the following characteristics with regards to habitat function:

- Improves the function of riparian habitat by providing high quality habitat to support more breeding by sensitive bird species.
- Removal of non-natives will allow the natural recruitment of willow saplings and other native plant seedlings to replace senescent vegetation

Diversity – Alternative 1 possesses the following characteristics with regards to habitat diversity:

- Planting of California Sagebrush/California Buckwheat Scrub increases habitat diversity by establishing a habitat not present in South Talbert.
- Removal of non-natives in riparian areas would provide greater structural diversity in this habitat.
- California sagebrush/California buckwheat would be planted on the slope in the northeast corner. This plant association would increase diversity in South Talbert by supporting Coastal Sage Scrub animals potentially including the federal threatened coastal California gnatcatcher. There would also be the potential to establish a population of rare Coastal Sage Scrub plant species such as many-stemmed dudleya and decumbent goldenbush, or to expand the population of southern tarplant onsite. Native vegetation, unlike invasive iceplant and non-native annual brome grasses, increase erosion control and increase drought tolerance for the hillsides below the homes in the northeast corner of the project area. This also reduces the fire danger in the summer months when annual grasses are dry and prone to burn.

Connectivity – Alternative 1 possesses the following characteristics with regards to habitat connectivity:

- Improves connectivity of high quality riparian habitat by converting interspersed disturbed habitat to high quality mulefat and black willow habitat.
- Improves connectivity of native habitat by replacing disturbed and ornamental areas with native plant associations (black willow/mulefat, coastal sage scrub, quailbush scrub).

### *3.7.2.2 Alternative 2 – Moderate Touch*

The habitat discussion for this alternative is provided below by the project biologist.

Value (Quality) – Alternative 2 possesses the following characteristics with regards to habitat value (quality):

- Removal of non-native plant species would convert 10.5 acres of Disturbed Black Willow/Mule Fat Association as well as some ornamental landscaping to high quality Black Willow/Mule Fat Association dominated by native species.
- The increase in native willow and mule fat would improve the quality and quantity of riparian habitat for riparian birds including the endangered least Bell's vireo and yellow breasted chat, a California Species of Special Concern. The higher quality habitat may support more breeding pairs of these and other riparian bird species. Furthermore, by removing non-native plant species from a riparian woodland, a native understory can recover and will lead to natural recruitment of willow saplings and other native plant seedlings which are vital to replacing older senescent vegetation.

- California sagebrush/California buckwheat would be planted on the slope in the northeast corner. This plant association would increase diversity in South Talbert by supporting Coastal Sage Scrub animals potentially including the federal threatened coastal California gnatcatcher. There would also be the potential to establish a population of rare Coastal Sage Scrub plant species such as many-stemmed dudleya, decumbent goldenbush, or to expand the population of southern tarplant onsite. Native vegetation, unlike invasive iceplant and non-native annual brome grasses, increase erosion control and increase drought tolerance for the hillsides below the homes in the northeast corner of the project area. This also reduces the fire danger in the summer months when annual grasses are dry and prone to burn.
- Native trees (Fremont Cottonwood, Arroyo Willow, and California Sycamore) would be planted. These trees would increase vegetation and wildlife diversity. Raptors and great horned owls would use the trees for nesting and roosting. Sycamores develop cavities which are used by cavity nesting birds like barn owls and western bluebirds. Increasing structural diversity also makes the vegetation community more resistant to weed or pest infestations and leads to greater disease resistance through an increase in native insects. Adding trees creates leaf litter that helps retain soil moisture and improve soil microbial activity which leads to the establishment of other native plant species rather than non-native species.
- Stocking the lake with fish may increase food for piscivorous birds like ospreys, herons and egrets and the California least tern.

Needs – Alternative 2 possesses the following characteristics with regards to habitat needs:

- Removes invasive species and restores riparian habitat.
- Provides erosion control on hillsides.
- Provides habitat for sensitive species.
- Increases habitat and structural diversity.

Function – Alternative 2 possesses the following characteristics with regards to habitat function:

- Improves the function of riparian habitat by providing high quality habitat to support more breeding by sensitive bird species.
- Removal of non-natives will allow the natural recruitment of willow saplings and other native plant seedlings to replace senescent vegetation.
- Native riparian trees provide roosting and nesting habitat for birds and habitat for native insects.
- Native trees create leaf litter, which helps retain soil moisture and improves soil microbial activity.

Diversity – Alternative 2 possesses the following characteristics with regards to habitat diversity:

- Planting of California Sagebrush/California Buckwheat Scrub increases habitat diversity by establishing a habitat not present in South Talbert.
- Removal of non-natives in riparian areas would provide greater structural diversity in this habitat.
- Planting of native riparian trees increases structural diversity by increasing the tree canopy layer.
- Planting native riparian trees increases plant and animal diversity.

Connectivity – Alternative 2 possesses the following characteristics with regards to habitat connectivity:

- Improves connectivity of high quality riparian habitat by converting interspersed disturbed habitat to high quality mulefat and black willow habitat.
- Improves connectivity of native habitat by replacing disturbed and ornamental areas with native plant associations (black willow/mulefat, coastal sage scrub, quailbush scrub).

#### *3.7.2.3 Alternative 3 – Maximum Touch*

The habitat discussion for Alternative 3 is provided below by the project biologist.

Value (Quality) - Alternative 3 possesses the following characteristics with regards to habitat value (quality):

- Removal of non-native plant species would convert 10.5 acres of Disturbed Black Willow/Mule Fat Association as well as some ornamental landscaping to high quality Black Willow/Mule Fat Association dominated by native species.
- The increase in native willow and mule fat would improve the quality and quantity of riparian habitat for riparian birds including the endangered least Bell's vireo and yellow breasted chat, a California Species of Special Concern. The higher quality habitat may support more breeding pairs of these and other riparian bird species. Furthermore, by removing non-native plant species from a riparian woodland, a native understory can recover and will lead to natural recruitment of willow saplings and other native plant seedlings which are vital to replacing older senescent vegetation.
- California sagebrush/California buckwheat would be planted on the slope in the northeast corner. This plant association would increase diversity in South Talbert by supporting Coastal Sage Scrub animals potentially including the federal threatened California gnatcatcher. There would also be the potential to establish a population of rare Coastal Sage Scrub plant species such as many-stemmed dudleya, decumbent goldenbush, or to expand the population of southern tarplant onsite. Native vegetation,

unlike invasive iceplant and non-native annual brome grasses, increase erosion control and increase drought tolerance for the hillsides below the homes in the northeast corner of the project area. This also reduces the fire danger in the summer months when annual grasses are dry and prone to burn.

- Native trees (Fremont Cottonwood, Arroyo Willow, and California Sycamore) would be planted. These trees would increase vegetation and wildlife diversity. Raptors and great horned owls would use the trees for nesting and roosting. Sycamores develop cavities which are used by cavity nesting birds like barn owls and western bluebirds. Increasing structural diversity also makes the vegetation community more resistant to weed or pest infestations and leads to greater disease resistance through an increase in native insects. Adding trees creates leaf litter that helps retain soil moisture and improve soil microbial activity which leads to the establishment of other native plant species rather than non-native species.
- Stocking the lake with fish may increase food for piscivorous birds like ospreys, herons and egrets and the California least tern.
- The creation of tidal salt marsh (Pickleweed Mat) in the southwest corner would add a habitat that is limited in California. Marsh birds including the state endangered Belding's savannah sparrow would be expected to breed in this habitat. Restoring salt marsh habitat would also make it possible to re-introduce rare salt marsh plant species such as salt marsh bird's-beak, aphanisma, the Salt Spring checkerbloom. The tidal channels would support estuarine fishes like gobies and topsmelt. These small fishes would provide food for piscivorous birds such as California least terns (topsmelt), herons and egrets. The channels also would support estuarine invertebrates which would provide a food base for numerous bird species including shorebirds such as willets, long-billed curlews and marbled godwits.

Needs - Alternative 3 possesses the following characteristics with regards to habitat needs:

- Removes invasive species and restores riparian habitat.
- Provides erosion control on hillsides.
- Provides habitat for sensitive species.
- Increases habitat and structural diversity.
- Creates regionally rare tidal salt marsh habitat.

Function - Alternative 3 possesses the following characteristics with regards to habitat function:

- Improves the function of riparian habitat by providing high quality habitat to support breeding by sensitive bird species and provides undisturbed islands.
- Removal of non-natives will allow the natural recruitment of willow saplings and other native plant seedlings to replace senescent vegetation.

- Native riparian trees provide roosting and nesting habitat for birds.
- Native trees create leaf litter, which helps retain soil moisture and improves soil microbial activity.
- Pickleweed marsh provides habitat for State endangered Belding's savannah sparrow.
- Tidal channels support estuarine fish and invertebrates.
- Tidal channels provide foraging opportunities for piscivorous birds and shorebirds.

Diversity - Alternative 3 possesses the following characteristics with regards to habitat diversity:

- Planting of California Sagebrush/California Buckwheat Scrub increases habitat diversity by establishing a habitat not present in South Talbert.
- Removal of non-natives in riparian areas would provide greater structural diversity in this habitat.
- Planting of native riparian trees increases structural diversity by increasing the tree canopy layer.
- Planting native riparian trees increases plant and animal diversity.
- Creation of tidal pickleweed marsh increases habitat and species diversity by adding a habitat not present at South Talbert.

Connectivity - Alternative 3 possesses the following characteristics with regards to habitat connectivity:

- Improves connectivity of high quality riparian habitat by converting interspersed disturbed habitat to high quality mulefat and black willow habitat.
- Improves connectivity of native habitat by replacing disturbed and ornamental areas with native plant associations (black willow/mulefat, coastal sage scrub, quailbush scrub).
- Provides connectivity with pickleweed marsh and tidal channels of the Santa Ana River Marsh immediately south of South Talbert.

### 3.7.3 Public Access

Public access, visitor serving and interpretive elements of the final alternatives are described and illustrated below. The alternatives were developed in a series of public and technical advisory committee meetings. The details described below are the result of not only refinement of minimal, moderate and maximum touch alternatives, but in the end also reflect a weighing of particular specific access components by stakeholder preference so that some components were shifted from one alternative to another over the course of later meetings. In addition, several elements shown in one or more of the alternatives during the process - most notably vehicular access and on-site parking at the Victoria access point - were eliminated from the final alternatives based on preliminary analysis and stakeholder feedback.

Each of the three alternatives are described in sections, with maps showing the particular access details in the 19th Street, Balboa Street, Sheephills and Victoria Pond areas. Overall views of each alternative are provided in the overview section above.

### *3.7.3.1 Alternative 1 - Minimum Touch*

Overall Public Access elements for Alternative 1 are shown in Figure 24 in Section 3.4. Under this alternative, limited access improvements would occur. Changes to the access conditions would primarily include selectively thinning dense vegetation areas, adding signage to trails, and trail coordination with the 19th Street bike trail project on the southern boundary of South Talbert.

All existing trails and the Sheephills BMX recreational area remain "as-is" under this alternative. Entry access improvements include repairing the existing stairway and creating ramp access from Balboa Street, and adding stair/ramp access at the Santa Ana River Levee/Banning Bike Trail. The fence around the pond will be removed or reconfigured to allow access. A new trail around the perimeter of Victoria Pond is also proposed to provide the public with access to the pond. Removing the fence and providing access to the pond may present a public safety issue if the edges of the pond are too steep. As mentioned previously, the County may need to determine if the slopes around the perimeter of the pond need to be re-graded and made flatter than they are today. Design components proposed for this alternative are listed below:

- Improve main entrance at Balboa Boulevard
- No existing trail alterations, add interpretive signs only
- New loop trail around Victoria Pond
- Fence around pond to be removed or reconfigured
- No parking, kiosks, or overlooks
- No alterations to Sheephills, protect "as-is"

A detailed description and analysis of public access components for Alternative 1 is presented below.

<u>Balboa Boulevard Access</u>

Figure 37 shows access improvements along Balboa Boulevard. Parking for park users in this alternative is limited to the 27 existing on-street parking spaces. The current stair access at the terminus of Balboa Boulevard would be improved to add railings, and provide for appropriate tread and riser dimensions. The existing informal bicycle trail near the intersection of Balboa and 19th Streets would be improved to be ADA-compliant, and would serve both bicycles and pedestrians. Two ADA spaces would be provided near that ramp, with the balance of the paved area outside of the drive lanes proposed for a vegetated swale to detain 19th Street runoff for contact time and treatment prior to entering the Talbert Regional Park landscape as a water quality enhancement element.

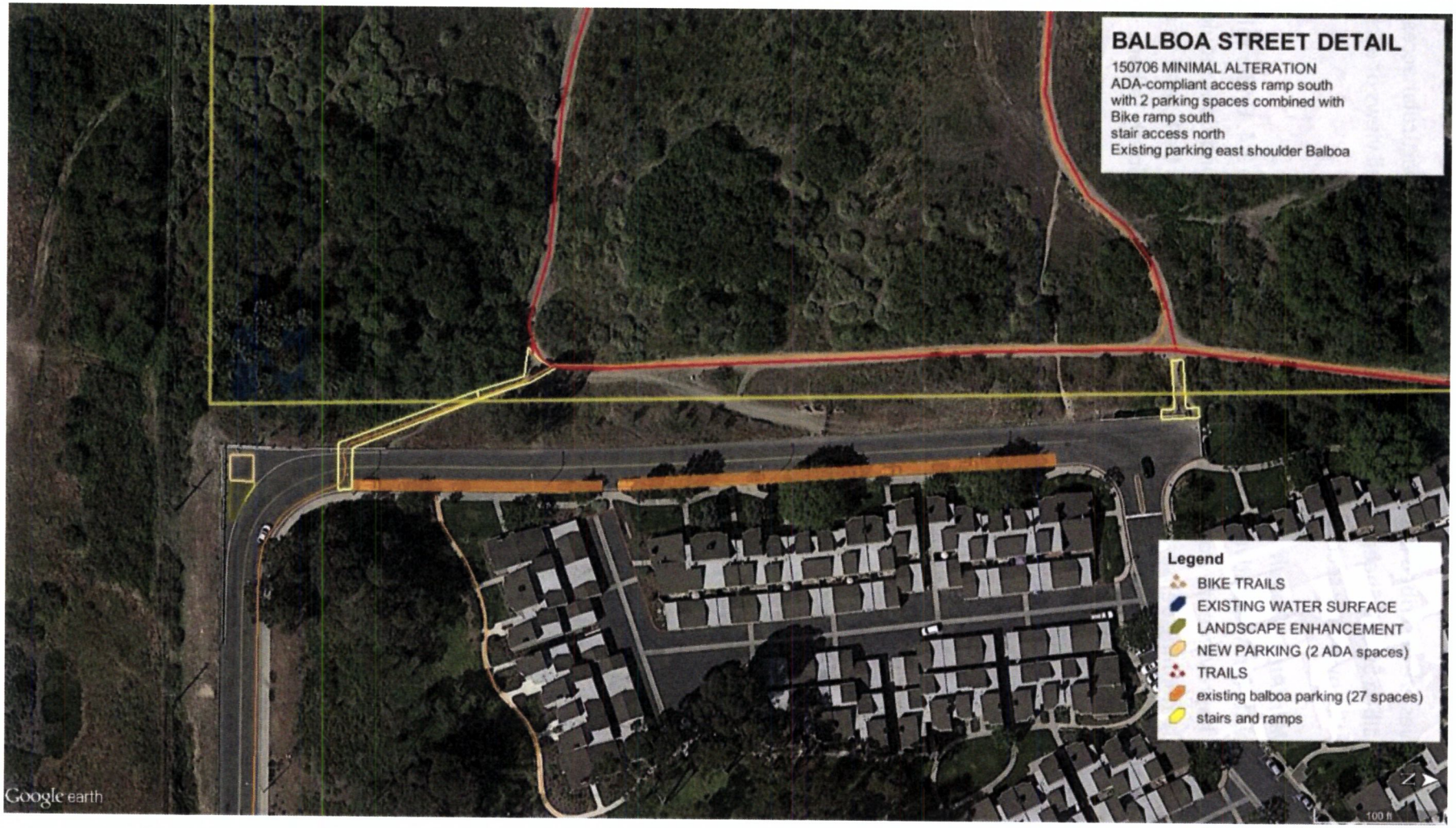


**Figure 37: Alternative 1 Balboa Access Improvements**

Victoria Street Access

Figure 38 shows Victoria Street and Victoria Pond access improvements. The controlled vehicular access from Victoria Street will remain as existing, but the large and currently un-vegetated areas to the south of the entry will be largely restored, leaving about 1/3 of the current area as permeable parking, staging and activity area for County use. Adjacent to this area and the current Orange Coast Bicycle trail access from Victoria, a small modular or package restroom area is proposed. Between the permeable vehicle staging area and the pond itself, the restoration design would incorporate a vegetated swale to capture, detain and treat runoff from the levee Bike Trail itself. In addition, an ADA compliant ramp and stair is proposed for access to the shoreline of Victoria Pond and the proposed Pond loop trail. The loop trail is proposed to provide sufficient pond access for fishing and casting to deter additional unplanned bank access trails and protect the bulk of the shoreline habitat.

To provide for a glimpse of the pond from the main trail and to discourage encampments, this alternative provides for a more open "gladed" area of mixed shade. The landscape between the Balboa-Victoria trail and the east pond shoreline is proposed for selective thinning of existing vegetation, along with the removal of invasive and non-native species. While no turf would be introduced, the intent here is to maintain a more open, park-like, and yet fully functioning native landscape with multiple small trails and resting areas in contrast with the dominant and thick willow forest of the majority of the Park.

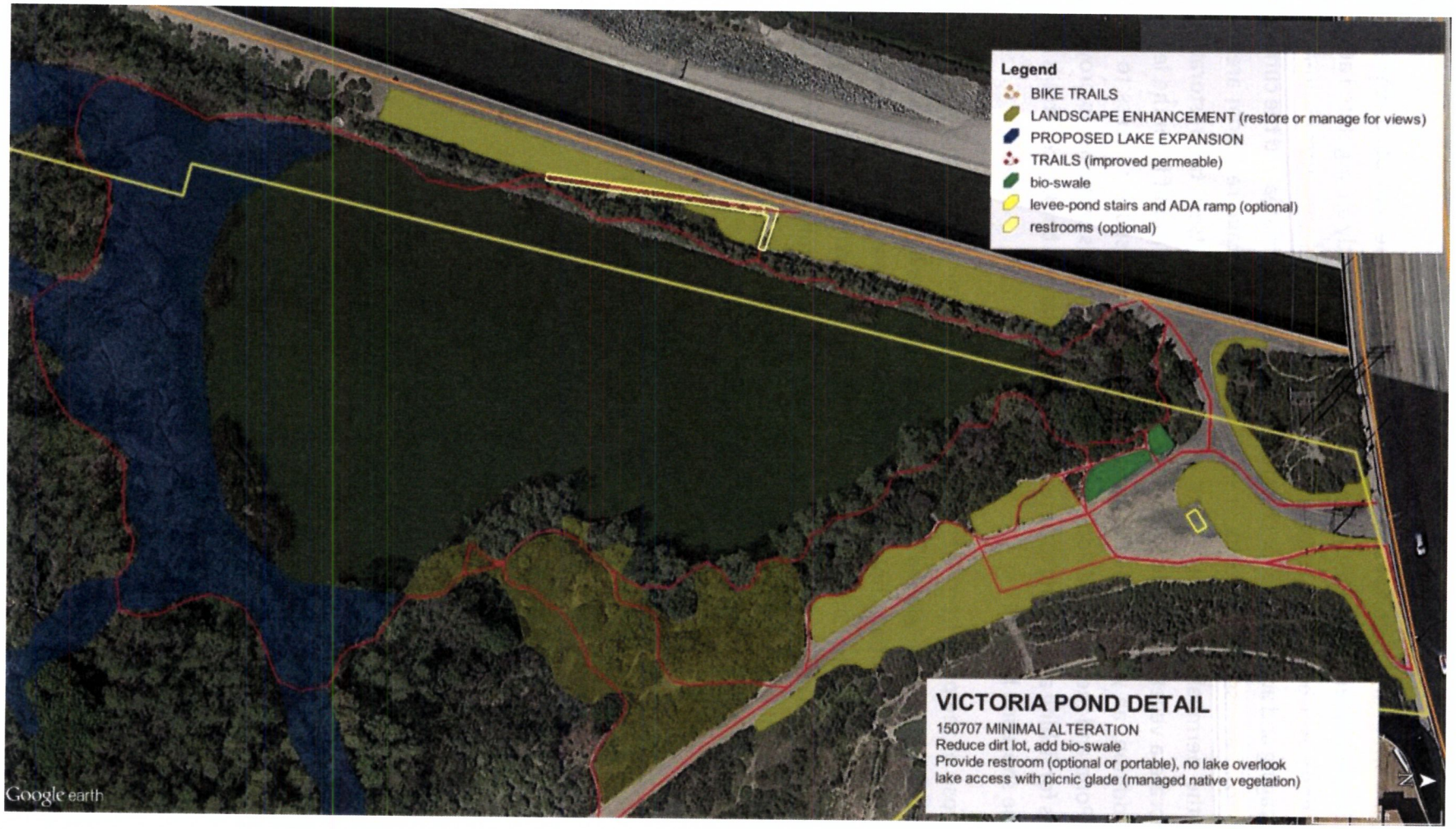


**Figure 38: Alternative 1 Victoria Street and Pond Access Improvements**

Sheephills

In this alternative, the Sheephills area remains in the current location and access conditions, with no alteration. As shown in Figure 39 Sheephills access is unchanged under Alternative 1.

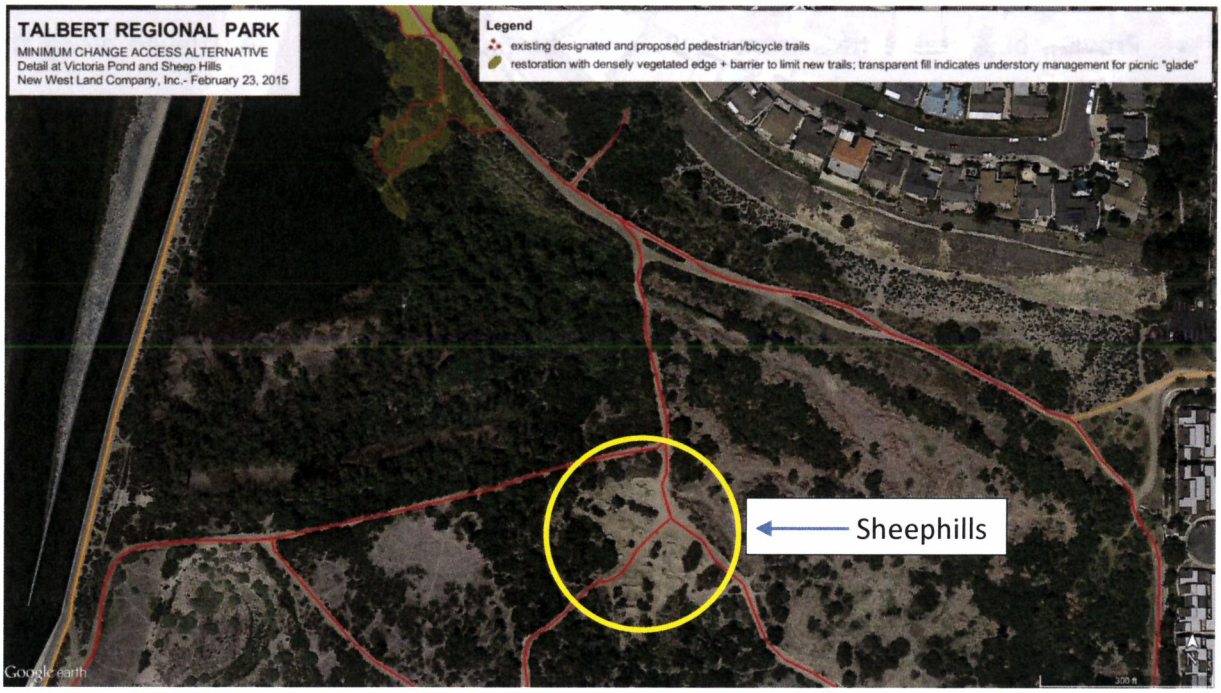


**Figure 39: Alternative 1 Sheephills Access**

19th Street Access Elements

A bicycle crossing zone would be provided at the top of the Balboa ramp, providing continuation with Costa Mesa's planned 19th Street bicycle lane improvements.

Trail Improvements

Trails remain in the current locations, profiles, and edge conditions of the existing, with the exception of the main trail within the Victoria Street access. The restoration of the existing un-vegetated area would be defined by trail edge containment, with native Sycamore trees or tall Willow species defining the west side of the trail, providing shade from the afternoon sun. Minimal way-finding and interpretive signs would be located at entry points to the Park, as well as at Sheephills.

### *3.7.3.2 Alternative 2 – Moderate Touch*

Overall Public Access elements for Alternative 2 are shown in Figure 25 in Section 3.5. This alternative represents a mix of features originally proposed for the minimum and maximum alternatives. Under this alternative a moderate amount of site access improvements would occur

including selective thinning of dense vegetation areas, addition of ADA access ramps and trail amenities such as signs and kiosks, delineating trail edges, making improvements at the main entrance and trail coordination with the 19th Street bike trail project on the southern boundary of South Talbert. Design components proposed for this alternative include:

- Provide bike trail access from 19th St to the Santa Ana River (SAR) levee along the southern boundary
- Improved entrance(s) to the park along Balboa Boulevard
- Add an ADA compliant loop trail
- Pier (option) over Victoria Pond
- Stock the pond with fish
- The fence around the pond is to be removed or reconfigured
- Sheephills will have perimeter grading only for separation of pedestrians and passive recreational cyclists from the active BMX activity

A detailed description and analysis of public access components for Alternative 2 is presented below.

Balboa Boulevard Access

Figure 40 shows access improvements along Balboa Boulevard. Parking for park users in this alternative includes the 27 existing on-street parking spaces, but relocates the two proposed new ADA-compliant spaces to the north end of Balboa Boulevard under the moderate touch alternative.

Victoria Street Access

The moderate alternative retains all of the features of Alternative 1, but proposes to replace the modular restrooms with a fixed restroom facility. The other features unique to this proposal are a "fishing pier" for access to and views of the pond surface, and a more formal interpretive node and pond overlook at the Orange Coast River trail overlooking the pond from the northwest. The pond perimeter trail remains in this alternative, becoming even more of a shoreline trail with the proposed lake and habitat channel expansion.

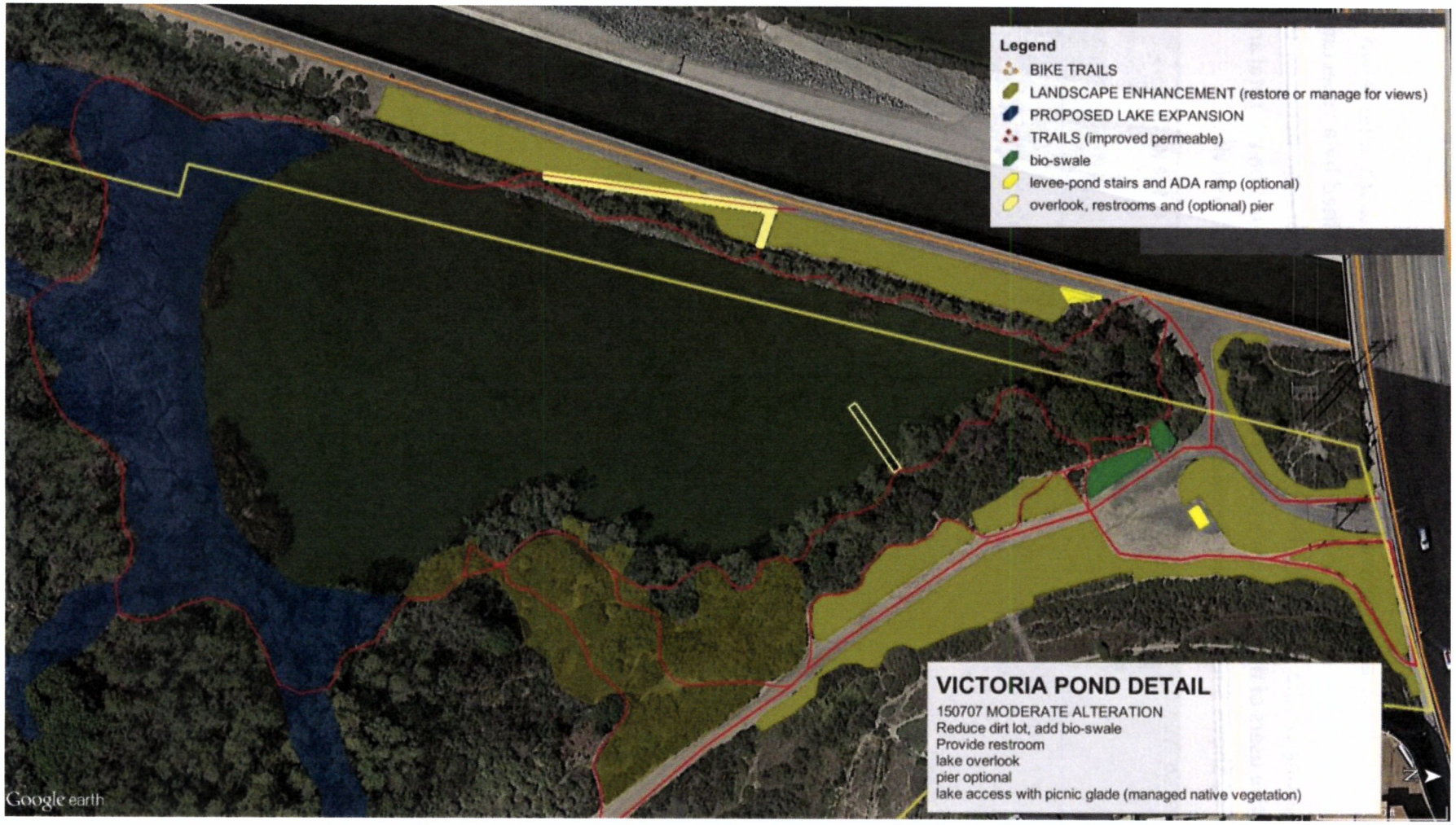


**Figure 40: Alternative 2 Victoria Pond Access Improvements**

## Sheephills

Figure 41 shows Sheephills access improvements under the moderate touch alternative in planview. In this alternative, the edge of Sheephills is proposed to be defined by a "spectator berm," providing viewing of the BMX activities by visitors and safe separation between the visitors and more active users of the Park, while placing a defined and final limit on the total area of Sheephills. Figure 42 shows Sheephills access improvements in cross-sectional view.

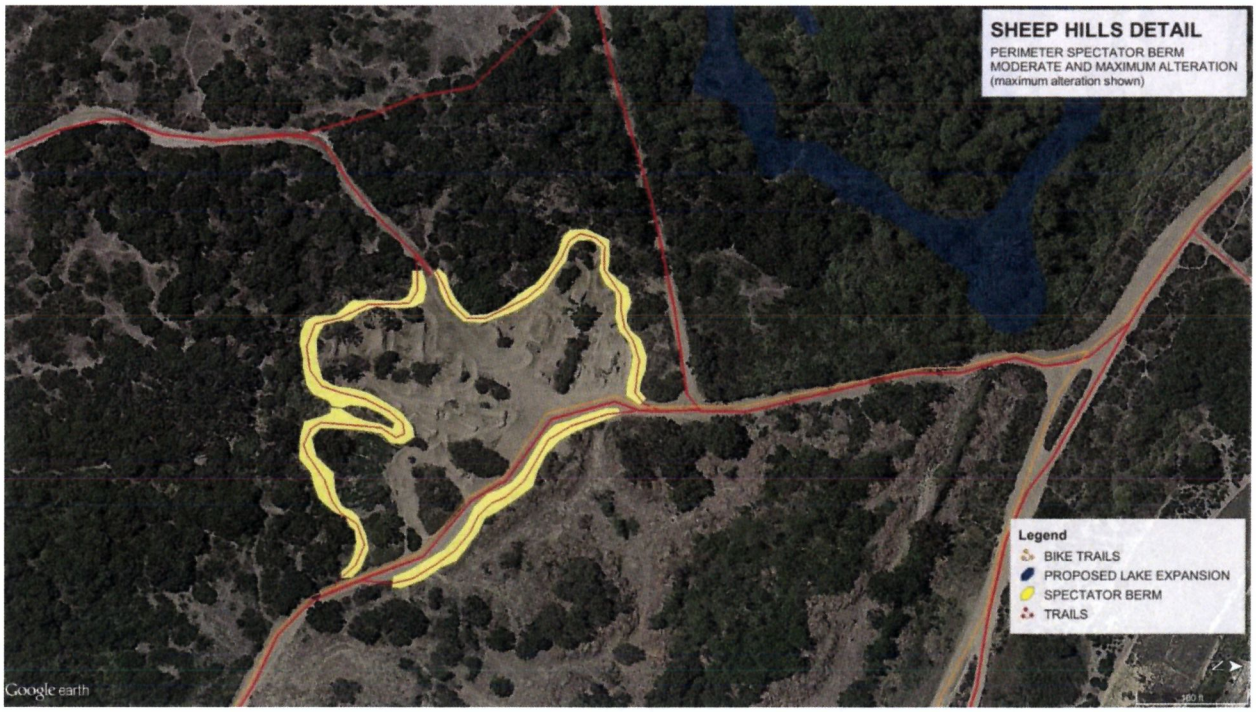


**Figure 41: Alternative 2 Sheephills Access**

## 19th Street

The moderate alternative integrates with Costa Mesa's bicycle improvement project. It includes a linear park where the existing paved area on 19th Street is widest. This concept also provides for the extension of the proposed north side bicycle path to a crossing near the proposed Balboa bicycle access ramp. Figure 43 shows 19th Street access improvements.

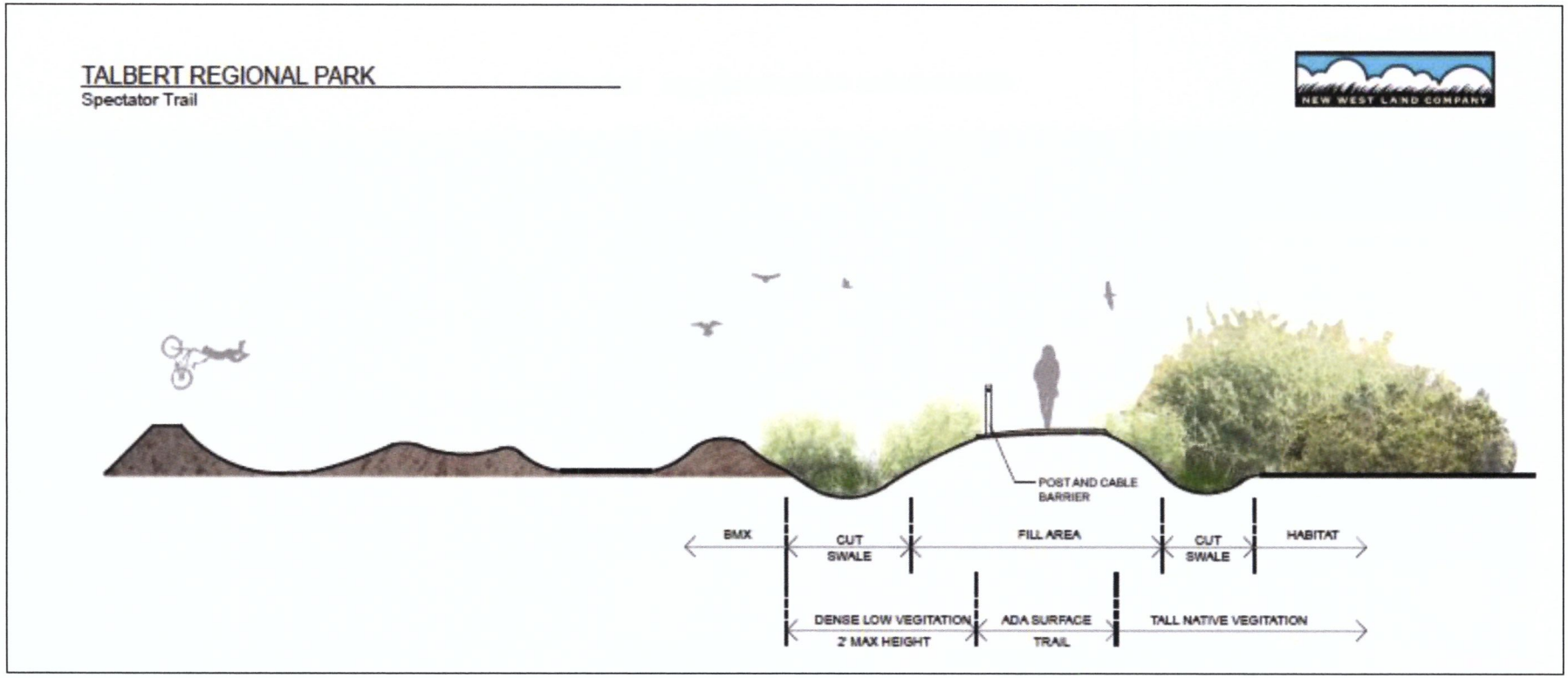


**Figure 42: Alternative 2 Sheephills Access**

**Figure 43: 19th Street Access Improvements**

Trail Improvements

As with the previous alternative, trails remain in the current locations, profiles, and edge conditions of the existing, with the exception of the main trail within the Victoria Street access. However, the restoration of the existing un-vegetated area as defined by trail edge containment would be augmented with native Sycamore trees or tall Willow species defining the west side of the trail, providing shade from the afternoon sun. Additional way-finding and interpretive signs would be located at points within the park.

#### *3.7.3.3 Alternative 3 – Maximum Touch*

The overall view of this alternative is shown in Figure 28 Section 3.6. This alternative introduces the maximum amount of site improvements and alteration to address access needs and diversity within the Park. Changes to the site include adding ADA access ramps and trail amenities such as signs and kiosks, delineating trail edges and increasing the amount of ADA-compliant trails through porous paving. It also includes making improvements at the main entrance, and trail coordination between the 19th Street bike trail project on the southern boundary of South Talbert and proposed public trails and visitor-serving amenities on Banning Newport Ranch property. Design components proposed for this alternative include:

- Bike trail access from 19th Street to the Santa Ana River (SAR) levee along the southern boundary
- Improved entrance(s) to the Park along Balboa Boulevard
- ADA compliant access and trails added
- A "boulevard" style trail section at the main Balboa-Victoria-Levee trail (See Figure 44)
- Sycamore and/or Willow plantings along south and west sides of trails for shade
- A boardwalk/"fishing bridge" over Victoria Pond
- Small footbridges over peripheral waterways connecting to Victoria Pond
- Sheephills perimeter grading only for pedestrian traffic

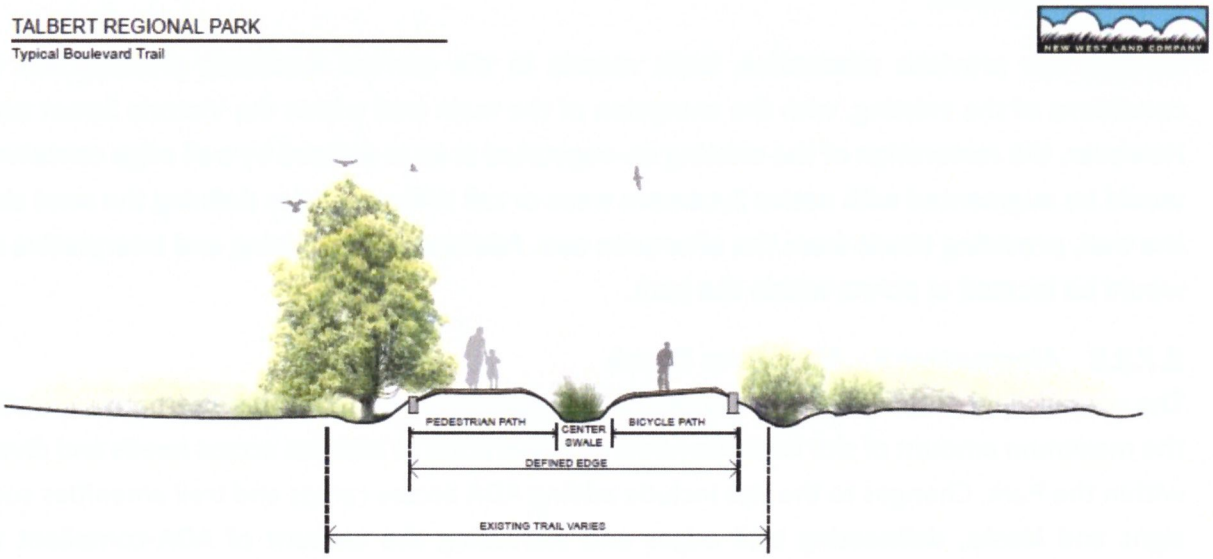


**Figure 44: Boulevard-Type Trail Section**

A detailed description and analysis of public access components for Alternative 3 is presented below.

Balboa Boulevard Access

Figure 45 shows access improvements along Balboa Boulevard. Parking for park users in this alternative includes the 27 existing on-street parking spaces, but adds 9 standard and 2 ADA-compliant spaces on the north side of Balboa, adjacent to and dedicated to the Park. The two proposed new ADA-compliant spaces with an adjacent bio-swale are located as in Alternative 1 at the south end of Balboa Street. This is also where a dedicated switchback ADA ramp is proposed to provide a unique vantage over the open water "oasis" that is a current favorite of birders. This creates two separate access points for pedestrians and bicyclists on the south end of Balboa.

As in Alternative 2, the current stair access at the north terminus of Balboa Boulevard would be improved, as would the existing service vehicle access from Balboa. The balance of the steep and currently eroding fill slope will be re-vegetated for slope stability and erosion control, and to provide visual separation between the road and the Park, while framing the entrance and access points along Balboa.

**Figure 45: Alternative 3 Balboa Access Improvements**

Victoria Street Access

Figure 46 shows Victoria Pond access improvements under Alternative 3, the maximum touch. This alternative retains all of the features of the moderate, but proposes a visitor facility including restrooms, a multi-use meeting space and docent and stewards equipment storage. The other features unique to this proposal are the "fishing bridge" providing for access across the center of the pond from the interior of Talbert Regional Park to the Orange Coast River Park trail. Additional ramps and stairs down the levee face allow for a continuous byway from the river trail to the pond in either direction of travel. Additional spans are shown at the proposed lake expansion channels for an ADA-compliant pond loop trail.

Sheephills

Alternative 3 provides for the same berm and access plan and sections as the moderate touch alternative.

19th Street

The maximum alternative coordinates with Costa Mesa's bicycle improvement project and its linear park, but proposes to integrate public parking at the existing large pavement area on 19th Street. The parking provides not only an additional 14 conventional parking spaces, but also 2 ADA-compliant spaces near the proposed access trail (with ADA-compliant grade and surface) to a proposed visitor serving node and overlook on the Banning Newport Ranch project. The location of this node is exceptional in that it not only provides for a panoramic overview from Talbert Park to the ocean, but is also hidden from view of the homes on the mesa above due to the nature of the topography in the area. Figure 47 shows proposed 19th Street access improvements.

Trail Improvements

As with the previous alternative, trails remain in the current locations, profiles, and edge conditions of the existing, with the exception of the main trail within the Victoria Street access. However, the restoration of the existing un-vegetated area as defined by trail edge containment would be augmented with native Sycamore trees or tall Willow species defining the west side of the trail, providing shade from the afternoon sun. Additional way-finding and interpretive signs would be located at points within the Park.

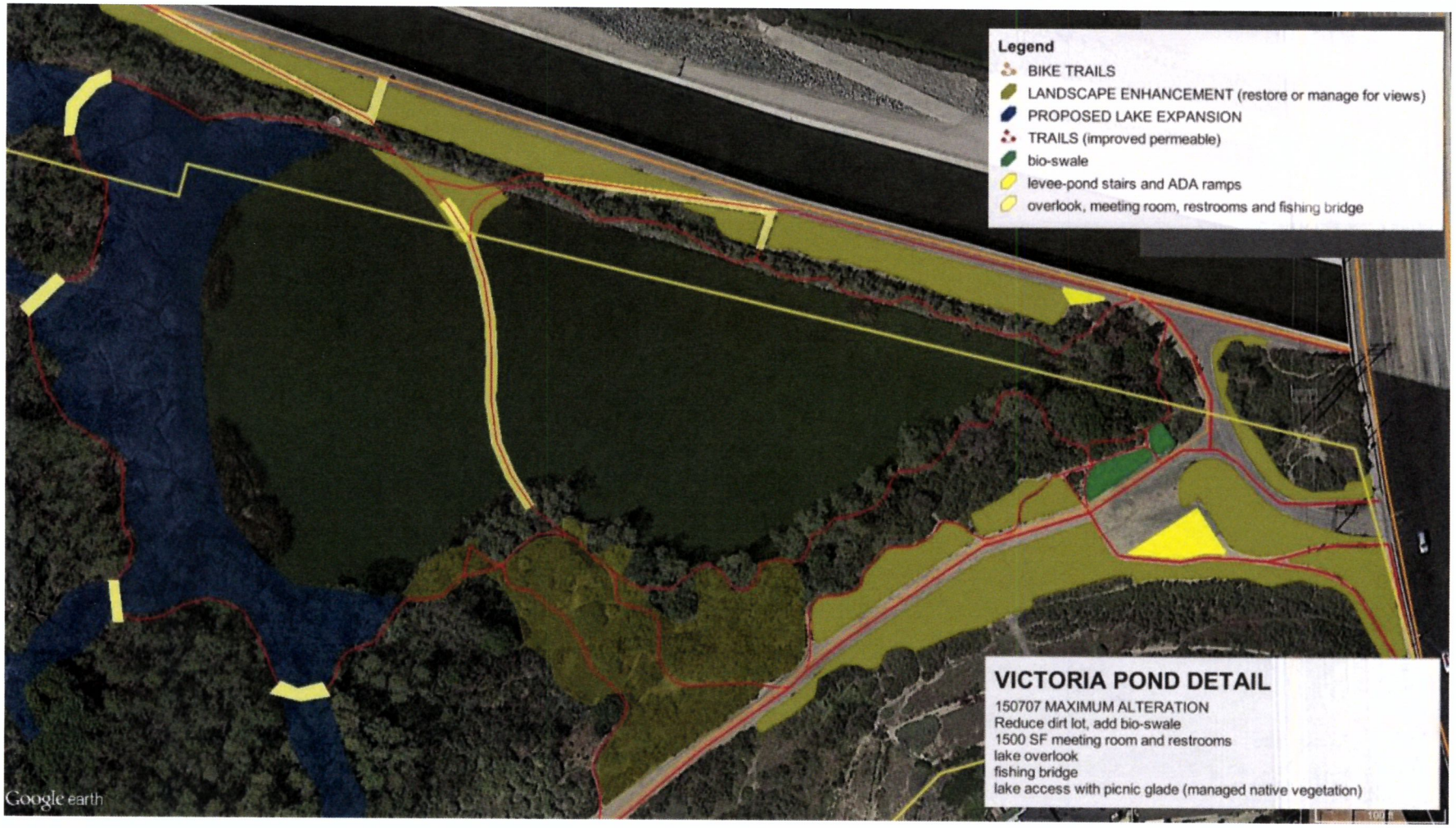


**Figure 46: Alternative 3 Victoria Pond Access Improvements**

**Figure 47: 19th Street Access Improvements**

### 3.7.4 Construction

Construction components are listed below to identify the leading construction needs and requirements of each alternative. Phasing of certain construction components might be necessary in consideration of ecological needs, permitting, and available funding.

#### *3.7.4.1 Alternative 1 - Minimum Touch*

- Light construction only, e.g. installing signage, fencing, entrance amenities – no grading or earthwork.
- Access will be from perimeter arterial streets and along the existing network of internal roads/trails.
- Mainly weeding and use of light equipment (i.e. shovels, rakes, and hoes), with some heavier equipment for pampas grass, and perhaps trucks for hauling off vegetation.
- Non-native vegetation to be hauled offsite.

#### *3.7.4.2 Alternative 2 - Moderate Touch*

- Moderate construction grading and excavation to lower the existing channel to a lower elevation in the southwest portion of the site.
- Access will be from perimeter arterial streets and along the existing network of internal roads/trails.
- Could include the use of heavy equipment (i.e. excavators and trucks) for earthwork and hauling off material.
- Non-native vegetation to be hauled offsite.
- Re-use of excavated soil onsite to minimize the need for offsite disposal.

#### *3.7.4.3 Alternative 3 - Maximum Touch*

- Construction is mainly to be done in the "dry" (except for Victoria Pond).
- Construction of tidal channels, berms, culverts and tide gates.
- Access from will be from perimeter arterial streets and along the existing network of internal roads/trails.
- Use of heavy equipment (i.e. excavators and trucks) for hauling of materials.
- Non-native vegetation to be hauled offsite.
- Dewatering may be required if a high groundwater table is encountered during construction.
- Re-use of excavated soil onsite to minimize offsite disposal. Attempt to balance cut and fill, and only haul off any remaining net surplus of material.

### 3.7.5 Maintenance

Each of the proposed Alternatives will require long-term maintenance. Items such as fencing, trails, culverts, etc. require maintenance to reduce the need and frequency of replacement. The Alternatives were designed such that the number of park improvements and amenities increase

with each successive Alternative, i.e. less for the Minimum Alternative and a maximum number of amenities for the Maximum Alternative.

Partnership maintenance agreements between OC Parks, other site managers (OCPW; Orange County Flood Control District) and other stakeholders with an interest in the park (e.g., City of Costa Mesa) should be encouraged to balance burdens among user and owner groups. Maintenance actions for each Alternative are itemized below.

#### *3.7.5.1 Alternative 1 – Minimum Touch*

- Vegetation management (weeding and non-native removal)
- Removal of trash
- Vector control
- Access and trail repairs
- Erosion repairs (berms, bluff slopes and trails)
- Park facility repairs (signage, kiosks, interpretive features)
- Homeless encampment eradication
- Sheephills perimeter/elevated berm

#### *3.7.5.2 Alternative 2 – Moderate Touch*

- Vegetation management (irrigation, weeding and replanting)
- Graffiti
- Removal of trash
- Vector control
- Access and trail repairs
- Erosion repairs (berms, bluff slopes and trails)
- Park facility repairs (signage, kiosks, interpretive features)
- Pier inspection and maintenance
- Homeless encampment eradication
- Sheephills perimeter/elevated berm

#### *3.7.5.3 Alternative 3 – Maximum Touch*

- Vegetation management (irrigation, weeding and replanting)
- Graffiti
- Removal of trash
- Vector control
- Access and trail repairs
- Erosion repairs (berms, bluff slopes and trails)
- Park facility repairs (signage, kiosks, interpretive features)

- Footbridge inspection and maintenance
- Culvert and tide gate maintenance
- Homeless encampment eradication
- Sheephills perimeter/elevated berm

### 3.7.6 Costs

Restoration costs for each alternative are presented in Table 3-1 below. Costs can be managed by prioritization, adaptive management, and phasing of various restoration components. Soft costs are also included for each alternative.

## Table 3-1 – Opinion of Probable Construction Costs for Talbert Park

**CONSTRUCTION COST ESTIMATE**
**SUMMARY**
**TALBERT REGIONAL PARK RESTORATION CONCEPT PLAN**

| ITEM NO. | ITEM DESCRIPTION | Alt 1 SUBTOTAL | Alt 2 SUBTOTAL | Alt 3 SUBTOTAL | Cummulative Total |
|---|---|---|---|---|---|
| 1 | Remove Non-Native Vegetation | $250,000 | | | $250,000 |
| 2 | Plantings at Top of Bluff in Site A | $19,800 | | | $19,800 |
| 3 | Non-Native Removal and Planting of Riparian Habitat Over Site | | $41,200 | $0 | $41,200 |
| 4 | Plant Additional Trees Along West and South Sides of Trails | | $4,400 | $0 | $4,400 |
| 5 | Salt Marsh Plantings in Southwest Portion of Site | | $44,000 | $0 | $44,000 |
| 6 | Expand the Acreage of Existing Restoration Sites C, D and E | | $18,000 | $0 | $18,000 |
| 7 | Remove Fence Around Pond | $47,025 | $0 | $0 | $47,025 |
| 8 | Improve Main Entrance at Balboa Blvd | $26,400 | | $81,600 | $108,000 |
| 9 | Striping and signing for ADA | | | $2,000 | $2,000 |
| 10 | Bioswale at 19th St Lot | | | $32,000 | $32,000 |
| 11 | Add Interpretive Signs | $6,000 | $12,000 | $4,000 | $22,000 |
| 12 | Trail Access Structures along Balboa Blvd (stairs only) | $28,000 | | | $28,000 |
| 13 | Trail Access Along Southern Perimeter of the Site | | $240,000 | $30,000 | $270,000 |
| 14 | Trail Access Structures Along West Perimenter of Site | | $173,750 | $176,250 | $350,000 |
| 15 | Improved Entrance to Park from Victoria St | | $113,000 | $367,400 | $480,400 |
| 16 | Add ADA-Compliant Loop Trail | | $580,000 | $290,000 | $870,000 |
| 17 | Improve Remaining Trails | | $616,000 | $96,800 | $712,800 |
| 18 | Pier Over Victoria Pond[2] | | $250,000 | | $250,000 |
| 19 | Boardwalk Over Victoria Pond[2] | | | $500,250 | $500,250 |
| 20 | Mobilization & Demobilization | $50,000 | $150,000 | $150,000 | $350,000 |
| 21 | Excavate and Lower Existing Swale in Southwest Area[1] | | $67,500 | $0 | $67,500 |
| 22 | Sheephills Promenade for Pedestrian Traffic[3] | | $9,585 | $0 | $9,585 |
| 23 | Temporary Construction Fencing | | $48,000 | $12,000 | $60,000 |
| 24 | Victoria Pond Grading / Enlarge Pond | | | $135,000 | $135,000 |
| 25 | Haul Off Pond Material | | | $607,500 | $607,500 |
| 26 | Tidal Connection for Salt Marsh[4] | | | $1,000,000 | $1,000,000 |
| 27 | Grade Berms and Channels in Southwest Area | | | $1,201,500 | $1,201,500 |
| 28 | Haul off Surplus Material from Grading Salt Marsh | | | $435,000 | $435,000 |
| 29 | Naturalize Drainage Channel from Walkabout Circle | | | $6,750 | $6,750 |
| | Footnotes: | | | | |
| | 1 = Volume is based on excavating 2 feet from existing swale | | | | |
| | 2 = Estimate is based on Fairview Park estimate | | | | |
| | 3 = Assumes top of berm trail elevation of +8.5 Feet NGVD | | | | |
| | 4= Assumes very large box culvert | | | | |
| | Subtotal Items | $427,225 | $2,367,435 | $5,128,050 | $7,922,710 |
| | Contingency | $106,806.25 | $591,859 | $1,282,013 | $1,980,678 |
| | Permits | $21,361 | $118,372 | $256,403 | $396,136 |
| | Environmental Review (Environ. Document for the entire wetlands complex) | $23,497 | $130,209 | $282,043 | $435,749 |
| | Final Engineering, Bid Documents, Construction Support | $42,723 | $236,744 | $512,805 | $792,271 |
| | Construction Management | $21,361 | $118,372 | $256,403 | $396,136 |
| | Escalation (3% per year for 5 years, project assumed start date is 2020) | $529,634 | $2,934,927 | $6,357,282 | $9,821,843 |
| | **GRAND TOTAL** | $1,172,608 | $6,497,917 | $14,074,997 | $21,745,521 |

= Restoration = Access = Construction

# 4 Conclusions

Conclusions from the study are summarized below.

1. Talbert Regional Park is a major public amenity that provides various types of recreational opportunities. The Park is separated into North Talbert Park and South Talbert Park by a major street (Victoria Street).
2. North Talbert Park is already restored to a great extent as a passive recreational opportunity, but offers a remaining restoration opportunity at Placentia Drain. Placentia Drain is degraded and can be cleared of non-native vegetation to provide a riparian habitat area.
3. South Talbert Regional Park is an informal recreational area that offers both active and passive use opportunities. Degraded existing habitat poses the option for restoration, public access improvements and enhancements to allow more visitation, and other opportunities exist for potential site enhancement.
4. Three restoration alternatives are formulated for South Talbert Regional Park that consists of a minimum action alternative, a moderate action alternative, and a maximum action alternative. The range of actions is least for the minimal alternative, greatest for the maximum alternative, and intermediate between the two for the moderate alternative. Each alternative consists of components that can be implemented either individually or as a group, depending on available funding and public needs.
5. Alternative 1, the minimum alternative, is simple removal of non-native vegetation, fish stocking of Victoria Pond, and basic improvements to public access to allow continued safe use of the park. Other actions can occur if desired, but this is the basic approach to the minimum action.
6. Alternative 2, the moderate alternative, includes the same basic components as the minimum touch, but adds planting for establishment of sage and riparian habitat, modest excavation and contouring, more extensive public access improvements, and potential enlargement of Victoria Pond with installation of a fishing amenity to augment fish stocking.
7. Alternative 3, the maximum alternative, includes all of the components of the previous alternatives plus more. The new items are more extensive public access improvements, addition of a boardwalk spanning across Victoria Pond, constructing a berm around Sheephills, and installation of a tidal salt marsh with connection to either the River or the marsh to the south.
8. The alternatives were analyzed for their performance and results are below.
    a. Alternative 1 – The minimum touch alternative provides basic improvement to habitat by removal of invasive vegetation without improvements to hydrology. Site access is slightly improved. Benefits of Alternative 1 are site enhancement without significant investment in capitol. Maintenance is minimal, however non-native vegetation may

still colonize the site due to a lack of native vegetation on-site. The site basically remains as is but with greater habitat quality.

The Park will remain predisposed toward freshwater and riparian habitats and the southwest portion of the site will be preserved for future planting of salt tolerant plant species. The clearing of any vegetation in densely vegetated areas is proposed to discourage homeless encampments.

Public access improvements are generally limited to the peripheral areas and interior areas utilizing the existing trail network. This alternative provides low cost opportunities to improve existing trails. Improvements will largely consist of improving the entrance from Balboa Boulevard by adding stairs and an ADA ramp. Improvements to the internal trails will consist of adding trail signage and edge effects designed to contain the width of the trails. A public access trail that loops around the pond is also proposed under this alternative.

The overall construction cost for this alternative is approximately $1,200,000.

b. Alternative 2 – The moderate touch alternative provides the same basic improvements as Alternative 1, with added benefits of planting of native habitat, improved hydrology, enlarging and stocking Victoria Pond, and more significant improvements to public access. This option is more costly than Alternative 1 but not as costly as Alternative 3. Maintenance requirements are intermediate between the two alternatives.

   The park will remain predisposed toward freshwater and riparian habitats while plantings of salt tolerant plant species are proposed for the southwest portion of the site. Primary actions to improve the existing habitat will include modest excavation, removing non-native invasive species, weeding, planting vegetation appropriate for the soils at the site, and clearing specific areas with dense vegetation to discourage homeless encampments. Planting of trees along the south and west trail edges is included.

   Excavation is proposed at two locations: 1) the pond and 2) the existing swale located in the southwest portion of the site. Excavation at the pond is proposed to expand the aquatic area of the pond, increase aquatic habitat, and create island features for birds. In the southwest area, the purpose of excavating the existing swale is to facilitate ground water percolation and the establishment of salt tolerant plant species such as pickle weed and bulrush.

   As with Alternative 1, no tidal connection is proposed under this Alternative.

Public access improvements and amenities are increased from the number of improvements proposed in the Minimum Alternative and are slightly less than the number of improvements offered in the Maximum Alternative.

To keep trails from expanding and impinging on adjacent vegetated habitat, hard edges will be added to the existing main trails. The hard edges will be designed to contain the width of the trails. In addition, an elevated berm is proposed around the Sheephills area. This elevated berm is proposed for two purposes: 1) to clearly delineate the BMX area and contain the area from expanding; and, 2) provide the public with a safe viewing trail.

Under this alternative stairs and ADA ramp access to Victoria Pond from the river levee and from the entrance at Balboa Boulevard to the Park are proposed. An overlook from the levee and a recreational pier is also proposed at Victoria Pond for fishing and other recreational uses. Other improvements will include adding trail signage and informational kiosks to the internal trails, bike access from Balboa Boulevard, a small restroom facility, and landscape enhancement along the hillside at Balboa Boulevard.

Construction Costs – Overall construction cost for this alternative is approximately $6,500,000.

c. Alternative 3 – The maximum alternative provides all potential site restoration improvements to the greatest degree, with significant benefits of habitat, hydrology, and public access. Victoria Pond is enlarged to the greatest extent with fish stocking and a boardwalk, a salt marsh is connected to surface seawater sources, public access is optimized and parking is made available where appropriate. Sheephills is protected with a berm and perimeter landscaping. This option is the highest cost and represents the ultimate vision of all restoration components successfully implemented on-site. Maintenance will be comparatively greater than the other alternatives.

This Alternative also presents the greatest diversity of habitat at Talbert Regional Park. The park remains predisposed toward freshwater and riparian habitats while tidal salt marsh habitat is introduced and confined to the southwest portion of the site. The southwest area of the park would become dominated by a functioning tidal salt marsh. Also, the aquatic fresh water area of the pond is expanded and grading of the drainage channel from Walkabout Circle is proposed to naturalize the channel and create a bio-swale dominated by a riparian community of trees and shrubs. Primary actions to improve the existing habitat will include excavation, removing non-native invasive species, weeding, planting vegetation appropriate for the soils at the site, and

clearing specific areas with dense vegetation to discourage homeless encampments. Trees may be planted along the south and west sides of trails.

For Alternative 3 excavation is proposed at three locations: 1) the pond; 2) the drainage channel from Walkabout Circle; and, 3) the existing swale located in the southwest portion of the site. However, the majority of topographic site alteration occurs in the southwest area under this alternative. Significant excavation of the existing swale and its adjacent topography is proposed to create a contained network of tidal channels and tidal salt marsh habitat.

To contain the salt marsh area, an earthen dike is proposed on the south and north sides of the salt marsh and, a transitional wetland habitat is proposed to be aligned with Trail B of the Park. The transitional wetland will be constructed using surplus soils excavated from the tidal channels. The transitional wetland will gently slope from the flat low-lying area of Trail E to a higher elevation at Trail B. This topographic feature will allow the salt marsh to adjust and migrate to higher ground during any future sea level rise. Note: the creation of transitional wetlands will alter a portion of Trail B and Trail E by burial of these trail segments. This is addressed in the "Public Access" analysis below.

A tidal connection is proposed under this Alternative through either the North Marsh project area or the GBC/Santa Ana River levee. The creation of a tidal salt marsh with a connection to tidal waters is feasible with excavation and the installation of culverts and/or an open channel design.

Public access consists of a maximum number of public amenities, access features, and trail improvements proposed under this alternative. Improvements will consist of revamping access from Balboa Boulevard by adding stairs, an ADA ramp, and a limited number of parking spaces. Stair and ADA access from the river levee to Victoria Pond is included, and a series of small footbridges and a boardwalk are added to the loop trail surrounding the pond. An overlook is also proposed at Victoria Pond. Other improvements will include adding trail signage and informational kiosks to the internal trails, bike access from Balboa Boulevard, a permanent restroom and storage facility, and landscape enhancement along the hillside at Balboa Boulevard.

As with Alternative 2, hard edges are proposed to be added to the existing main trails. The edges will be designed to contain the width of the trails. In addition, an elevated berm is proposed around the Sheephills area. This elevated berm is proposed for two purposes: 1) to clearly delineate the BMX area and contain the area from expanding; and 2) provide the public with a safe viewing trail.

For the Trail B and Trail E segments that become partially buried under this alternative, these trails segments could either be realigned or raised topographically in elevation using the surplus material from excavation. The elevated trails would provide the public with unique viewing opportunities, and during the rainy season be more accessible than trails located at lower elevations. If so desired, other trails within the Park could also be topographically raised using the surplus material excavated.

Construction costs for this alternative are $14,000,000.

If all actions of each alternative were implemented as a grand master plan, then the cumulative total cost would be approximately $22,000,000.

Recommendations consist of moving the project through the process of evaluation, approvals, and design. The steps to be taken include the following:

1. Select the preferred alternative – This step can be accomplished with a decision by the stakeholder group, or by using the environmental document to identify the preferred alternative through analyses.
2. Complete environmental review – The environmental review document(s) will have to satisfy the California Environmental Quality Act (CEQA) and the National Environmental Environmental Policy Act (NEPA). Depending on the alternative selected, the document will either be a Mitigated Negative Declaration (MND) for CEQA and an Environmental Assessment (EA) for NEPA, or an Environmental Impact Report (EIR) for CEQA and an Environmental Impact Statement (EIS) for NEPA. It is possible to prepare a Programmatic document that evaluates all possible future actions on the site, with a supplemental document(s) to address site-specific actions when they are determined.
3. Apply for permits – Permits will be required from federal, state, regional and local agencies. Anticipated permits are the Section 404 Permit from the U.S. Army Corps of Engineers, a Section 401 Water Quality Certification from the Regional Water Quality Control Board, a Coastal Development from the California Coastal Commission, and an Encroachment Permit from the County of Orange. City permits may also be required for perimeter actions.
4. Complete engineering for construction – Final engineering for construction will be required to implement the project.
5. Monitor before, during, and after construction – Habitat monitoring will be required prior to construction, and then during and after construction go assess project impacts and successes.
6. Construct – Implement the project.

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# APPENDIX A: DATA INVENTORY

| Date | Author | Source | Planning Document | Local Info | Site Topography | Biology & Habitat | Hydrology & WQ | Soils Information | Access & Use | Opportunities Constraints |
|---|---|---|---|---|---|---|---|---|---|---|
| 4/15/2008<br>11/2006<br>2/26/2008 | Santa Ana River Trail Blue Ribbon Committee | City of Costa Mesa, Huntington Beach, and Newport Beach | X | | | | | | | X |
| NP | City of Costa Mesa | NP | X | | | | | | X | |
| 6/1989 | EDAW, Inc. | | X | | | X | X | X | X | X |
| 6/1991 | EDAW, Inc. | OC Environ. Management Agency | X | | | X | X | X | | X |
| 4/2003 | OC Public Facilities and Resources Dept./ Harbors, Beaches, & Parks Design | | X | | | X | X | X | | |
| 8/20/1993 | Katzmaier Newell Kehr- (Landscape Architect) | OC Environ. Management Agency | X | | | X | X | X | | |
| 2004 | OC Harbors, Beaches, & Parks | | X | | | | | | | |
| 1988 | NP | | X | | | | | | | |
| 1991 | EDAW, Inc. | | X | | | | | | | |
| 2001 | Katzmaier Newell Kehr<br>Ann Christoph -Architect<br>Robert Bein - (William Frost & Associates)<br>Robert A. Hamilton - (Michael Brandman Associates)<br>Henry C. Koerper, Ph.D. | City of Costa Mesa | X | | | | | | | |
| NP | NP | NP | X | | | | | | | |
| NP | U.S. Army Corp of Engineers | | X | | | | X | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4/16/2013 | OC Sanitation District | | X | | | | | | |
| 3/29/2008 | SCCWRP | | X | | | X | | | |
| 9/9/2011 | BonTerra Consulting | City of Newport Beach | X | | X | X | X | X | |
| 1980 | Kristen Bender -CSULB | OC Environ. Management Agency | X | | | | | | |
| 2/2009 | Bernard S. Pyska -OC Public Works | | X | | | | | | |
| NP | Orange County Parks | | X | | | | | X | |
| 2013 | Dudek | | X | | | | | | |
| 10/11/2013 | Byron de Arakal, Parks & Recreation Commission Chairman | | | X | | | | | |
| 5/9/2014 | J. Dobruck & B. Zint | Daily Pilot Newspaper | | X | | | | | |
| 5/3/2000 | Bob McDonell - Chief of Police | Newport Beach Police Department | | X | | | | | |
| 2/26/1991 | U.S. Army Corp of Engineers | | | | X | | | | |
| NP | U.S. Army Corp of Engineers | | | | X | X | | | |
| NP | U.S. Army Corp of Engineers | | | | X | | | | |
| 2/2006 | Stewart Geo Technologies | | | | X | | | | |
| 10/2005 | Dulin & Boynton | | | | X | | | | |
| 9/2009-4/2011 | URS & NOREAS | | | | | X | | | |

| | | | | |
|---|---|---|---|---|
| 12/2011 | URS & NOREAS | | X | |
| 3/2013 | Dudek | | X | |
| 5/2014 | Dudek | | X | |
| NP | EDAW, INC. | OC Environ. Management Agency | | X |
| 2/1983 | T.L.K. | OC Environ. Management Agency | | |
| 2/1983 | T.L.K. | OC Environ. Management Agency | | |
| NP | USGS | Esri Online | | |
| 2007/2009 | CA Invasive Plant Council | Esri Online | | |
| NP | Caltrans | Esri Online | | |
| NP | OCFCD | OCFCD | | |
| NP | OCFCD | OCFCD | | |
| NP | OCFCD | OCFCD | | |
| NP | OCFCD | OCFCD | | |
| NP | OCFCD | OCFCD | | |
| NP | FEMA | FEMA GIS DB | | |
| NP | FEMA | FEMA GIS DB | | |
| NP | FEMA | FEMA GIS DB | | |
| NP | FEMA | FEMA GIS DB | | |
| NP | FEMA | FEMA GIS DB | | |

# APPENDIX B: BIOLOGICAL REPORT FOR THE TALBERT REGIONAL PARK RESTORATION PLAN

# BIOLOGICAL REPORT FOR THE TALBERT REGIONAL PARK RESTORATION PLAN ORANGE COUNTY, CALIFORNIA

***Prepared for:***

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**August 2014**

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# SECTION 1.0 – INTRODUCTION

This Biological Report has been prepared for Moffatt & Nichol under contract to OC Parks. The biological study was performed to assist Moffatt & Nichol and OC Parks in preparation of restoration plan for Talbert Regional Park. Information contained in this document is in accordance with accepted scientific and technical standards that are consistent with the requirements of United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW).

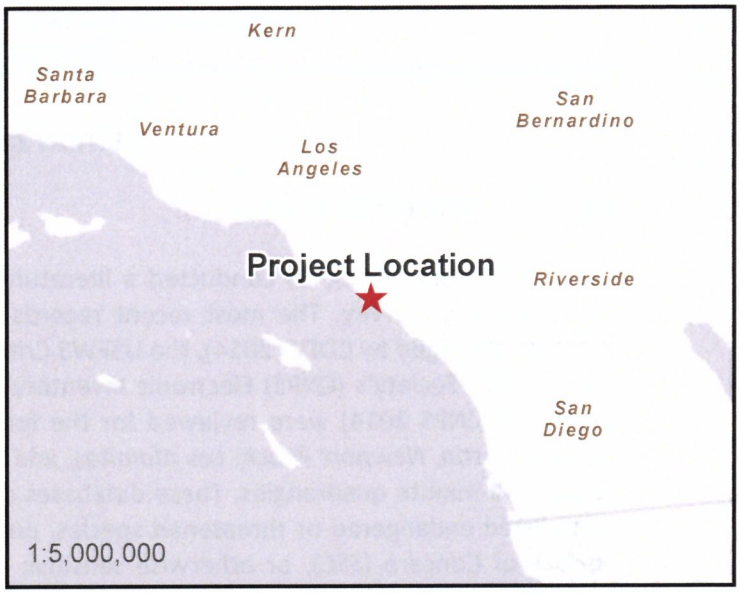
Chambers Group, Inc. (Chambers Group) was retained by Moffatt & Nichol to conduct a literature review and reconnaissance-level survey for the development of alternatives to restore Talbert Regional Park. During the survey, biologists identified vegetation communities, determined the potential for the occurrence of sensitive species and habitats that could support sensitive wildlife species on site, made observations on Victoria Pond, and recorded all plants and animals observed or detected within the Project boundary.

## 1.1 PROJECT LOCATION AND ENVIRONMENTAL SETTING

Talbert Regional Park is located north and south of Victoria Street in Costa Mesa, between Pacific Avenue and the Santa Ana River in Orange County, California. North Talbert consists of 91.5 acres and South Talbert is approximately 88.5 acres. The Santa Ana River and adjacent Greenville Banning Channel are on the west of the site, Fairview Park is on the north, residential areas on top of bluffs are to the east, and Banning Ranch and the Santa Ana River Marsh are to the south.

The vegetation around Victoria Pond within the southern portion of the Talbert Preserve is dominated by native willow trees and interspersed with mule fat and patches of native bulrush. Portions of the area are alkaline with areas of salt bush, pickleweed, and alkali heath present.

In the northern portion of the Park, the vegetation transitions to a drier habitat type dominated by mule fat and coyote brush. Many of the installed sycamore trees appear to be doing well, but also, portions of the northern area have not recovered since the last burn. Restoration efforts have been initiated on site, but many areas have failed due to a lack of water and an over-abundance of weeds.



**Legend**

Project Location

N

0 750 1,500 3,000

Feet

# Figure 1

Talbert Regional Park
Habitat Restoration Plan
Project Location and Vicinity Map

Name: 20748 Fig 1 Location & Vicinity.Mxd
Print Date: 8/8/2014, Author: msimmons

CHAMBERS GROUP

# SECTION 2.0 – METHODS

## 2.1 LITERATURE REVIEW

Chambers Group biologists conducted a literature review of the survey area prior to performing the reconnaissance survey. The most recent records of the CDFW California Natural Diversity Database (CNDDB; managed by CDFW 2014), the USFWS Critical Habitat Mapper (USFWS 2014), and the California Native Plant Society's (CNPS) Electronic Inventory (CNPSEI) of Rare and Endangered Vascular Plants of California (CNPS 2014) were reviewed for the following seven quadrangles: *Laguna Beach, Anaheim, Orange*, *Tustin, Newport Beach, Los Alamitos,* and *Seal Beach*, California, United States Geologic Survey (USGS) 7.5-minute quadrangles. These databases contain records of reported occurrences of federal or state listed endangered or threatened species, proposed endangered or threatened species, California Species of Concern (SSC), or otherwise sensitive species or habitats that may occur within or in the immediate vicinity of the Project site.

## 2.2 BIOLOGICAL RECONNAISSANCE-LEVEL FIELD SURVEY

Chambers Group biologists Heather Clayton and Heather Franklin conducted the general reconnaissance survey to map vegetation communities and identify the potential for occurrence of sensitive plant and wildlife species as well as habitats that could support sensitive wildlife species on site. The reconnaissance-level plant and wildlife survey was conducted on foot throughout the Project site between the hours of 7:30 a.m. and 12:00 p.m. on June 30, 2014.

All plants and animals observed or detected on site were recorded. Representative photographs throughout the Project site were taken to document existing site conditions (Appendix A).

### 2.2.1 Vegetation

All plant species observed within the Project site were recorded (Appendix B). Vegetation communities within the Project site were identified, qualitatively described, and mapped onto an aerial photograph. Plant communities were determined in accordance with the categories set forth in Holland (1986), Gray and Bramlet (1992), or Sawyer et al. (2009). Plant nomenclature follows that of Baldwin et al. (2012).

### 2.2.2 Wildlife

All wildlife and wildlife sign observed and detected, including tracks, scat, carcasses, burrows, excavations, and vocalizations, were recorded (Appendix C). Additional survey time was spent in those habitats most likely to be utilized by wildlife (undisturbed native habitat, wildlife trails, etc.), and in habitats with the potential to support state and/or federally listed or otherwise sensitive species. Notes were made on the general habitat types, species observed, and the conditions of the Project site.

### 2.2.3 Victoria Pond

Victoria Pond was surveyed on June 30, 2014, by Noel Davis and Mike Anghera. They tried snorkeling at the northeast edge of the pond. Visibility was less than 1 foot and it was determined that the visibility was too poor to attempt SCUBA diving in the pond.

A series of water column measurements were made at various locations on the edge of the pond. Measurements were made near the gate at the northeast portion of the pond and at three locations from the levy on the west side of the pond. Mike Anghera and/or Noel Davis waded out from the edge into calf deep water and took measurements just above the bottom. Dissolved Oxygen measurements were made with a Milwaukee Model MW 600 Dissolved Oxygen meter. Salinity measurements were made with a Yellow Springs Instruments Model 33 Salinity/Conductivity/Temperature meter. Temperature and pH were measured with a Milwaukee Model MW 102 pH/Temperature meter.

## SECTION 3.0 – RESULTS

Weather conditions during the survey included temperatures ranging from 69 to 74 degrees Fahrenheit with 80-100 percent cloud cover, winds ranging from 0 to 1 mile per hour (mph), and no precipitation.

### 3.1 VEGETATION COMMUNITIES AND OTHER AREAS

Nineteen distinct vegetation communities and areas were documented within the Project site: Menzies's Golden Bush-Coyote Brush-Quailbush Scrub, California Bulrush Marsh, Disturbed Black Willow/Mule Fat Association, Black Willow Thicket, Mule Fat Thicket, Giant Reed Break, Ornamental Landscaping/Ruderal, Quailbush Scrub, Perennial Pepper Weed-Ice Plant Patch, Fremont Cottonwood-Arroyo Willow-California Sycamore Association, Coyote Brush Scrub, Disturbed/Degraded Restoration Area, Summer Bush Lupine Stand, Turf Grass, Coast Live Oak-California Sycamore Woodland Alliance, Alkali Heath Marsh, Disturbed Quailbush Scrub, Alkali Sacaton Grassland, and Disturbed/Developed. A map showing the vegetation communities observed and other areas within the Project site was prepared (Figure 2), and the communities are described in the following subsections. The biologists observed 91 plant species within the Project site (Appendix B).

#### 3.1.1 Riparian Habitats

**California Bulrush Marsh**

California Bulrush Marsh is described as dominated or co-dominated by California bulrush (*Schoenoplectus californicus*) that is intermittent to continuous in the herbaceous layer (Sawyer et al., 2009). Typically California Bulrush Marsh is found in brackish to freshwater marshes, shores, bars, and channels of river mouth estuaries. Soils often have a high organic content and are poorly aerated (Sawyer et al., 2009). In addition to California bulrush, salt marsh fleabane (*Pluchea odorata* var. *odorata*) was found in this community on site, but in lesser amounts.

California Bulrush Marsh is present in several patches on the south and east sides of Victoria Pond towards the center of the Project site. The Project area includes approximately 0.79 acre of California Bulrush Marsh.

**Black Willow Thicket**

Black Willow Thicket is typically a dense, broadleaved, winter-deciduous riparian thicket dominated by black willow (*Salix gooddingii*) in the shrub or tree canopy (Sawyer et al., 2009). Most stands are too dense to allow much understory development (Holland, 1986). This community typically occupies floodplains; low gradient depositions along rivers and streams. This habitat is seasonally flooded and typically saturated with fresh water. The soils tend to be loose and are comprised of sandy or fine gravelly alluvium that is deposited near stream channels during flood flows (Sawyer et al., 2009).

Black Willow Thicket is present in the northern portion of the Project site around Victoria Pond. The Project area includes approximately 7.35 acres of Black Willow Thicket.

**Disturbed Black Willow/Mule Fat Association**

Disturbed Black Willow/Mule Fat Association is described as a community association where black willow and mule fat (*Baccharis salicifolia* subsp. *salicifolia*) are co-dominant species in the shrub and tree layers, and non-native species occupy approximately 25 percent cover. Non-native tree species such as Brazilian pepper tree (*Schinus terebinthefolius*) and myoporum (*Myoporum laetum*) and pampas grass (*Cortaderia selloana*) present within the community represent a lower habitat value for wildlife species than intact Black Willow/Mule Fat Association. Cover within this community is dense to intermittent, with a continuous, diverse and grassy non-native herbaceous understory layer. Occasional individuals of western sycamore (*Platanus racemosa*) were also found scattered throughout the site in these areas.

Disturbed Black Willow/Mule Fat Association is present in multiple patches within the southern third of the Project site. The Project area includes approximately 10.73 acres of Disturbed Black Willow/Mule Fat Association.

**Mule Fat Thicket**

Mule Fat Thicket consists of dense stands of mule fat with lesser amounts of willow species (*Salix* spp.) (Sawyer et al., 2009). This community, also known as Mule Fat Scrub by Holland (1986), usually occupies intermittent streambeds, seeps, and the toe of landslides where seeps develop (Gray and Bramlet 1992). In addition to the dominant mule fat, other species found in the Mule Fat Thicket habitat on site included Hooker's evening primrose (*Oenothera elata* subsp. *hookeri*), tarragon (*Artemisia dracunculus*), and occasional non-native tree tobacco (*Nicotiana glauca*).

Mule Fat Thicket is the most extensive vegetation community present, with multiple large patches in the southeastern third of the Project site. The Project area includes approximately 27.38 acres of Mule Fat Thicket.

**Fremont Cottonwood-Arroyo Willow-California Sycamore Association**

Fremont Cottonwood-Arroyo Willow-California Sycamore Association is described as a community association where Fremont cottonwood (*Populus fremontii*), arroyo willow (*Salix lasiolepis*), and California sycamore, also known as western sycamore, are co-dominant species in the tree layer. The canopy on site was continuous with an intermittent shrub layer. This community typically is found on floodplains, along low-gradient rivers, along perennial or seasonally intermittent streams, or in valleys with a dependable subsurface water supply (Sawyer et al., 2009). In addition to Fremont cottonwood, arroyo willow, and California sycamore, other native species found in this community on site included sandbar willow (*Salix exigua*), mugwort (*Artemisia douglasiana*) and blue elderberry (*Sambucus nigra* subsp. *caerulea*).

Fremont Cottonwood-Arroyo Willow-California Sycamore Association was found within several patches within the center and northern half of the Project site. The Project area includes approximately 1.87 acres of Fremont Cottonwood-Arroyo Willow-California Sycamore Association vegetation.

**Coast Live Oak-California Sycamore Woodland Alliance**

Coast live oak (*Quercus agrifolia*) is a co-dominant tree with the California sycamore in this woodland alliance. Trees are typically less than 100 feet in height with a continuous canopy and sparse shrub layer (Sawyer et al., 2009). The community can be found on alluvial terraces, canyon bottoms, stream banks, slope or flats and the soils can be deep, sandy or loamy with high organic matter (Sawyer et al., 2009).

This community on site is well maintained and includes patches of turf grass within the interior of the large trees. The trees serve as shade for the Preserve visitors. The community occurs in the northern portion of the Project site on the western edge and occupies a total of 8.44 acres on site.

**Alkali Heath Marsh**

Alkali Heath Marsh is dominated by alkali heath (*Frankenia salina*), with lesser amounts of other herbs and occasional shrubs. The cover is open to continuous and most often occupies coastal salt marshes, brackish marshes, alkali meadows, and alkali playas. Soils tend to be saline and sandy, but can vary to clayey alluvium as well (Sawyer et al., 2009). In addition to alkali heath, other species in this community on site included quailbush or big saltbush (*Atriplex lentiformis*) and common pickleweed (*Sarcocornia pacifica*).

Alkali Heath Marsh is present within the Project site as a small dense patch of alkali heath and pickleweed to the east of Victoria Pond and as a large recovering field along the southern boundary of the Project site with sparse patches of alkali heath and scattered qualibush shrubs. The Project area includes approximately 20.65 acres of Alkali Heath Marsh.

**Alkali Sacaton Grassland**

Alkali Sacaton Grassland is dominant in the herbaceous layer with scattered shrubs and non-native grasses also present. The herbaceous layer is less than 3 feet in height with an open canopy. Alkali Sacaton Grassland typically occupies alluvial flats, basins, stream terraces, swales, valley bottoms, and can occupy the lower portions of alluvial slopes. The soils can be nonsaline to moderately saline, but are usually alkaline (Sawyer et al., 2009). In addition to alkali sacaton, this community on site had scattered native cocklebur (*Xanthium strumarium*) and non-native five-hooked bassia (*Bassia hyssopifolia*) also present.

Alkali Sacaton Grassland is present within a small patch at the very southern end of the Project site, and comprised approximately 1.28 acres on site.

### 3.1.2 Scrub Habitats

**Menzies's Golden Bush-Coyote Brush-Quailbush Scrub**

Menzies's Golden Bush-Coyote Brush-Quailbush Scrub is a shrubland alliance in which Menzies's golden bush or coast goldenbush (*Isocoma menziesii*) is co-dominant in the shrub layer with coyote brush (*Baccharis pilularis*) and quailbush or big saltbush. Shrub cover within this community is open to intermittent, with a continuous, diverse, and grassy herbaceous understory layer. This community typically occupies sandy soils and tends to form as the result of recent or frequent disturbance such as fire, flooding, erosion, and human-caused clearing (Sawyer et al., 2009). In addition to Menzies's golden



11C

bush, coyote brush, and quailbush, other native shrubs found in this community included California bush sunflower (*Encelia californica*) and California sagebrush (*Artemisia californica*). Occasional individuals of jimson weed (*Datura wrightii*) were also found scattered throughout the site in these areas.

A small patch of this community was mapped just south of Victoria Street and larger disturbed areas were mapped in the northern area. The Project site includes approximately 17.84 acres of Menzies's Golden Bush-Coyote Brush-Quailbush Scrub total.

**Coyote Brush Scrub**

Coyote Brush Scrub is described as dominated or co-dominated by coyote brush with a variable canopy in the shrub layer (Sawyer et al., 2009). This community occupies many areas, including river mouths, stream sides, terraces, spits along the coastline, coastal bluffs, open slopes, and ridges (Sawyer et al., 2009). Soils are variable and can be from sandy to relatively heavy clay. In addition to coyote brush shrubs, occasional individuals of quailbush and infrequent planted California sycamore trees were also found scattered throughout the site in these areas.

Coyote Brush Scrub was found in a large portion of the center and the western edge of the Project site. The Project area includes approximately 21.96 acres of Coyote Brush Scrub.

**Summer Bush Lupine Stand**

Summer Bush Lupine Stands include areas where the vegetation is dominated by summer bush lupine (*Lupinus formosus*). These stands have been planted, presumably, for horticultural purposes.

Summer Bush Lupine Stands were found in patches on either side of the paved maintenance road in the northernmost portion of the Project site. The patch to the south of the road was recently burned. The Project area includes approximately 6.34 acres of Summer Bush Lupine Stand.

**Quailbush Scrub**

Quailbush Scrub is described as dominated by quailbush. Shrub cover within this community is open to intermittent, with a variable herbaceous understory layer. This community typically occupies alkaline or saline clay soils in alkali sinks, flats, washes, wetlands, or gentle to steep slopes (Sawyer et al., 2009). In addition to quailbush, other species found in this community on site include California buckwheat (*Eriogonum fasciculatum*), San Diego marsh-elder (*Iva hayesiana*), and brittlebush (*Encelia farinosa*).

Quailbush Scrub is present as a primarily long thin patch following the western edge of the Project site adjacent to the maintenance access road. The Project area includes approximately 5.63 acres of Quailbush Scrub.

**Disturbed Quailbush Scrub**

Areas characterized as Disturbed Quailbush Scrub have a minimum cover of 25 percent non-native weedy vegetation present within the community and represent a lower habitat value for wildlife species than intact Quailbush Scrub. Non-native species observed within this community include iceplant (*Carpobrotus* sp.), Mexican radish (*Raphanus sativus*), castor-bean (*Ricinus communis*), wild oat (*Avena* sp.), and bristly ox-tongue (*Helminthotheca echioides*).

Disturbed Quailbush Scrub is present in scattered patches throughout the southern half of the Project site. The Project area includes approximately 9.10 acres of Disturbed Quailbush Scrub.

### 3.1.3 Non-Native Communities and Other Areas

**Giant Reed Break**

Giant Reed Break is described by Sawyer et al. (2009) as being dominated solely by non-native and invasive giant reed (*Arundo donax*). Emergent shrubs and trees may be present and the cover is continuous where giant reed is less than 30 feet in height. Often, this community can be permanently saturated with fresh water (Sawyer et al., 2009).

Giant Reed Break is present within the Project site towards the center where the site bottlenecks. The Project area includes approximately 0.06 acre of this community.

**Perennial Pepper Weed-Ice Plant Patch**

Perennial Pepper Weed-Ice Plant Patch is described as a community of vegetation dominated solely by nonnative and invasive perennial pepper weed (*Lepidium latifolium*) and ice plant (*Carpobrotus* spp).

A Perennial Pepper Weed-Ice Plant Patch is present toward the center of the Project site. The Project area includes approximately 2.02 acres of Perennial Pepper Weed-Ice Plant Patch.

**Ornamental Landscaping/Ruderal**

Ornamental Landscaping/Ruderal includes areas where the vegetation is dominated by non-native horticultural plants (Gray and Bramlet 1992) or by nonnative, weedy species that are adapted to frequent disturbances. Typically, ornamental species composition consists of introduced trees, shrubs, flowers, and turf grass.

Ornamental Landscaping/Ruderal is present all along the eastern edge of the Project site on the slope below the homes. Plant species found on the Project site within this community include: nonnative Aleppo pine (*Pinus halepensis*), pampas grass, mimosa acacia (*Acaia baileyana*), sweet-alyssum (*Lobularia maritima*), and short-pod mustard (*Hirschfeldia incana*). The Project area includes approximately 24.73 acres of Ornamental Landscaping/Ruderal vegetation.

**Disturbed/Degraded Restoration Area**

Portions of the Talbert Preserve were planted with native vegetation as part of a restoration effort for the site; however, not all areas were successfully restored. Due to a lack of maintenance, many areas are now dominated by sparse nonnative ruderal vegetation and are not likely to support native wildlife species. Nonnative species within these degraded restoration areas include fennel (*Foeniculum vulgare*), shortpod mustard, and tocalote (*Centaurea melitensis*). Scattered native coyote brush shrubs were also present, but in low densities.

Disturbed/Degraded Restoration Areas were mainly found in the center of the Project site and comprised approximately 24.93 acres on site.

**Turf Grass**

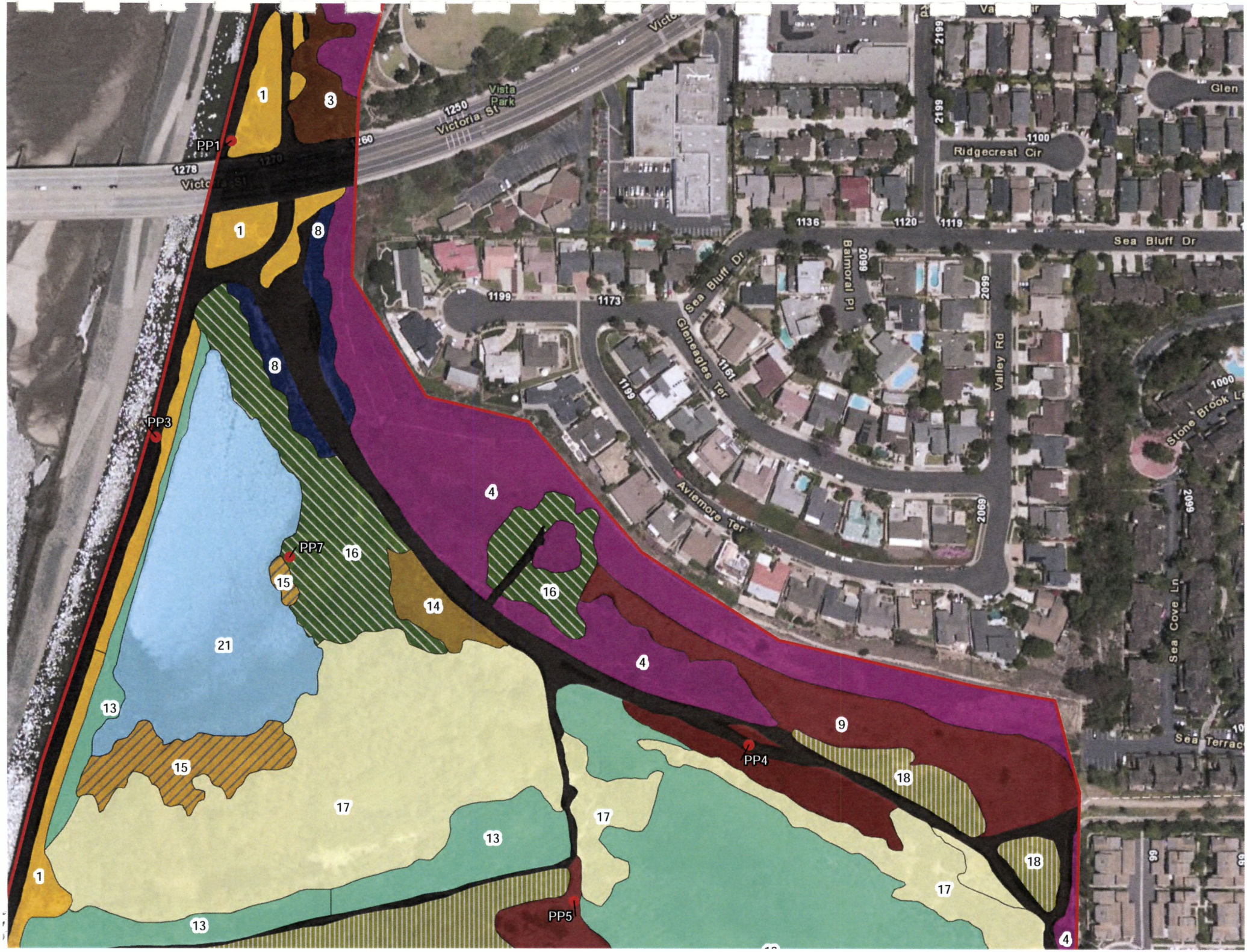
Turf Grass consists of nonnative grass planted and maintained at a short height and used for aesthetic and recreational purposes by the public. Turf Grass areas are present within the northern portion of the Project site, surrounded by coast live oak and California sycamore trees. Approximately 1.73 acres of Turf Grass are found on site.

**Disturbed/Developed**

Disturbed/Developed areas are those that have been altered by humans. Disturbed areas are either devoid of vegetation (cleared or graded) such as dirt roads or those areas that have a high percentage of non-native weedy species (i.e., greater than 25 percent of the species cover). Developed areas display man-made structures such as houses, paved roads, buildings, or parks.

Disturbed/Developed areas found throughout the Project site and primarily include the paved or graded access roads and trails. The Project area includes approximately 10.59 acres of areas classified as Disturbed/Developed.

18
16
13
4
99
Surfside Ct
99
Seabird Ct
18
13
14
13
16
16
PP8
18
Balboa Ave
19
13
13
16
13
16


PP1
PP3
PP4
PP5
PP7
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8
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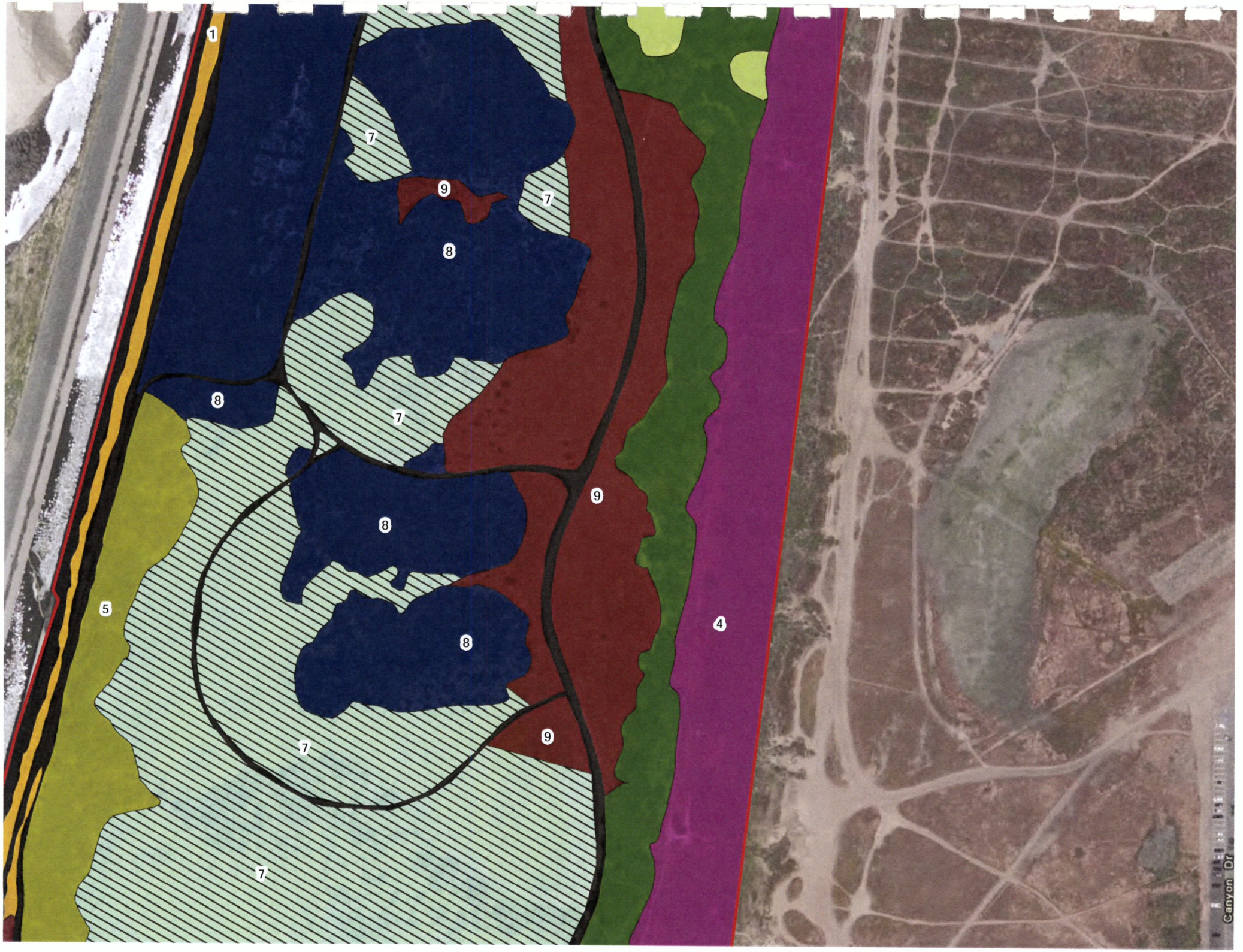
16
15
14
21
13
17
9
18
Victoria St
1250
Vista Park
1278
Ridgecrest Cir
1100
1136
1120
1119
Sea Bluff Dr
2099
Balmoral Pl
1199
1173
Gleneagles Ter
1161
Valley Rd
Aviemore Ter
2069
Stone Brook Ln
1000
Sea Cove Ln
Glen

1
5
7
3
6
5
5
4
Sea Breeze
1199
Mesa Bluff Dr
2273
Pacific Ave
1099
W Wilson St
2249
Pacific Ave
2177
1098
Townhouse Dr
1299
Las Arenas Way
1199
Sandi Ln
2163
Pacific Ave


1
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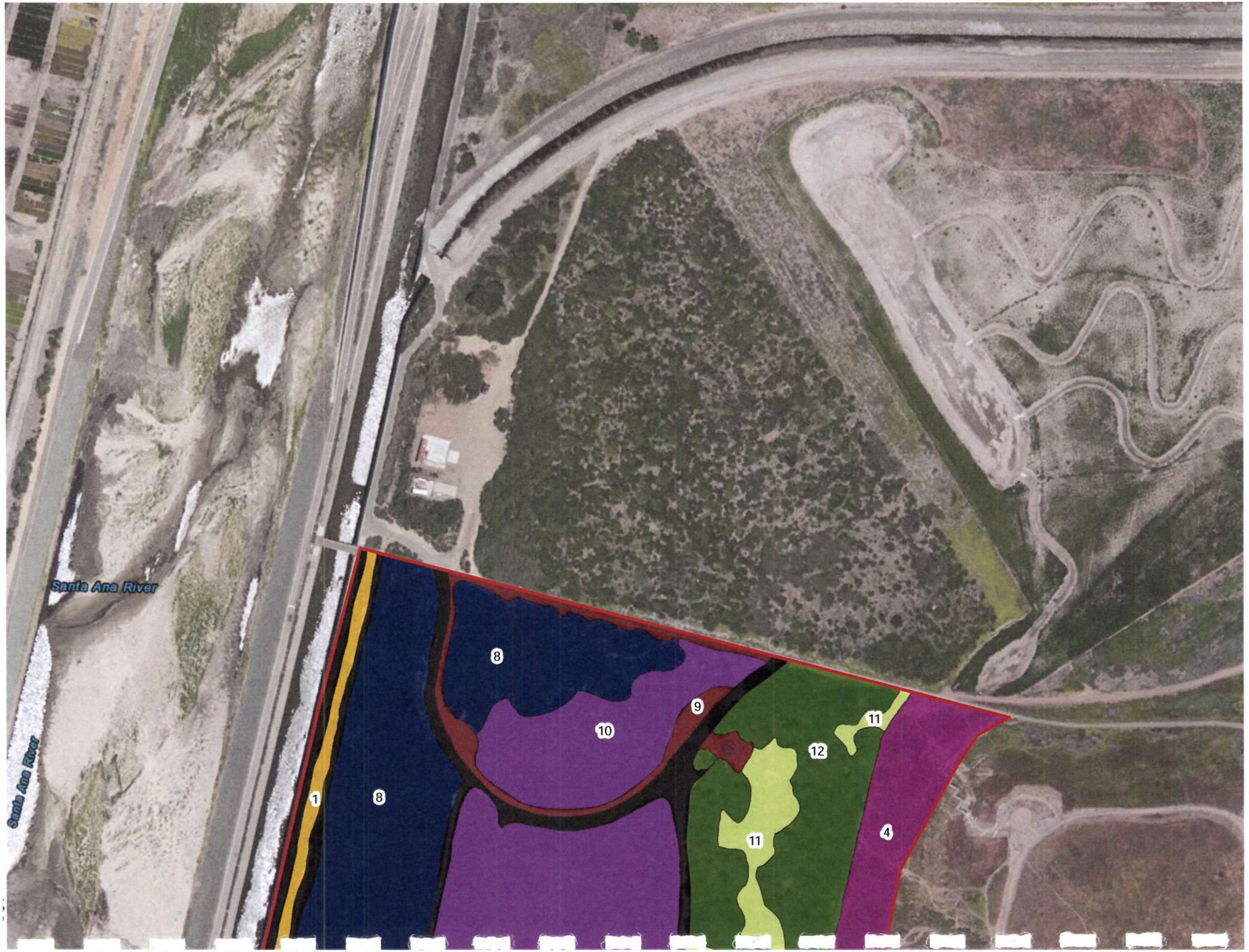
Canyon Dr


Santa Ana River
Santa Ana River
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12
11
4

## 3.2 SENSITIVE SPECIES

The following is a list of abbreviations used to help determine the significance of biologically sensitive resources potentially occurring within the Project site.

**California Rare Plant Rank (CRPR)**

CRPR 1A = Plants presumed extinct in California.
CRPR 1B = Plants rare and endangered in California and throughout their range.
CRPR 2 = Plants rare, threatened, or endangered in California but more common elsewhere in their range.
CRPR 3 = Plants about which we need more information; a review list.
CRPR 4 = Plants of limited distribution; a watch list.

**CRPR Extensions**

0.1 = Seriously endangered in California (greater than 80 percent of occurrences threatened/high degree and immediacy of threat).
0.2 = Fairly endangered in California (20 to 80 percent occurrences threatened).
0.3 = Not very endangered in California (less than 20 percent of occurrences threatened).

**Federal**

FE = Federally listed; Endangered
FT = Federally listed; Threatened
FC = Federal Candidate for listing

**State**

ST = State listed; Threatened
SE = State listed; Endangered
RARE = State-listed; Rare (Listed "Rare" animals have been re-designated as Threatened, but Rare plants have retained the Rare designation.)
SSC = State Species of Special Concern
WL = CDFW Watch List

Several criteria were used to evaluate the potential for sensitive species to occur within the Project site (Table 1).

**Table 1: Criteria for Evaluating Sensitive Species' Potential for Occurrence**

| PFO* | CRITERIA |
|---|---|
| **Absent:** | Species is restricted to habitats or environmental conditions that do not occur within the Project site. |
| **Low:** | Habitats or environmental conditions needed to support the species are of poor quality within the Project site; or marginal habitat exists within the site and a historical record exists of the species within the Project site or immediate vicinity (5 miles) of the Project site. |
| **Moderate:** | Either habitat requirements or environmental conditions associated with the species occur within the Project site; or low-quality habitat exists within the site and a historical record exists of the species within the Project site or immediate vicinity (5 miles) of the Project site. |
| **High:** | Both the habitat requirements and environmental conditions associated with the species occur within the site and a historical record exists of the species within the Project site or its immediate vicinity (5 miles). |
| **Present:** | Species was detected within the site at the time of the survey. |

* PFO: Potential for Occurrence

### 3.2.1 Sensitive Plants

Current database searches (CDFW 2014 and CNPS 2014) resulted in a list of 39 federally and/or state listed threatened and endangered or rare sensitive plant species documented to occur within the vicinity of the Project site. This list includes CRPR Species 1 through 3. After the literature review and the reconnaissance-level survey, it was determined that 21 species are considered absent from the Project site based on the assessment of the various habitat types observed in the area of the site. Factors used to determine the potential for occurrence included the quality of habitat, elevation, and the results of the reconnaissance survey. In addition, the location of prior CNDDB records of occurrence were used as additional data, but because the CNDDB is a positive-sighting database, historic records can only support site conditions and would not give reason for occurrence without suitable habitat present on site.

The following 21 plant species are considered **Absent** from the Project site due to lack of suitable habitat, out of geographic range, and/or the species is found outside the elevation range of the Project site:

- Ventura Marsh milk-vetch (*Astragalus pycnostachyus* var. *lanosissimus*) – **FE**, **SE**, CRPR 1B.1
- Parish's brittlescale (*Atriplex parishii*) – CRPR 1B.1
- intermediate mariposa-lily (*Calochortus weedii* var. *intermedius*) – CRPR 1B.2
- Orcutt's pincushon (*Chaenactis glabriuscula* var. *orcuttiana*) – CRPR 1B.1; presumed extirpated from Orange County
- salt marsh bird's-beak (*Chloropyron maritimum* subsp. *maritimum*) – **FE**, **SE**, CRPR 1B.2
- San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*) – **SE**, CRPR 1B.1; presumed extirpated from Orange County
- summer holly (*Comarostaphylis diversifolia* ssp. *diversifolia*) – CRPR 1B.2
- Laguna Beach dudleya (*Dudleya stolonifera*) – **FT**, **ST**, CRPR 1B.1
- Santa Ana River woollystar (*Eriastrum densifolium* ssp. *sanctorum*) – **FE**, **SE**, CRPR 1B.1
- San Diego button-celery *(Eryngium aristulatum* var. *parishii*) – **FE**, **SE**, CRPR 1B.1
- cliff spurge (*Euphorbia misera*) – CRPR 2B.2

- Los Angeles sunflower (*Helianthus nuttallii* subsp. *parishii*) – CRPR 1A; presumed extirpated from Orange County
- prostrate vernal pool navarretia (*Navarretia prostrata*) – CRPR 1B.1
- coast woolly-heads (*Nemacaulis denudata* var. *denudata*) – CRPR 1B.2
- California Orcutt grass (*Orcuttia californica*) – **FE**, **SE**, CRPR 1B.1
- Brand's star phacelia (*Phacelia stellaris*) – CRPR 1B.1; presumed extirpated from Orange County
- Nuttall's scrub oak (*Quercus dumosa*) – CRPR 1B.1
- Sanford's arrowhead (*Sagittaria sanfordii*) – CRPR 1B.2; presumed extirpated from Orange County
- chaparral ragwort (*Senecio aphanactis*) – CRPR 2B.2
- California seablite (*Suaeda californica*) – **FE**, CRPR 1B.1; presumed extirpated from Orange County
- big-leaved crownbeard (*Verbesina dissita*) – **FT**, **ST**, CRPR 1B.1

The analysis of the database searches and reconnaissance survey resulted in 11 species with **Low Potential** to occur within the Project site due to low quality habitat present. These species are:

- **aphanisma (*Aphanisma blitoides*) – CRPR 1B.2**

Aphanisma is a CRPR 1B.2 species. This annual herb flowers between April and May in sandy areas of coastal bluff scrub, coastal sage scrub, and costal strands at elevations up to 1,000 feet amsl. This species ranges from Los Angeles to lower California and the Channel Islands. Aphanisma is in steep decline on the mainland and islands. Threats to this species include: urbanization, recreational development, foot traffic, and feral herbivores on Santa Catalina, Santa Cruz, and Santa Rosa Islands.

Suitable habitat is present, but of low quality within the nearly barren sandstone cliffs on the southern portion of the Project site. In addition, historical records indicate populations of this species occur within 1 mile of the site on coastal bluffs, however, the sandstone cliffs do not receive the same type of coastal influence that bluff habitat might receive. Therefore, this species has a **low** potential to occur on site.

- **South coast saltscale (*Atriplex pacifica*) – CRPR 1B.2**

South coast saltscale is a CRPR 1B.2 species. This annual herb flowers between March and October on sea bluffs and playas of coastal bluff scrub, coastal sage scrub, and coastal dunes at elevations upwards to 460 feet amsl. This species range extends from Santa Barbara County and the Channel Islands to Baja and inland as far as Riverside County and northwest Mexico. Threats to south coast saltscale include urbanization, especially on the mainland.

Suitable habitat is present, but of low quality within the nearly barren sandstone cliffs on the southern portion of the Project site. In addition, historical records indicate populations of this species occur within 3 miles of the site on coastal bluffs, however, the sandstone cliffs do not receive the same type of coastal influence that bluff habitat might receive. Therefore, this species has a **low** potential to occur on site.

- **Davidson's saltscale (*Atriplex serenana* var. *davidsonii*) – CRPR 1B.2**

Davidson's saltscale is a CRPR 1B.2 species. This annual herb flowers between April and October in alkaline areas of coastal bluff scrub and coastal scrub at elevations from 30 and 660 feet amsl. This species known range extends from Santa Barbara County and the Channel Islands down the coast and inland as far as Riverside County to Baja California. Plant may be extirpated in Los Angeles County.

Low quality habitat is present on site for this species. Historical records indicate populations of this species occur within 3 miles of the site on coastal salt marsh, however, the habitat on site is sparse, disturbed, and not contiguous with other salt marsh habitat or coastal scrub. Therefore, this species has a **low** potential to occur on site.

- **many-stemmed dudleya (*Dudleya multicaulis*) – CRPR 1B.2**

Many-stemmed dudleya is a CRPR 1B.2 species. This perennial herb flowers between April and July in rocky outcrops and clay soils of chaparral, coastal scrub, and valley and foothill grasslands at elevations between 50 and 2,600 feet amsl. Known ranges include: Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties. Development, road construction, grazing, and recreation are some of the serious threats to this species.

Low quality habitat is present on site for this species. Historical records indicate populations of this species occur within 3 miles of the site in bluff habitat in the hills above Newport Bay and at the San Joaquin Freshwater Marsh Preserve, however, the coastal scrub habitat on site is sparse and portions are disturbed. Therefore, this species has a **low** potential to occur on site.

- **San Bernardino aster (*Symphyotrichum defoliatum*) – CRPR 1B.2**

San Bernardino aster is a CRPR 1B.2 species. This perennial rhizomatous herb flowers from July to November and typically occurs near ditches, streams, and springs. Habitats include cismontane woodland, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, and valley and foothill grassland in vernally mesic soils. This species grows at elevations from 2 to 2,040 meters amsl. The known range includes Imperial, Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego, and San Luis Obispo counties.

Low quality habitat is present on site for this species. Historical records indicate populations of this species occur within 3 miles of the site near Newport Bay in the freshwater marsh habitat. Because Victoria Pond on the Project site is an isolated water body, the marsh habitat surrounding the pond is of low quality and not contiguous with other marsh habitat. Therefore, this species has a **low** potential to occur on site.

- **Salt Spring checkerbloom (*Sidalcea neomexicana*) – CRPR 2B.2**

Salt spring checkerbloom is a CRPR 2.2 species. This perennial herb flowers between March and June and is found on alkaline areas, usually in wet places like springs and marshes. Habitat includes chaparral, coastal scrub, Mojave desert scrub, playas, and lower montane coniferous forest at elevations between 50 and 5,000 feet amsl. The known range of this species exists in Santa Barbara,

San Bernardino, and San Luis Obispo counties. This species is threatened by urbanization, grazing, and road maintenance.

Low quality habitat is present onsite for this species, however, the coastal scrub habitat onsite is sparse and portions are disturbed. Furthermore, known occurrences have not been documented within 5 miles of the site. Therefore, this species has a **low** potential to occur on site.

- **estuary seablite (*Suaeda esteroa*) – CRPR 1B.2**

Estuary seablite is a CRPR 1B.2 species. This perennial herb flowers between May and January and typically grows in coastal salt marshes and swamps. This species is found at elevations up to 15 feet amsl. The known range includes Los Angeles, Orange, Santa Barbara, San Diego, and Ventura Counties. Estuary seablite is potentially threatened by development and recreation.

Suitable habitat is present onsite for this species. In addition, historic records indicate that populations of this species have been found within 1 mile of the site in the Newport Slough, 1.8 miles west-southwest of Harbor Boulevard and Newport Boulevard. Additional populations have been found within 4 miles of the site at Balboa Beach and on the north shore of Upper Newport Back Bay Regional Park. Because Victoria Pond on the Project site is an isolated water body, the marsh habitat surrounding the pond is of low quality and not contiguous with other marsh habitat. Therefore, this species has a **low** potential to occur on site.

- **mesa horkelia (*Horkelia cuneata* var. *puberula*) – CRPR 1B.1**

Mesa horkelia is a CRPR 1B.2 species. This perennial herb flowers from February to September. It is typically found in sandy or gravelly soils, within maritime chaparral, cismontane woodland, and coastal scrub habitats at elevations between 70 and 810 meters amsl. The known range includes Los Angeles, Orange, Riverside, Santa Barbara, San Bernardino, San Diego, San Luis Obispo, and Ventura counties. Further study is required to confirm status of occurrences and for true species representation. Mesa horkelia is potentially threatened by habitat conversion.

Low quality habitat is present on site for this species, however, the coastal scrub habitat on site is sparse and portions are disturbed. Furthermore, known occurrences have not been documented within 5 miles of the site. Therefore, this species has a **low** potential to occur on site.

- **Coulter's saltbush (*Atriplex coulteri*) – CRPR 1B.2**

Coulter's saltbush is a CRPR 1B.2 species. This perennial herb or subshrub flowers between March and October in alkaline or clay soils, in open areas at elevations reaching 1,500 feet amsl. Habitats include coastal bluff scrub, coastal dunes, coastal scrub, valley and foothill grasslands. This species ranges from Santa Barbara County and the Channel Islands to Baja California and inland as far as San Bernardino County. This species is threatened by development and feral herbivores.

Suitable habitat is present, but of low quality within the nearly barren sandstone cliffs on the southern portion of the Project site. In addition, historical records indicate populations of this species occur within 4 miles of the site on coastal bluffs above Newport Bay and at the San Joaquin Marsh Preserve, however, the sandstone cliffs on site do not receive the same type of coastal

influence that bluff habitat might receive. Therefore, this species has a **low** potential to occur on site.

- **decumbent goldenbush (*Isocoma menziesii* var. *decumbens*) – CRPR 1B.2**

Decumbent goldenbush is a CRPR 1B.2 species. This shrub flowers between April and November in sandy, often disturbed areas, in granitic or sandstone derived soils on the landward side of dunes, hillsides, and arroyos at elevations between 30 and 440 feet amsl. Habitats include: chaparrals and coastal scrubs. Known ranges include: Orange and San Diego counties, San Clemente and Santa Catalina islands, and Baja California.

Low quality habitat is present on site in the sandstone cliffs on the southern portion of the Project site. Historical records of this species have been documented within 5 miles of the site in Corona Del Mar, near the Pacific Ocean drainage area. Due to the disturbance and encroachment of nonnative iceplant on these cliffs, there is only a **low** potential for the decumbent goldenbush to occur on site.

- **Allen's pentachaeta (*Pentachaeta aurea* subsp. *allenii*) – CRPR 1B.1**

Allen's pentachaeta is an annual herb that flowers between March and May in openings within coastal scrub or valley and foothill grasslands. This species occurs at elevations up to 1,640 feet amsl. Allen's pentachaeta is known from fewer than 20 occurrences in Orange County. It is threatened by development, habitat alteration, and vehicles, and possibly threatened by non-native plants as well.

Low quality habitat is present on site for this species, however, the coastal scrub habitat on site is sparse and portions are disturbed. Furthermore, known occurrences have not been documented within 5 miles of the site. Therefore, this species has a **low** potential to occur on site.

The analysis of the reconnaissance survey and literature search resulted in three species with **Moderate Potential** to occur within the Project site due to the presence of suitable habitat on the Project site:

- **Lewis' evening-primrose (*Camissoniopsis lewisii*) – CRPR 3**

Lewis' evening-primrose is a CRPR List 3 species. This annual herb blooms between March and June and can be found in sandy or clay soils within coastal bluff scrub, cismontane woodland, coastal dunes, coastal scrub, and valley and foothill grassland at elevations up to 984 feet amsl. Lewis' evening-primrose is known to occur in Los Angeles, Orange and San Diego counties. This species is potentially threatened by erosion and recreational activities.

Suitable habitat is of moderate quality within the Project site in areas of coastal scrub. Currently there are no historical records of this species documented within 5 miles of the Project site. The habitat suitability and historic records from the site give this species a **moderate** potential to occur on site.

- **Gambel's water cress (*Nasturtium gambelii*) – FE, ST, CRPR 1B.1**

Gambel's water cress is a federal-listed endangered, state-listed threatened and CRPR List 1B species. This perennial rhizomatous herb blooms between April and October and can be found in

fresh or brackish water in marshes and swamps at elevations up to 1,000 feet amsl. Gambel's water cress is known to occur in Los Angeles County, Orange, Santa Barbara, San Bernardino, San Diego, and San Luis Obispo counties. This species is considered nearly extinct in the United States and is known from only four occurrences. Habitat loss, erosion and alterations in hydrology from gum tree species are serious threats to Gambel's water cress. Historic records show this species was found within 2 miles of the Project.

Suitable habitat is of moderate quality within the Project site. In addition, historical records indicate a population of this species was found within 2 miles of the site, however, the exact location is unknown. The suitability and historic records from site give this species a **moderate** potential to occur on site.

- **south coast branching phacelia (*Phacelia ramosissima* var. *austrolitorlis*) – CRPR 3.2**

South coast branching phacelia is a CRPR List 3 species. This perennial herb blooms between March and August and can be found in sandy or rocky soils in chaparral, coastal dunes, coastal scrub, coastal salt marshes and swamps at elevations up to 984 feet amsl. South coast branching phacelia is known to occur in Los Angeles, Monterey, Orange, Santa Barbara, San Diego, San Luis Obispo, and Ventura counties. Threats to this species may include development and competition with non-native plants species.

Suitable salt marsh and coastal scrub habitat is of moderate quality within the Project site. Currently there are no historical records of this species documented within 5 miles of the Project site. The habitat suitability and historic records from the site give this species a **moderate** potential to occur on site.

The following three plant species are considered to have a **High Potential** to occur on Project site due to the presence of suitable soils on site and due to the presence of other occurrences of the species within 5 miles of the site:

- **chaparral sand-verbena (*Abronia villosa* var. *aurita*) – CRPR 1B.1**

Chaparral sand verbena is a CRPR List 1B.1 species. This annual herb blooms between January and September and can be found sandy soils in chaparral, coastal scrub and desert dunes at elevations between 246 and 5,249 feet amsl. Chaparral sand-verbena is known to occur in Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties. Threats to this species may include non-native plants, alteration of fire regimes, road maintenance, flood control activities, vehicles, and development. Historic records show this species was found adjacent to the Project along the Santa Ana River approximately 2 miles from the coast.

Coastal scrub habitat is of moderate quality within the Project site. In addition, historical records indicate a population of this species was found adjacent to the site along the Santa Ana River approximately 1.5 to 2 miles from Ocean. The suitability and historic records from site give this species a **high** potential to occur on site.

- **Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*) – CRPR 1B.1**

Coulter's goldfields is a CRPR 1B.1 species. This annual herb flowers between February and June and is found in saline areas and damp alkaline spots. Habitat includes coastal salt marshes and swamps, playas, and vernal pools at elevations up to 4,000 feet (amsl). The known range of this species exists in Colusa, Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Tulare, and Ventura counties; Santa Rosa Island; and Baja California. This species is threatened by urbanization and agricultural development.

Suitable habitat is of high quality within the Project site. In addition, historical records indicate a population of this species was found in Costa Mesa directly adjacent to the site, however, the exact location is unknown. Another population is within 5 miles of the site at the Bolsa Chica salt marsh and at the south end of Ed Martin's Airport in Santa Ana. The suitability and historic records from site give this species a **high** potential to occur on site.

- **mud nama (*Nama stenocarpa*) – CRPR 2B.2**

Mud nama is a CRPR List 2 species. This annual often perennial herb bloom between January and July and can be found along lake margins and riverbanks in marshes and swamps at elevations up 1,640 feet amsl. Mud nama is known to occur Imperial, Kings, Los Angeles, Orange, Riverside, San Clemente Island, and San Diego counties. Historic records show that this species was found within Fairview Park, directly adjacent to the Project.

Suitable habitat is of high quality within the Project site. In addition, historical records indicate a population of this species was found within Fairview Park, directly adjacent to the Project site. The suitability and historic records from site give this species a **high** potential to occur on site.

The following species was **Present** on the Project site during the survey:

- **southern tarplant (*Centromadia parryi* ssp. *australis*) – CRPR 1B.1**

Southern tarplant is a CRPR 1B.1 species. This annual herb flowers between May and November in seasonally moist saline soils of marshes and swamps, vernal pools, and valley and foothill grasslands at elevations upwards to 1400 feet amsl. Known ranges include: Los Angeles, Orange, Santa Barbara, San Diego, Ventura counties, Santa Catalina Island, and Baja California. This species has been known to grow intertwined with slender tarweed (*Hemizonia fasiculata*). Threats to southern tarplant include: urbanization, vehicles, development, and foot traffic.

This species was observed on site at the southern end of the site. Other populations in the area at Fairview Park, north of the site and in the Banning Ranch area just south of the site indicate the Talbert Preserve is likely to support a self-sustaining population of southern tarplant. Focused surveys will need to be conducted to determine the extent and number of individuals present on site.

### 3.2.2 Sensitive Wildlife

A current database search (CDFW 2014) resulted in a list of 27 federally and/or state listed endangered or threatened, SSC, or otherwise sensitive wildlife species that may potentially occur within the Project

site. A literature review and the assessment of the various habitat types within the Project site determined that 16 sensitive wildlife species were considered absent from the site, eight species have low potential to occur, one species has moderate potential to occur, two species have a high potential to occur, and three species were present on site. Factors used to determine potential for occurrence included the quality of habitat, and results of the reconnaissance-level survey. In addition, the location of prior database records of occurrence were used as additional data, but since the CNDDB is a positive-sighting database, this data was used only in support of the analysis from the previously identified factors.

The following 16 wildlife species are considered **Absent** from the Project site due to lack of suitable habitat present. In addition, no record shows the existence of these species within 5 miles of the Project site:

- Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) – **SE**
- big free-tailed bat (*Nyctinomops macrotis*)—SSC
- California black rail (*Laterallus jamaicensis coturniculus*)—**SE**
- coast horned lizard (*Phrynosoma blainvillii*) – SSC
- coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis*)—SSC
- green turtle (*Chelonia mydas*)—**FT**
- light-footed clapper rail (*Rallus longirostris levipes*) — **FE**, **SE**
- Mexican long-tongued bat (*Choeronycteris mexicana*)—SSC
- Pacific pocket mouse (*Perognathus longimembris pacificus*) – **FE**, SSC
- red-diamond rattlesnake (*Crotalus ruber*)—SSC
- Santa Ana sucker (*Catostomus santaanae*)—**FT**, SSC
- tidewater goby (*Eucyclogobius newberryi*)—**FE**, SSC
- tricolored blackbird (*Agelaius tricolor*) — SSC
- western spadefoot (*Spea hammondii*)—SSC
- western yellow bat (*Lasiurus xanthinus*)—SSC
- western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)—**SE**

The analysis of the reconnaissance survey and database searches resulted in 8 species with **Low Potential** to occur within the Project site due to low quality or unsuitable habitat present. In addition, known occurrences are recorded within 5 miles of the Project site:

- **bank swallow (*Riparia riparia*) – ST**

  The bank swallow (nesting) is a state-threatened species. This passerine nests in colonies across much of North America; however, unlike many other swallows that nest on or inside man-made structures, the bank swallow mostly nests inside tunnels that it builds in steep sand or gravel banks or cliffs of river banks or quarries near water. Bank swallows will nest in colonies, including five to over 3,000 individuals with an average of 350 burrows per colony. This species inhabits open and partly open areas, and is frequently found near flowing water. Flood and erosion control Projects in California have eliminated much of the historic habitat of this species (Garrison et al. 1987, Garrison 1999).

  Bank swallow occurrences have been recorded within 3 miles of the Project site in Newport and Huntington Beach. Steep banks consisting of sandy substrate border the west side of Victoria Pond;

however, the banks are heavily vegetated, therefore providing low quality habitat for this species. Therefore, the bank swallow has a low potential to occur within the Project site.

- **grasshopper sparrow (*Ammodramus savannarum*)-- SSC**

The grasshopper sparrow (nesting) is a California Species of Special Concern. This species breeds from Oregon south along the California coast and the east side of the Sierras in the lowlands into Baja California. This species also ranges from southern Canada south through the central United States and east to the east coast and winters in the central and southern United States (National Geogrphic, 2008). The grasshopper sparrow inhabits prairie grasslands, pastures, old weedy fields, palmetto scrub, grain fields, and hayfields. This species generally does not use habitats with dense shrub cover or sites that have been over-grazed. Populations of this species are declining due to habitat loss, fragmentation, and degradation.

This species has been recorded within 5 miles of the Project site. Some large open weedy fields occur near the northern portion of the Project site; however, these fields are surrounded by densely vegetated habitat, therefore providing low quality habitat. Therefore, there is a **low** potential for the species to occur on site.

- **Orange-throated whiptail (*Aspidoscelis hyperythra*)-- SSC**

This orange-throated whiptail lizard can be found from San Bernardino County, California throughout Baja California, Mexico. Suitable habitat includes low-elevation coastal scrub, chamise-redshank chaparral, mixed chaparral, and valley-foothill hardwood habitats (Morey 2000). Hibernation sites occur on well-insulated, south-facing open slopes that are often adjacent to terraces with woody perennials. The Belding's orange-throated whiptail (*Aspidoscelis hyperythra beldingi*) can be found in semi-arid shrub habitat with loose soil and rocks, including washes, stremsides, rocky hillsides, and coastal chaparral ranging from the Santa Ana River in Orange county, Colton in San Bernardino County, west if the Peninsular Ranges, and throughout the Baja Peninsula (California Herps 2012).

Low-quality habitat occurs near the western side of Victoria Pond and throughout the northern portion of the Project site. These areas consist of hillsides with shrub habitat and open weedy fields which could provide habitat for the orange-throated whiptail. This species has also been historically recorded within 5 miles of the Project site near Corona Del Mar; however, the individual was not observed in similar habitat and the population is now considered extirpated. Therefore, the orange-throated whiptail has a **low** potential to occur within the Project site.

- **south coast marsh vole (*Microtus californicus stephensi*) – SSC**

The South Coast Marsh Vole (also known as the Stephens' California Vole) is a California Species of Special Concern. No species specific information is available although this species is located within Los Angeles, Orange, and Ventura counties (Hall 1981). The South Coast Marsh Vole is a subspecies of the California Vole. The California Vole feeds on leafy parts of grasses, sedges, and herbs. It creates underground burrows in soft soil. Its' habitat includes meadows and grasslands with friable soil. California Voles can reproduce at any time during the year, but peaks during when food and cover are abundant (Brylski 1990). Although the California Voles are widespread and abundant, specific subspecies, such as the South Coast Marsh Vole, are considered state Species of Special

Concern due to localized threats to habitat due to urbanization and/or agricultural conversion of the habitat.

Low-quality habitat occurs near the northern portion of the Project site in the open fields. These areas consist of open weedy fields which could provide habitat for this species. This species has also been historically recorded within 5 miles of the Project site near Upper Newport Bay and Bolsa Chica; however, the majority of the Project site lacks open meadows and grasslands, providing low quality habitat for the vole. Therefore, the south coast marsh vole has a **low** potential to occur within the Project site.

- **western mastiff bat (*Eumops perotis californicus*) – SSC**

The western mastiff bat is a state Species of Special Concern. It is a permanent resident throughout its range in southern California, southern Arizona, Texas, and south to South America. With a wingspan approaching 2 ft, the western mastiff bat is the largest bat species in North America. It is also unique in that its call can be readily identified with the unaided ear. It roosts in small colonies or singly in primarily natural substrates such as large trees, cliff faces, large boulders, and exfoliating rock surfaces. It is less commonly found in artificial structures such as buildings and roof tiles. It is found in a wide variety of habitats, including desert scrub, chaparral, woodlands, floodplains, and grasslands. Birthing dates vary extensively but are generally from April through September in California (Ahlborn 1999). Reasons for observed population declines are unknown (TPWD 2008).

Suitable roosting habitat occurs for the western mastiff bat within the native and non-native trees with crevices within the Project site. There are historic occurrences of this species within 5 miles of the Project site but no recent occurrences. Therefore, there is a **low** potential for the western mastiff bat to roost within the Project site.

- **western Pond Turtle (*Emys marmorata*) – SSC**

The western pond turtle is a California Species of Special Concern. This species occurs along the west coast of North America from Baja California up to San Francisco Bay, and occurs from sea level to 5,900 feet in elevation (Calherps 2011). It inhabits permanent or nearly permanent bodies of water in many habitat types including ponds, marshes, rivers, and streams that typically have a rocky or muddy bottom and extensive aquatic vegetation along water body margins (Calherps 2011). The western pond turtle requires basking sites such as partially submerged logs, vegetation mats, or open mud banks for thermoregulation. This species occurs in a variety of habitat types including woodland, grassland, and open forest (Calherps 2011). Although this species is considered aquatic, it usually leaves the aquatic site to reproduce, estivate, and overwinter. Pond turtles hibernate under water in mud and will estivate during dry summers in soft mud, leaf litter, or wood rat nests (Calherps 2011). Pond turtles are diurnal and are most active from February to November; however, if water temperatures remain warm, this species may be active year-long (Bury 2008). Pond turtles feed on aquatic plants, invertebrates, worms, frog and salamander eggs and larvae, crayfish, carrion, and occasionally frogs and fish (Calherps 2011). Habitat destruction is the primary threat to this species.

Victoria Pond could provide potential habitat for the western pond turtle. The pond turtle has been recorded within 5 miles of the Project site near San Joaquin Reserve; however, the pond lacks clear

connectivity to the Santa Ana River system, which would be required for dispersal of this species. Therefore, the western pond turtle has a **low** potential to occur within the Project site.

- **American Badger (*Taxidea taxus*) – SSC**

The American badger is a California Species of Special Concern. This carnivorous species ranges over most of the western U.S. and upper midwestern U.S. south into central Mexico. In California, the badger may occupy a variety of habitats, especially grasslands, savannas, sandy soils and deserts. It prefers friable soils for burrowing, and relatively open, uncultivated ground. Prey items include pocket gophers and ground squirrels (Jameson and Peeters 1988). The American badger may weigh up to 11.4 kg or 25 pounds, and is easily recognized by its overall silver gray coloration, white stripe on top of its head, white cheeks, and black feet with noticeably long front claws. It is a heavy-bodied animal that is stout and flattened. The American badger is chiefly nocturnal, but it is often seen by day as well. It gives birth to one to four young from March to April (Jameson and Peeters 1988). Threats to this species include habitat loss due to agriculture, housing, and other land conversions, and illegal hunting.

This species has been historically recorded within 3 miles of the Project site near Newport, and small areas along the northern portion of the Project site contains suitable habitat for the American badger; however, based on the absence of the badger's large and distinctive dens and the relatively small foraging areas within the Project site, the American badger has a **low** potential to occur within the Project site.

- **western snowy plover (*Charadrius alexandrinus nivosus*) – FE, SSC**

The western snowy plover (nesting) is federally listed as threatened and is also a California Species of Special Concern. The Pacific coastal population breeds primarily on beaches from southern Washington to southern Baja California, Mexico. Interior populations can be found in the Central Valley of California, Oregon, Nevada, and other western states. This small plover has a pale tan back, rump, and tail; white underparts; and dark patches on the sides of its neck that reach around onto the top of its chest. The western snowy plover nests on barren to sparsely vegetated sand beaches, dry salt flats in lagoons, dredge spoils deposited on beach or dune habitats, levees and flats at salt-evaporation ponds, and in river bars. In California, most breeding occurs on dune-backed beaches, barrier beaches, and salt-evaporation ponds and infrequently on bluff-backed beaches (USFWS 2001). Habitat alteration and recreational beach use have led to a serious decline in nesting habitat and populations over the last 40 years (USFWS 2001; Page et al. 1995).

This species has been historically recorded within 3 miles of the Project site near Newland Marsh; however, the Project site lacks large areas of beach or other flat areas, which are necessary for quality nesting habitat. Therefore, the western snowy plover has a low potential to occur within the Project site.

The analysis of the CNDDB search and reconnaissance survey resulted in one species with **Moderate Potential** to occur within the Project site due to the presence of suitable habitat and known occurrences within 3 miles of the Project site in habitat similar to conditions at the Project site:

- **Coastal California gnatcatcher (*Polioptila californica californica*) - FT, SSC**

The coastal California gnatcatcher is a federally threatened species and a California Species of Special Concern. The range of this species extends southern California west of the Peninsular and Transverse ranges south into northwestern Baja California, Mexico. The gnatcatcher has a short and slender bill; tail is mostly black with white edges, grayish overall, back and wings grey with brown tinge and a white eye ring. Breeding males have a black cap. It is a permanent resident of Diegan, Riversidian, and Venturan sage scrub sub-associations found from sea level to 2,500 feet in elevation. The species lives and breeds within California sagebrush (*Artemisia californica*) dominant habitats and also occurs in mixed scrub habitats with lesser percentages of this favored shrub (Atwood and Bontrager 2001). Coastal California gnatcatchers primarily feed upon insects including, spiders, leaf hoppers and beetles. The largest threat to the species is a loss of habitat; other threats include wildfires and nest paratism.

Several areas throughout the Project site provide potential habitat for the California gnatcatcher. The areas of coyote brush and golden bush scrub throughout the site could provide suitable areas for foraging. In addition, has also been historically documented within 3 miles of the Project site near Upper Newport Bay and on Banning Ranch. Therefore, the California gnatcatcher has a **moderate** potential to occur within the Project site.

The analysis of the CNDDB search and reconnaissance survey resulted in two species with **High Potential** to occur within the Project site due to known occurrences within one mile of the Project site and the presence of suitable habitat:

- **Burrowing owl (*Athene cunicularia*) – SSC**

The burrowing owl is a California Species of Special Concern. It is broadly distributed across the western United States, with populations in Florida and Central and South America. The burrowing owl breeds in open plains from western Canada and the western United States, Mexico through Central America, and into South America to Argentina (Klute 2003). This species inhabits dry, open, native or nonnative grasslands, deserts, and other arid environments with low-growing and low-density vegetation (Ehrlich 1988). It may occupy golf courses, cemeteries, road rights-of way, airstrips, abandoned buildings, irrigation ditches, and vacant lots with holes or cracks suitable for use as burrows (TLMA 2006). Burrowing owls typically use burrows made by mammals such as California ground squirrels (*Spermophilus beecheyi*), foxes, or badgers (Trulio 1997). When burrows are scarce, the burrowing owl may use man-made structures such as openings beneath cement or asphalt pavement, pipes, culverts, and nest boxes (TLMA 2006). Burrowing owls often are found within, under, or in close proximity to man-made structures. Prey sources for this species include small rodents; arthropods such as spiders, crickets, centipedes, and grasshoppers; smaller birds; amphibians; reptiles; and carrion.

Several areas throughout the Project site provide potential habitats for the burrowing owl. The open fields along the northern portion of the site and the berms and rip rap along the channel provide suitable areas for nesting, perching, and foraging. In addition, several California ground squirrels and a high number of burrows were observed along the mentioned areas. This species has also been recorded within 1 mile of the Project site near Fairview Park and on Banning Ranch. Therefore, the burrowing owl has a **high** potential to occur within the Project site.

- **San Diego fairy shrimp (*Branchinecta sandiegonensis*)—FE**

The San Diego fairy shrimp is a federally endangered species that occurs from southwestern coastal California to northwestern Baja California in Mexico. This species can be eight to 16 millimeters in length (USFWS 2002). This species is restricted to vernal pools of five to 30 centimeters in depth below 2,300 feet in elevation and 40 miles of the Pacific Ocean (USFWS 2002). Water temperatures of vernal pools range from 50 to 68 degrees Fahrenheit (USFWS 2002). Their diet consists of algae, bacteria, protozoa, rotifers, and organic materials and they are predated by water fowl and reptiles. Threats to the species include habitat destruction and fragmentation from urbanization and agriculture, and changes to vernal pool hydrology due to off-highway vehicle activity and livestock grazing (USFWS 2002).

Several areas along the access road could provide potential pools for the San Diego fairy shrimp. Several depressions were observed within and along the sides of the access road, which could create vernal pools, providing quality habitat for this species. In addition, this species has been historically documented within 1 mile of the Project site near Fairview Park and on Banning Ranch. Therefore, the San Diego fairy shrimp has a **high** potential to occur within the Project site.

The following three species were **Present** on the Project site during the survey:

- **California least tern (*Sternula antillarum browni*) – FE, SE**

The California least tern (nesting colony) is a federally and state endangered species and a Department of Fish and Wildlife Fully Protected species. The least tern lives and breeds in the San Francisco Bay, Sacramento River Delta and from San Louis Obispo County south into San Diego County. This small tern has long tapered wings and a forked tail, white forehead with a black cap and black tipped wings and has yellow legs and bill. The species lives and breeds in shallow marine and estuarine shores. Nesting usually occurs in colonies on bare ground (sand or gravel) with sparse vegetation near the water in relatively undisturbed areas (Rigney and Granholm 2005). Least terns feed upon small fish including, herrings, anchovies, silversides and shiner surfperch. Nesting habitat has been lost to urban development and predation. Non-native foxes, coyote, raccoon, American kestrels, burrowing owls, feral cats and American crows all predate on nesting terns colonies.

One adult California least tern was observed foraging in Victoria pond throughout the duration of the survey. The Project site lacks large estuarine shores required for nesting for this species. Therefore, the Project site provides suitable foraging habitat only.

- **least Bell's vireo (*Vireo bellii pusillus*) – FE, SE**

The least Bell's vireo (nesting) is a federal- and state-listed endangered subspecies of the Bell's vireo. This small passerine subspecies has a breeding range that is restricted to lower elevations of coastal California and northwestern Baja California, Mexico with a few inland populations (Franzreb 1989). Its winter range extends into southern Baja California, Mexico (R. Hutto, pers. comm., cited in Franzreb 1989). This bird is approximately 4.3 to 4.7 inches in length with an overall drab appearance consisting of brownish grey upperparts and a whitish underside, and a faint white eye-ring. Its unique song most easily identifies it. The least Bell's vireo typically nests in willows (*Salix* spp.) and other riparian trees or shrubs, and typically nests three to six feet above the ground. This species requires densely vegetated riparian habitat along streams and rivers during the spring and

summer months to breed, and foraging in habitat adjacent to its nesting territory, which is typically riparian or chaparral (Gray and Greaves 1984; Franzreb 1989; USFWS 1994). Least Bell's vireos forage by gleaning insects from the leaves of trees and shrubs. The two major threats and subsequent factors in the decline of least Bell's vireo populations are the loss of riparian habitat from urban and agricultural development, overgrazing, flood control projects and logging operations, and nest parasitism by the brown headed-cowbird (Brown 1993, Franzreb 1989). Despite historic least Bell's vireo population losses followed by federal protection in 1986, recent trends indicate that populations are increasing with populations returning to parts of their former range and colonizing some new areas (USFWS 1998).

One adult least Bell's vireo was observed singing near the utility pole line located along the southern portion of the Project site. High quality nesting habitat occurs throughout the site within the mule fat thickets. Therefore, this species has **high** potential for nesting and foraging throughout the Project site.

- **yellow-breasted chat (*Icteria virens*) – SSC**

The yellow-breasted chat (nesting) is a California Species of Special Concern. The breeding range of this species includes most of the U.S., south-central Canada, and northern Mexico. It winters from the southern U.S. to Panama. In Southern California, the population is very locally distributed throughout the Coast and Peninsular ranges. The yellow-breasted chat is the largest wood warbler. The Upperparts from forehead to upper tail-coverts olive green, becoming slightly grayer on lower rump, by white supercilium, lower eye-lid also bordered by white crescent, underparts are a bright yellow (Eckerle and Thompson 2001). Habitats include swamplands, riparian willow thickets and other dense brush, often near watercourses. The yellow-breasted chat feeds on insects, larvae, spiders, berries, and fruits (Green 2005). It mimics songs (often at night), sports an impressive array of sounds, and is often conspicuous within its territory early in the breeding season. It has a characteristic display flight whereupon it takes off from a perch, jumbles through the air, and sings all the while. Predators include snakes, accipiters, and small mammals. Population declines are due to the loss and degradation of riparian habitats rangewide. The decline is also due to parasitism of brown-headed cowbirds (*Molothrus ater*).

Several yellow-breasted chats were observed singing throughout the southern portion of the Project site. In addition, the Project site contains high quality nesting and foraging habitat within the willow and mule fat thickets. Therefore, this species has **high** potential for nesting and foraging throughout the Project site.

### 3.2.3 Critical Habitat

The Project site is not within critical habitat for any federally-listed species (USFWS 2014).

## 3.3 GENERAL PLANTS

Biologists observed 91 plant species during the reconnaissance-level survey (Appendix B). Plant species observed during the survey were characteristic of the existing site conditions. One sensitive plant species, southern tarplant, were observed during the survey; however, the survey was not conducted at a time of year when all sensitive species would be blooming and conspicuous and additional sensitive species may be present within the Project area.

## 3.4 GENERAL WILDLIFE

Biologists observed 36 wildlife species during the survey (Appendix C). Wildlife species observed or detected during the survey were characteristic of the existing site conditions. Sensitive wildlife species were observed during the survey effort.

## 3.5 VICTORIA POND

Table 2 shows the results of the water column parameter measurements in Victoria Pond.

**Table 2: Victoria Pond Water Column Measurements**

| Location | Time | Temperature($^0$C) | Salinity (ppt) | Dissolved Oxygen (ppm) | pH |
|---|---|---|---|---|---|
| Northeast | 0930 | 24 | 2 | 1.2 | 8.68 |
| Southwest End | 1025 | 25.7 | 2 | 1.5 | 8.68 |
| West Side Middle | 1035 | 25.6 | 2 | 3.3 | 8.72 |
| Northwest Corner | 1049 | 25.5 | 8 | 4.7 | 8.76 |

Water temperature ranged from 24 degrees Centigrade on the northeast side of the pond at 0930 to 25.7 degrees Centigrade at the southwest end of the pond at 1025. The relatively high temperature in the pond probably reflects that it is a small body of water being warmed by the hot summer weather.

Salinity was 2 parts per thousand (ppt) at all of the stations except the northwest tip of the pond where it was 8 ppt. The low salinity suggests that whatever tidal water is entering the pond via the spillway is being diluted by freshwater sources. It is unknown why the salinity is brackish at the northwest corner.

Dissolved oxygen ranged from 1.2 parts per million (ppm) on the northeast side of the pond to 4.7 ppm at the northwest corner. It is typical for dissolved oxygen levels to drop in still bodies of water during the night. Vegetation depletes oxygen and does not produce more by photosynthesis when there is no sunlight. As the sun rises throughout the day, plants photosynthesize and produce oxygen and the dissolved oxygen level rises.

The pH varied from 8.68 at the northeast corner of the pond to 8.76 at the northwest corner. These slightly basic pH levels are typical of freshwater systems in southern California.

# SECTION 4.0 – CONCLUSIONS AND RECOMMENDATIONS

## 4.1 SENSITIVE PLANTS

Of the 59 sensitive plant species identified in the literature review, it was determined that 21 species are considered absent from the Project site, 11 have a low potential to occur, 3 have a moderate potential to occur, 3 have a high potential to occur, and 1 species was observed on the Project site. Focused surveys are recommended to determine if any of the other sensitive plant species with a potential to occur are also present on site and therefore could be protected during restoration activities.

## 4.2 SENSITIVE WILDLIFE

Of the 27 sensitive wildlife species identified in the literature review, it was determined that 16 sensitive wildlife species are considered absent from the survey site, 8 have a low potential to occur, 1 has a moderate potential to occur, 2 have a high potential to occur, and 3 were observed on the Project site. The American badger, SSC; bank swallow, ST; grasshopper sparrow, SSC; orange-throated whiptail, SSC; south coast marsh vole , SSC; western mastiff bat, SSC; western snowy, FE, SSC; and western pond turtle, SSC, have low potential to occur within the Project site. The California gnatcatcher, FT, SSC has a moderate potential to occur within the Project site. The burrowing owl, SSC; and San Diego fairy shrimp, FE, have a high potential to occur within the Project site. The California least tern, FE, SE; least Bell's vireo, FE, SE; and yellow-breasted chat, SSC, were observed on site during the survey. To minimize potential impacts to these species, focused surveys and biological monitoring should be conducted. If the above species are identified, measures to avoid or minimize impacts to the species should be submitted to resource agencies for approval prior to construction.

## 4.3 MIGRATORY BIRD TREATY ACT, AS AMENDED (16 USC 703-711)

In order to comply with the Migratory Bird Treaty Act (MBTA), any vegetation clearing should take place outside the general bird breeding season (February 14 to September 1), to the maximum extent practical. If this is not possible, prior to ground-disturbing activities, a qualified biologist should conduct and submit a migratory nesting bird and raptor survey report. The survey should occur no more than three days prior to initiation of Project activities, and any occupied rookeries, passerine, and/or raptor nests occurring within or adjacent to the study area should be delineated. Additional follow-up surveys may be required by the resource agencies. To the maximum extent practicable, a minimum buffer zone around occupied nests should be maintained during physical ground-disturbing activities. The buffer zone should be sufficient in size to prevent impacts to the nest. Once nesting has ceased, the buffer may be removed.

## 4.4 VICTORIA POND

It is recommended that additional measurement of water column parameters be taken in the middle of the pond. If these measurements indicate oxygen levels below 6 ppm throughout the day no measures to increase fish densities in the pond should be taken because of potential further depletion of oxygen and fish kills.

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# APPENDIX A – SITE PHOTOGRAPHS

## APPENDIX A - SITE PHOTOGRAPHS

**Photo 1.** Photo depicts Quailbush Scrub off of Victoria Street on the east side of the Santa Ana River channel. Photo facing north. Corresponds to Photo Point 1.

**Photo 2.** Photo depicts an additional area of Quailbush Scrub, north of Victoria Street on the east side of the Santa Ana River channel. Photo facing north. Corresponds to Photo Point 2.



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**Photo 3.** Photo shows some rock formations on the Project site. Photo facing east.

**Photo 4.** Photo shows an area of Disturbed vegetation community under some power lines on the Project site. Photo facing west.

**Photo 5.** Photo shows Victoria Pond located toward the center of the Project site. Corresponds to Photo Point 3, facing east.

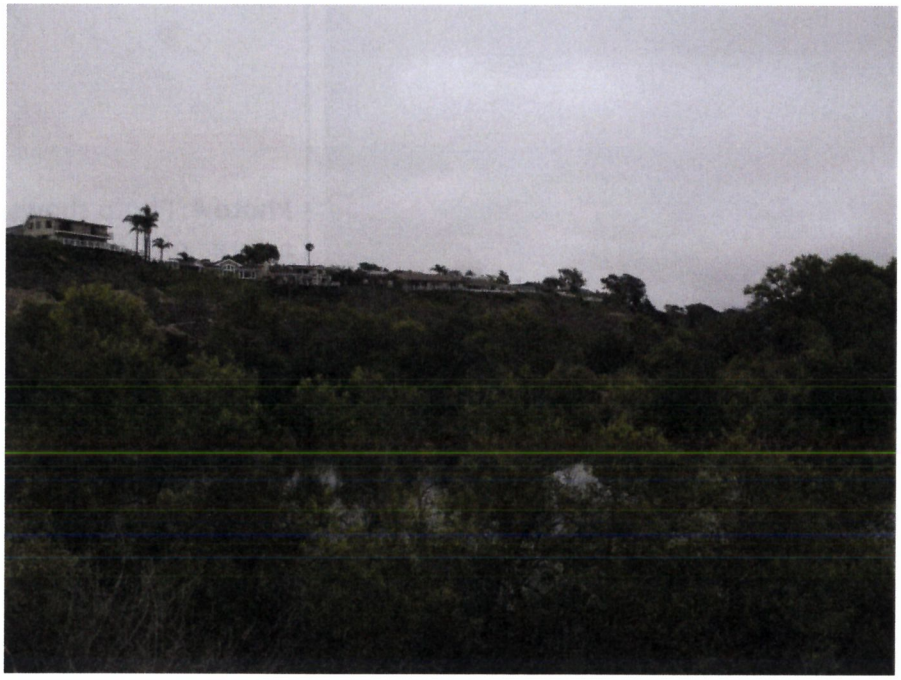

**Photo 6.** Photo showing Victoria Pond from the north side. Corresponds to Photo Point 3, facing south.

**Photo 7.** Photo depicts an area of Disturbed Quailbush Scrub toward the center of the Project site. Photo facing east. Corresponds to Photo Point 6.

**Photo 8.** Photo show the large pond from the eastern edge. Photo facing west. Corresponds to Photo Point 7.

**Photo 9.** Photo shows an area being utilized for off-road vehicles within the Project site. Photo facing south. Corresponds to Photo Point 5.

**Photo 10.** Photo depicts some burned vegetation on the Project site. Photo facing south. Corresponds to Photo Point 4.

**Photo 11.** Photo shows a representation of Alkali Sacaton Grassland vegetation found in the southern portion of the Project site. Photo facing south. Corresponds to Photo Point 8.

**Photo 12.** Photo shows a representation of Alkali Heath Marsh vegetation along the western boundary of the Project site. Photo facing southeast. Corresponds to Photo Point 9.

# APPENDIX B – PLANT SPECIES OBSERVED

# APPENDIX B - PLANT SPECIES OBSERVED

| Scientific Name | Common Name |
|---|---|
| **GYMNOSPERMS** | |
| **PINACEAE** | **PINE FAMILY** |
| *Pinus halepensis** | Aleppo pine |
| *Pinus greggii* | Gregg's pine |
| **ANGIOSPERMS (EUDICOTS)** | |
| **ADOXACEAE** | **MUSKROOT FAMILY** |
| *Sambucus nigra* subsp. *caerulea* | blue elderberry |
| **AIZOACEAE** | **FIG-MARIGOLD FAMILY** |
| *Carpobrotus* sp.* | iceplant |
| *Mesembryanthemum nodiflorum** | slender-leaved iceplant |
| **ANACARDIACEAE** | **SUMAC OR CASHEW FAMILY** |
| *Rhus integrifolia* | lemonadeberry |
| *Schinus molle** | Peruvian pepper tree |
| *Schinus terebinthifolius** | Brazilian pepper tree |
| **APIACEAE** | **CARROT FAMILY** |
| *Apium graveolens** | celery |
| *Conium maculatum** | poison hemlock |
| *Foeniculum vulgare** | fennel |
| **ASTERACEAE** | **SUNFLOWER FAMILY** |
| *Ambrosia psilostachya* | common ragweed |
| *Artemisia californica* | California sagebrush |
| *Artemisia douglasiana* | mugwort |
| *Artemisia dracunculus* | tarragon |
| *Baccharis pilularis* | coyote brush |
| *Baccharis salicifolia* subsp. *salicifolia* | mule fat |
| *Centaurea melitensis** | tocalote |
| *Centromadia parryi* subsp. *australis* | southern tarweed |
| *Chrysanthemum coronarium** | chrysanthemum |
| *Encelia californica* | California bush sunflower |
| *Encelia farinosa* | brittlebush |
| *Erigeron canadensis* | horseweed |
| *Helminthotheca echioides** | bristly ox-tongue |
| *Heterotheca grandiflora* | telegraph weed |
| *Isocoma menziesii* | Mezies's golden bush, coast goldenbush |
| *Iva hayesiana* | San Diego marsh-elder |
| *Pluchea odorata* var. *odorata* | salt marsh fleabane |
| *Pulicaria paludosa** | Spanish sunflower |
| *Symphyotrichum subulatum* | aster |

| Scientific Name | Common Name |
|---|---|
| *Xanthium strumarium* | cocklebur |
| **BORAGINACEAE** | **BORAGE FAMILY** |
| *Echium candicans** | pride of Madeira |
| *Heliotropium curassavicum* var. *oculatum* | salt heliotrope |
| *Phacelia cicutaria* | caterpillar phacelia |
| **BRASSICACEAE** | **MUSTARD FAMILY** |
| *Hirschfeldia incana** | shortpod mustard |
| *Lepidium latifolium** | peppergrass |
| *Lobularia maritima** | sweet-alyssum |
| *Raphanus sativus** | radish |
| **CACTACEAE** | **CACTUS FAMILY** |
| *Opuntia ficus-indica** | Indian fig |
| **CHENOPODIACEAE** | **GOOSEFOOT FAMILY** |
| *Atriplex lentiformis* | big saltbush, quailbush |
| *Bassia hyssopifolia** | five-hooked bassia |
| *Sarcocornia pacifica* | common pickleweed |
| *Suaeda* sp. | sea-blite |
| **CLEOMACEAE** | **SPIDERFLOWER FAMILY** |
| *Peritoma arborea* | bladderpod |
| **EUPHORBIACEAE** | **SPURGE FAMILY** |
| *Chamaesyce albomarginata* | rattlesnake weed |
| *Ricinus communis** | castor-bean |
| **FABACEAE** | **LEGUME FAMILY** |
| *Acacia baileyana** | mimosa acacia |
| *Acacia longifolia** | Sydney golden wattle |
| *Lupinus formosus* | summer lupine |
| *Melilotus indica** | sourclover |
| *Frankenia salina* | alkali heath |
| **LAMIACEAE** | **MINT FAMILY** |
| *Marrubium vulgare** | horehound |
| **LYTHRACEAE** | **LOOSESTRIFE FAMILY** |
| *Ammannia coccinea* | valley red-stem |
| *Lythrum hyssopifolia** | hyssop loosestrife |
| **MALVACEAE** | **MALLOW FAMILY** |
| *Fremontodendron californicum* | California fremontia/flannelbush |
| *Malvella leprosa* | alkali-mallow |
| **OLEACEAE** | **OLIVE FAMILY** |
| *Fraxinus uhdei** | shamel ash |
| **ONAGRACEAE** | **EVENING PRIMROSE FAMILY** |
| *Clarkia speciosa* | red spotted clarkia |



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| Scientific Name | Common Name |
|---|---|
| *Epilobium ciliatum* | California cottonweed |
| *Oenothera elata* subsp. *hookeri* | evening primrose |
| **PAPAVERACEAE** | **POPPY FAMILY** |
| *Romneya coulteri* | Coulter's matilija poppy |
| **PHRYMACEAE** | **LOPSEED FAMILY** |
| *Mimulus aurantiacus* | orange bush monkey-flower |
| **PLATANACEAE** | **SYCAMORE FAMILY** |
| *Platanus racemosa* | California/western sycamore |
| **PLUMBAGINACEAE** | **LEADWORT FAMILY** |
| *Plumbago auriculata** | cape plumbago |
| **POLYGONACEAE** | **BUCKWHEAT FAMILY** |
| *Eriogonum fasciculatum* | California buckwheat |
| *Eriogonum giganteum* var. *giganteum** | Santa Catalina island buckwheat |
| *Rumex* sp. | dock |
| **RHAMNACEAE** | **BUCKTHORN FAMILY** |
| *Rhamnus crocea* | spiny redberry |
| *Ziziphus jujube** | common jujube |
| **ROSACEAE** | **ROSE FAMILY** |
| *Prunus* sp. | cherry |
| **SALICACEAE** | **WILLOW FAMILY** |
| *Populus fremontii* subsp. *fremontii* | Fremont cottonwood |
| *Salix exigua* | narrow-leaved willow |
| *Salix gooddingii* | black willow |
| *Salix lasiolepis* | arroyo willow |
| **SCROPHULARIACEAE** | **FIGWORT FAMILY** |
| *Myoporum laetum** | myoporum |
| **SOLANACEAE** | **NIGHTSHADE FAMILY** |
| *Datura wrightii* | jimson weed |
| *Nicotiana glauca** | tree tobacco |
| **TAMARICACEAE** | **TAMARISK FAMILY** |
| *Tamarix ramosissima** | Mediterranean tamarisk |
| **ULMACEAE** | **ELM FAMILY** |
| *Ulmus* sp.* | elm |
| **ANGIOSPERMS (MONOCOTS)** | |
| **ARECACEAE** | **PALM FAMILY** |
| *Phoenix canariensis** | Canary Island date palm |
| *Washingtonia robusta** | Mexican fan palm |
| **CYPERACEAE** | **SEDGE FAMILY** |
| *Cyperus involucratus** | umbrella-plant |
| *Schoenoplectus californicus* | California bulrush |



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| Scientific Name | Common Name |
|---|---|
| **POACEAE** | **GRASS FAMILY** |
| *Arundo donax** | giant reed |
| *Avena* sp.* | wild oat |
| *Cortaderia selloana** | pampas grass |
| *Cynodon dactylon** | Bermuda grass |
| *Paspalum dilatatum** | Dallis grass |
| *Polypogon monspeliensis** | annual beard grass |
| *Sporobolus airoides* | alkali sacaton |
| *Stipa miliacea* var. *miliacea** | smilo grass |

*Non-Native Species

# APPENDIX C – WILDLIFE SPECIES OBSERVED OR DETECTED

# APPENDIX C - WILDLIFE SPECIES OBSERVED OR DETECTED

| Scientific Name | Common Name |
|---|---|
| **CLASS AMPHIBIA** | **AMPHIBIANS** |
| **HYLIDAE** | **TREEFROGS** |
| *Pseudacris regilla* | Pacific chorus frog |
| **CLASS REPTILIA** | **REPTILES** |
| **PHRYNOSOMATIDAE** | **ZEBRA-TAILED, EARLESS, FRINGE-TOED, SPINY, TREE, SIDE-BLOTCHED, AND HORNED LIZARDS** |
| *Sceloporus occidentalis* | western fence lizard |
| **CLASS AVES** | **BIRDS** |
| **ARDEIDAE** | **HERONS, BITTERNS** |
| *Ardea herodias* | great blue heron |
| *Botaurus lentiginosus* | American bittern |
| *Butorides virescens* | green heron |
| *Ardea alba* | great egret |
| *Egretta thula* | snowy egret |
| **ANATIDAE** | **DUCKS, GEESE, SWANS** |
| *Anas acuta* | Northern pintail |
| **ACCIPITRIDAE** | **HAWKS, KITES, EAGLES** |
| *Buteo jamaicensis* | red-tailed hawk |
| **CHARADRIIDAE** | **PLOVERS** |
| *Charadrius vociferus* | killdeer |
| **LARIDAE** | **SKUAS, GULLS, TERNS, SKIMMERS** |
| *Hydroprogne caspia* | Caspian tern |
| *Sterna antillarum* | least tern |
| **COLUMBIDAE** | **PIGEONS & DOVES** |
| *Zenaida macroura* | mourning dove |
| **APODIDAE** | **SWIFTS** |
| *Aeronautes saxatalis* | white-throated swift |
| **TROCHILIDAE** | **HUMMINGBIRDS** |
| *Calypte anna* | Anna's hummingbird |
| *Selasphorus sasin* | Allen's hummingbird |
| **PICIDAE** | **WOODPECKERS** |
| *Colaptes auratus* | northern flicker |
| *Picoides nuttallii* | Nuttall's woodpecker |
| **TYRANNIDAE** | **TYRANT FLYCATCHERS** |
| *Sayornis nigricans* | black phoebe |

| | |
|---|---|
| **HIRUNDINIDAE** | **SWALLOWS** |
| *Stelgidopteryx serripennis* | northern rough-winged swallow |
| **CORVIDAE** | **JAYS & CROWS** |
| *Corvus brachyrhynchos* | American crow |
| **AEGITHALIDAE** | **BUSHTITS** |
| *Psaltriparus minimus* | bushtit |
| **MIMIDAE** | **MOCKINGBIRDS, THRASHERS** |
| *Mimus polyglottos* | northern mockingbird |
| **VIREONIDAE** | **VIREOS** |
| *Vireo bellii pusillus* | least Bell's vireo |
| **PARULIDAE** | **WOOD WARBLERS** |
| *Geothlypis trichas* | common yellowthroat |
| *Setophaga petechia* | yellow warbler |
| *Icteria virens* | yellow-breasted chat |
| **ICTERIDAE** | **BLACKBIRDS** |
| *Quiscalus mexicanus* | great-tailed grackle |
| **EMBERIZIDAE** | **EMBERIZIDS** |
| *Junco hyemalis* | dark-eyed junco |
| *Melospiza melodia* | song sparrow |
| *Pipilo maculatus* | spotted towhee |
| *Melozone crissalis* | California towhee |
| **FRINGILLIDAE** | **FINCHES** |
| *Spinus psaltria* | lesser goldfinch |
| *Carpodacus mexicanus* | house finch |
| **CLASS MAMMALIA** | **MAMMALS** |
| **LEPORIDAE** | **HARES & RABBITS** |
| *Sylvilagus audubonii* | desert cottontail |
| **SCIURIDAE** | **SQUIRRELS** |
| *Spermophilus beecheyi* | California ground squirrel |

# APPENDIX C WATER QUALITY DATA FOR VICTORIA POND

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lake: | Victoria Pond | | | | | | | | |
| Date: | 5/22/2015 | | | | | | | | |
| Weather: | Sunny/partly cloudy | | | | | | | | |
| Instrument: | Horiba: | Scout: | YSI: X | Other: In Situ for side by side comparison | | | | | |
| | | | | | | | | | |
| Sampling Location and Parameters | | | | | | | | | |
| Location: | V Pond North | | | | | | | | |
| Time: | 10:14 | | | | | | | | |
| Secchi Disk (m): | .3m | | | | | | | | |
| Depth (m): (YSI/In situ) | Temp (°C) (YSI/In situ) | PH (YSI/In situ) | DO (mg/l) (YSI/In situ) | EC (µmhos/cm) (YSI/In situ) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments: |
| Surface | 22.82/22.91 | 8.45/8.38 | 7.49/5.62 | 1682/1629 | 6.35 | green planktonic | 0.91 | | |
| 0.616/.606 | 22.4/22.68 | 7.82/8.31 | 4.01/3.91 | 1694/1628 | N/A | | | | |
| 1.113 | 22.33 | 7.87 | 3.64 | 1695 | N/A | | | | |
| | | | | | | | | | |
| Location: | V Pond South | | | | | | | | |
| Time: | 10:34 | | | | | | | | |
| Secchi Disk (m): | .1m | | | | | | | | |
| Depth (m): | Temp (°C) (YSI/In situ) | PH (YSI/In situ) | DO (mg/l) (YSI/In situ) | EC (µmhos/cm) (YSI/In situ) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments: |
| Surface | 22.68/22.78 | 7.69/8.08 | 3.72/4.41 | 1698/1545 | 29.7 | green planktonic | 0.9 | | |
| 0.324 | 22.6 | 7.61 | 3.26 | 1697 | N/A | | | | |
| 0.668 | 22.56 | 7.64 | 3.39 | 1695 | N/A | | | | |
| | | | | | | | | | |
| Location: | V Pond East | | | | | | | | |
| Time: | 10:47 | | | | | | | | |
| Secchi Disk(m): | .1m | | | | | | | | |
| Depth (m): | Temp (°C) (YSI/In situ) | PH (YSI/In situ) | DO (mg/l) (YSI/In situ) | EC (µmhos/cm) (YSI/In situ) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments: |
| Surface | 22.93/22.15 | 7.74/8.07 | 5.04/4.55 | 1697/1634 | 19.7 | green planktonic | 0.88 | | |
| 0.443 | 22.96 | 7.73 | 4.75 | 1697 | N/A | | | | |
| 0.878 | 22.73 | 7.72 | 4.56 | 1692 | N/A | | | | |

Turbidity due to abundance of green planktonic algae
In situ probe cable not only about 1 meter long

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lake: | Victoria Pond | | | | | | | | |
| Date: | 5/28/2015 | | | | | | | | |
| Weather: | Sunny | | | | | | | | |
| Instrument: | Horiba: | Scout: | YSI: X | Other: | | | | | |

Sampling Location and Parameters

| Location: | V Pond North | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Time: | 10:26 | | | | | | | | |
| Secchi Disk (m): | 0.1 | | | | | | | | |
| Depth (m): | Temp (°C) | PH | DO (mg/l) | EC (µmhos/cm) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments: |
| Surface | 22.49 | 8.73 | 10.4 | 1692 | 28.6 | green planktonic | 0.91 | | |
| 0.606 | 22.36 | 8.35 | 8.3 | 1707 | N/A | | | | |
| 1.243 | 22.33 | 8.38 | 8.1 | 1707 | N/A | | | | |

| Location: | V Pond South | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Time: | 10:41 | | | | | | | | |
| Secchi Disk (m): | 0.1 | | | | | | | | |
| Depth (m): | Temp (°C) | PH | DO (mg/l) | EC (µmhos/cm) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments: |
| Surface | 22.24 | 8.52 | 10.58 | 1703 | 41.3 | green planktonic | 0.89 | | |
| 0.288 | 22.32 | 8.49 | 11.04 | 1706 | N/A | | | | |
| 0.539 | 22.33 | 8.5 | 11.26 | 1706 | N/A | | | | |

| Location: | V Pond East | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Time: | 10:53 | | | | | | | | |
| Secchi Disk(m): | 0.1 | | | | | | | | |
| Depth (m): | Temp (°C) | PH | DO (mg/l) | EC (µmhos/cm) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments: |
| Surface | 22.51 | 8.61 | 10.22 | 1692 | 47.6 | green planktonic | 0.91 | | |
| 0.401 | 22.56 | 8.57 | 11.61 | 1705 | N/A | | | | |
| 0.806 | 22.44 | 8.56 | 11.6 | 1704 | N/A | | | | |

Turbidity due to abundance of green planktonic algae

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lake: | Victoria Pond | | | | | | | | |
| Date: | 6/19/2015 | | | | | | | | |
| Weather: | Sunny | | | | | | | | |
| Instrument: | Horiba: | Scout: | YSI: X | Other: | | | | | |

Sampling Location and Parameters

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Location: | V Pond North | | | | | | | | |
| Time: | 10:12 | | | | | | | | |
| Secchi Disk (m): | 0.1 | | | | | | | | |
| Depth (m): | Temp (°C) | PH | DO (mg/l) | EC (µmhos/cm) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments: |
| Surface | 25.02 | 8.76 | 11.79 | 1622 | 74.5 | green planktonic | 0.84 | | |
| 0.601 | 24.77 | 9.04 | 11.87 | 1625 | N/A | | | | |
| 1.151 | 24.73 | 8.94 | 12.15 | 1626 | N/A | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Location: | V Pond South | | | | | | | | |
| Time: | 10:27 | | | | | | | | |
| Secchi Disk (m): | 0.1 | | | | | | | | |
| Depth (m): | Temp (°C) | PH | DO (mg/l) | EC (µmhos/cm) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments: |
| Surface | 24.98 | 9.01 | 10.95 | 1625 | 47.8 | green planktonic | 0.83 | | |
| 0.276 | 24.81 | 8.8 | 10.19 | 1624 | N/A | | | | |
| 0.553 | 24.59 | 8.95 | 10.35 | 1589 | N/A | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Location: | V Pond East | | | | | | | | |
| Time: | 10:36 | | | | | | | | |
| Secchi Disk(m): | 0.1 | | | | | | | | |
| Depth (m): | Temp (°C) | PH | DO (mg/l) | EC (µmhos/cm) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments: |
| Surface | 25.33 | 8.98 | 10.29 | 1622 | 71.6 | green planktonic | 0.81 | | |
| 0.526 | 24.87 | 8.87 | 10.01 | 1621 | N/A | | | | |
| 0.97 | 24.62 | 8.94 | 10.64 | 1628 | N/A | | | | |

Turbidity due to abundance of green planktonic algae

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lake: | Victoria Pond | | | | | | | | |
| Date: | 6/30/2015 | | | | | | | | |
| Weather: | Sunny | | | | | | | | |
| Instrument: | Horiba: | Scout: | YSI: X | Other: | | | | | |

Sampling Location and Parameters

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Location: | V Pond North | | | | | | | | |
| Time: | 10:14 | | | | | | | | |
| Secchi Disk (m): | 0.1 | | | | | | | | |
| Depth (m): | Temp (°C) | PH | DO (mg/l) | EC (µmhos/cm) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments: |
| Surface | 26.12 | 8.56 | 9.01 | 1763 | 55.5 | green planktonic | 0.89 | | |
| 0.677 | 25.58 | 8.53 | 8.53 | 1766 | N/A | | | | |
| 1.218 | 25.54 | 8.56 | 8.56 | 1767 | N/A | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Location: | V Pond South | | | | | | | | |
| Time: | 11:03 | | | | | | | | |
| Secchi Disk (m): | 0.1 | | | | | | | | |
| Depth (m): | Temp (°C) | PH | DO (mg/l) | EC (µmhos/cm) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments: |
| Surface | 26.09 | 8.57 | 7.13 | 1762 | 22.3 | green planktonic | 0.87 | | |
| 0.328 | 25.89 | 8.54 | 8.65 | 1766 | N/A | | | | |
| 0.632 | 25.34 | 8.57 | 7.88 | 1768 | N/A | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Location: | V Pond East | | | | | | | | |
| Time: | 11:14 | | | | | | | | |
| Secchi Disk(m): | 0.1 | | | | | | | | |
| Depth (m): | Temp (°C) | PH | DO (mg/l) | EC (µmhos/cm) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments: |
| Surface | 26.77 | 8.64 | 8.51 | 1763 | 26.7 | green planktonic | 0.88 | | |
| 0.483 | 26.05 | 8.48 | 7.37 | 1765 | N/A | | | | |
| 0.919 | 25.18 | 8.47 | 6.35 | 1772 | N/A | | | | |

Turbidity due to abundance of green planktonic algae

1 of 3

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lake: | Victoria Pond | | | | | | | | |
| Date: | 7/16/2015 | | | | | | | | |
| Weather: | Sunny | | | | | | | | |
| Instrument: | Horiba: | Scout: | YSI: X | Other: | | | | | |

Sampling Location and Parameters

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Location: | V Pond North | | | | | | | | |
| Time: | 10:21 | | | | | | | | |
| Secchi Disk (m): | .3m | | | | | | | | |
| Depth (m): | Temp (°C) | PH | DO (mg/l) | EC (µmhos/cm) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments |
| Surface | 26.47 | 8.78 | 9.25 | 1825 | 28.5 | green planktonic | 0.89 | | |
| 0.654 | 26.19 | 8.74 | 8.67 | 1826 | N/A | | | | |
| 1.29 | 26.1 | 8.59 | 8.58 | 1824 | N/A | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Location: | V Pond South | | | | | | | | |
| Time: | 10:37 | | | | | | | | |
| Secchi Disk (m): | .3m | | | | | | | | |
| Depth (m): | Temp (°C) | PH | DO (mg/l) | EC (µmhos/cm) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments |
| Surface | 26.68 | 8.75 | 9.39 | 1829 | 21.3 | green planktonic | 0.91 | | |
| 0.358 | 26.54 | 8.75 | 9.07 | 1828 | N/A | | | | |
| 0.642 | 26.16 | 8.75 | 9.04 | 1828 | N/A | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Location: | V Pond East | | | | | | | | |
| Time: | 10:46 | | | | | | | | |
| Secchi Disk(m): | .3m | | | | | | | | |
| Depth (m): | Temp (°C) | PH | DO (mg/l) | EC (µmhos/cm) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments |
| Surface | 26.72 | 8.79 | 10.05 | 1824 | 26.6 | green planktonic | 0.91 | | |
| 0.509 | 26.53 | 8.72 | 9.45 | 1825 | N/A | | | | |
| 1.011 | 26.22 | 8.72 | 8.85 | 1812 | N/A | | | | |

Turbidity due to abundance of green planktonic algae

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lake: | Victoria Pond | | | | | | | | |
| Date: | 7/29/2015 | | | | | | | | |
| Weather: | Overcast | | | | | | | | |
| Instrument: | Horiba: | Scout: | YSI: X | Other: | | | | | |

Sampling Location and Parameters

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Location: | V Pond North | | | | | | | | |
| Time: | 10:13 | | | | | | | | |
| Secchi Disk (m): | .1m | | | | | | | | |
| Depth (m): | Temp (°C) | PH | DO (mg/l) | EC (µmhos/cm) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments: |
| Surface | 27.18 | 7.99 | 3.17 | 1811 | 27.1 | green planktonic | 0.92 | | |
| 0.71 | 27.18 | 7.9 | 2.2 | 1813 | N/A | | | | |
| 1.298 | 27.09 | 7.95 | 2.48 | 1813 | N/A | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Location: | V Pond South | | | | | | | | |
| Time: | 10:24 | | | | | | | | |
| Secchi Disk (m): | .1m | | | | | | | | |
| Depth (m): | Temp (°C) | PH | DO (mg/l) | EC (µmhos/cm) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments: |
| Surface | 27.16 | 8.11 | 5.47 | 1808 | 9.81 | green planktonic | 0.93 | | |
| 0.39 | 27.23 | 8.1 | 4.9 | 1809 | N/A | | | | |
| 0.769 | 27.2 | 8.09 | 4.65 | 1810 | N/A | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Location: | V Pond East | | | | | | | | |
| Time: | 10:34 | | | | | | | | |
| Secchi Disk(m): | .1m | | | | | | | | |
| Depth (m): | Temp (°C) | PH | DO (mg/l) | EC (µmhos/cm) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments: |
| Surface | 27.22 | 8.16 | 5.49 | 1801 | 12.5 | green planktonic | 0.95 | | |
| 0.434 | 27.25 | 8.11 | 4.66 | 1808 | N/A | | | | |
| 0.845 | 27.23 | 8.13 | 4.88 | 1810 | N/A | | | | |

Turbidity due to abundance of green planktonic algae

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lake: | Victoria Pond | | | | | | | | |
| Date: | 8/17/2015 | | | | | | | | |
| Weather: | Partly cloudy | | | | | | | | |
| Instrument: | Horiba: | Scout: | YSI: X | Other: | | | | | |

Sampling Location and Parameters

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Location: | V Pond North | | | | | | | | |
| Time: | 10:12 | | | | | | | | |
| Secchi Disk (m): | .3m | | | | | | | | |
| Depth (m): | Temp (°C) | PH | DO (mg/l) | EC (µmhos/cm) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments: |
| Surface | 27.64 | 8.57 | 8.63 | 1952 | 9.21 | | 0.97 | | |
| 0.71 | 27.51 | 8.52 | 8.32 | 1956 | N/A | | | | |
| 1.298 | 27.45 | 8.39 | 8.6 | 1940 | N/A | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Location: | V Pond South | | | | | | | | |
| Time: | 10:24 | | | | | | | | |
| Secchi Disk (m): | .3m | | | | | | | | |
| Depth (m): | Temp (°C) | PH | DO (mg/l) | EC (µmhos/cm) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments: |
| Surface | 28 | 8.59 | 9.4 | 1954 | 21.3 | | 0.97 | | |
| 0.342 | 27.54 | 8.49 | 7.35 | 1956 | N/A | | | | |
| 0.731 | 27.39 | 8.53 | 7.35 | 1961 | N/A | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Location: | V Pond East | | | | | | | | |
| Time: | 10:35 | | | | | | | | |
| Secchi Disk(m): | .3m | | | | | | | | |
| Depth (m): | Temp (°C) | PH | DO (mg/l) | EC (µmhos/cm) | Turbidity (ntu) | Algae/Weeds | Salinity (PSU) | Aerator/Recirculation | Comments: |
| Surface | 28.12 | 8.69 | 10.69 | 1942 | 15 | | 0.97 | | |
| 0.388 | 27.8 | 8.72 | 10.24 | 1944 | N/A | | | | |
| 0.738 | 27.66 | 8.72 | 10.44 | 1952 | N/A | | | | |