Preserving Public Access to Torrey Pines State Natural Reserve

Final Feasibility Study

Prepared for: Los Peñasquitos Lagoon Foundation

5 January 2023

Photo: Los Peñasquitos Lagoon Foundation

ES1. Executive Summary

Located within Torrey Pines State Natural Reserve and State Beach, the North Beach Day Use Parking Lot (North Lot) is the closest parking lot and access point to the northern section of Torrey Pines State Beach, a popular beach in San Diego County that averages approximately 1.8 million visitors per year. Built in the 1960s, the North Lot is located in an area that was historically dunes and a tidal basin that was graded and filled when the inlet at Los Peñasquitos Lagoon was relocated to the south during the construction of Highway 101 (North Torrey Pines Road) in 1932. Roughly triangular in shape, the North Lot is bordered by the North County Transit District (NCTD) railway line along its eastern edge and North Torrey Pines Road to the west. The southern edge consists of a lagoon inlet, coastal dune, salt marsh and upland transitions that contain rare and sensitive plants and listed species.

Despite its size and proximity to the beach, the North Lot is underutilized even on busy summer holidays as most park visitors prefer to park along nearby surface streets to avoid daily use fees. Most of the North Lot's underground utilities are outdated and require frequent maintenance. Storm runoff drains from the lot into nearby wetlands reducing water quality and contributing to the establishment of invasive plant species. The North Lot's current configuration also makes it vulnerable to flooding from projected sea level rise. These issues present an opportunity and justification to re-examine the North Lot's location and design as a priority project identified in the Los Peñasquitos Lagoon Enhancement Plan update in 2018. In 2019, the Los Peñasquitos Lagoon Foundation in partnership with California State Parks received grant funding from the State Coastal Conservancy to develop managed retreat strategies for the North Lot that increase its resiliency to coastal hazards using natural coastal features and habitats while maintaining its function to provide public access to the coast.

A site condition analysis conducted as part of the project provided data supporting both the North Lot's underutilization and its vulnerability to sea level rise. A parking demand study conducted during the summer of 2021 found that surface street parking demand reached 90% capacity early in the day. During that same period, the North Lot remained under 65% capacity. This study suggests that a reduction of up to 24% (121 parking spaces) would not reduce the North Lot's capacity for current parking demands. The North Lot's vulnerability to coastal hazards occurs primarily along the southeast corner where water enters the site from the lagoon tidal channel starting at a water level elevation of 9.5 feet NAVD88. This water level can be achieved in a variety of ways but was replicated in this analysis during a 100-year extreme water level (EWL) and 3.6 feet of sea level rise. The flooding of the North Lot and McGonigle Road (the lot's access road) will increase in extent and severity with water levels greater than 11 feet. The study also supported replacing the failing culvert at McGonigle Road as an opportunity to restore tidal connectivity to the Northern Marsh area.

After assessing site conditions, a number of concepts were developed for the two most viable adaptation strategies for the North Lot. These strategies include the "Reduced Footprint" and "Upland Relocation" options. Offsite relocation of the North Lot was evaluated and rejected due to the lack of viable offsite locations. Concepts within these strategies were vetted within the community, stakeholder groups and the resource agencies through a series of 10 meetings and two online surveys. Based on these engagement activities, the preferred strategy was determined to be the Reduced Footprint with a preference towards retreating the lot to the north. This general strategy is shown in Figure ES-1.

Figure ES1. Reduced Footprint Strategy

Three Project alternatives were then developed within the Reduced Footprint strategy. The alternatives all include reduction of 121 parking spaces, new lifeguard facilities, replacing hardscape with native habitats, and stormwater/water quality improvements. The alternatives varied with respect to degree, scale and cost of proposed improvements to the North Lot. Alternative 1 is a "light touch" approach that proposes minimal improvements to gain some benefits at a reduced cost for permitting and construction. Alternative 2 and Alternative 3 propose a re-construction of the North Lot and would change the alignment and type of shoreline protection along the lagoon inlet, would move existing facilities (e.g., bathrooms) and replace the parking lot's existing asphalt surface with permeable surfaces and bioretention facilities to capture and treat storm runoff to improve water quality in the lagoon. Alternative 3 abandons the current access point to the North Lot at McGonigle Road for a new access point connecting it to North Torrey Pines Road. All three alternatives are further described below:

- Alternative 1 - Reduced Lot Footprint: Utilizes most of the North Lot in its existing configuration. A total of 2.2 acres of parking lot will be restored with Diegan Coastal Sage Scrub habitat. Stormwater improvement retrofits would occur to direct runoff flows to biofiltration areas to improve the water quality of stormwater flows. The existing undersized culvert at McGonigle Road will be improved with a new widened natural bottom culvert to improve tidal connectivity to the marsh north of McGonigle Road.

- Alternative 2 – Reduced Lot Footprint, Reconfigure Lagoon Inlet and Create Ecotone Slope: The existing rock shoreline protection located along the Lagoon inlet will be removed and replaced with a more naturalized shoreline protection system that will serve to stabilize the shoreline along the inlet channel while providing flooding protection during extreme water levels. The shoreline protection design would consist of a shallow-crested, buried revetment along the inlet channel (to provide scour protection from high velocity channel flows) and a buried cobble berm and dune adjacent to the parking lot (to provide flood protection against low velocity extreme water levels). The area between these two shoreline protection elements would be restored to an ecotone of coastal dune habitat that would transition to coastal sage scrub habitat with increasing elevation and finer textured soils. This new habitat would be designed to support special status dune species and coastal California gnatcatcher. The existing lot would be re-engineered as part of this alternative and would be replaced with a Low Impact Development (LID) / Green Infrastructure parking lot with pervious pavers, bioretention features, etc. to improve the stormwater runoff water quality. The existing restroom facility would be moved or a new restroom would be constructed at a more northerly location to allow for the new inlet configuration. This alternative would also

replace the existing poorly-functioning culvert / headwall on McGonigle Road with a new widened natural bottom culvert to improve tidal and potentially wildlife connectivity to the marsh north of McGonigle Road.

- Alternative 3 – Reduced Lot Footprint, Reconfigure Lagoon Inlet and Create New Lot Access via North Torrey Pines Road: Alternative 3 has identical features to Alternative 2 except that it would provide a new vehicular access to the lot via North Torrey Pines Road. The existing access via McGonigle Road would be converted to an elevated pedestrian boardwalk to maximize tidal connectivity while still providing public access.

A Feasibility Study (Study) using a multi-criteria analysis was conducted on each of the three alternatives, comparing them against the following five weighted criterion:

- Habitat Recovery
- Beach Access & Amenities
- Coastal Hazards
- Regulatory
- Financial/Economic.

Results from the Study are provided below in Table ES1. Alternative 2 was determined to score the highest of the alternatives considered, followed closely by Alternative 3. Required coordination and permitting with the City of San Diego for the connection at North Torrey Pines Road was the most significant difference between the two options. Alternative 1 scored relatively low with regard to habitat recovery and resiliency to coastal hazards.

Table ES1. Multi-Criteria Analysis Results Summary

Category		Alternative 1	Alternative 2	Alternative 3
	No Project	Reduced Lot Footprint	Reduced Lot Footprint, Reconfigured Lagoon Inlet and Ecotone Slope	Alt 2 with new vehicular access via Torrey Pines Road
Habitat Recovery (25%)	5%	16%	23%	23%
Beach Access & Amenities (25%)	17%	17%	16%	15%
Coastal Hazards (30%)	12%	18%	24%	27%
Regulatory (10%)	7%	8%	7%	5%
Financial/Economic (10%)	10%	5%	5%	4%
Total Weighted Score out of 100%	**51%**	**64%**	**75%**	**74%**
Alternative Ranking	*4*	*3*	*1*	*2*

Preliminary design of the North Lot and related features for Alternative 2 are provided in Figure ES2 and Figure ES3. Selected as the preferred alternative, Alternative 2 will be taken to 30% engineering design to complete this phase of the Project. An opinion of probable construction costs was developed for each of the alternatives and it was estimated that Alternative 2 would cost $15.7M to construct.

Next steps for the Project include progression to and completion of the final engineering design and environmental compliance. It is expected that the Project will require permits through the U.S. Army Corps of Engineers, Regional Water Quality Control Board, California Department of Fish and Wildlife and the California Coastal Commission. Based on consistency with the Los Peñasquitos Lagoon Enhancement Plan Programmatic Environmental Impacts Report and coordination with State Parks CEQA staff, the Project may be eligible for a categorical exemption under CEQA. It is estimated that the next phase of work would take approximately two years to complete; contingent on agency staff availability and level of Project controversy around environmental issues and reduction in parking spaces.

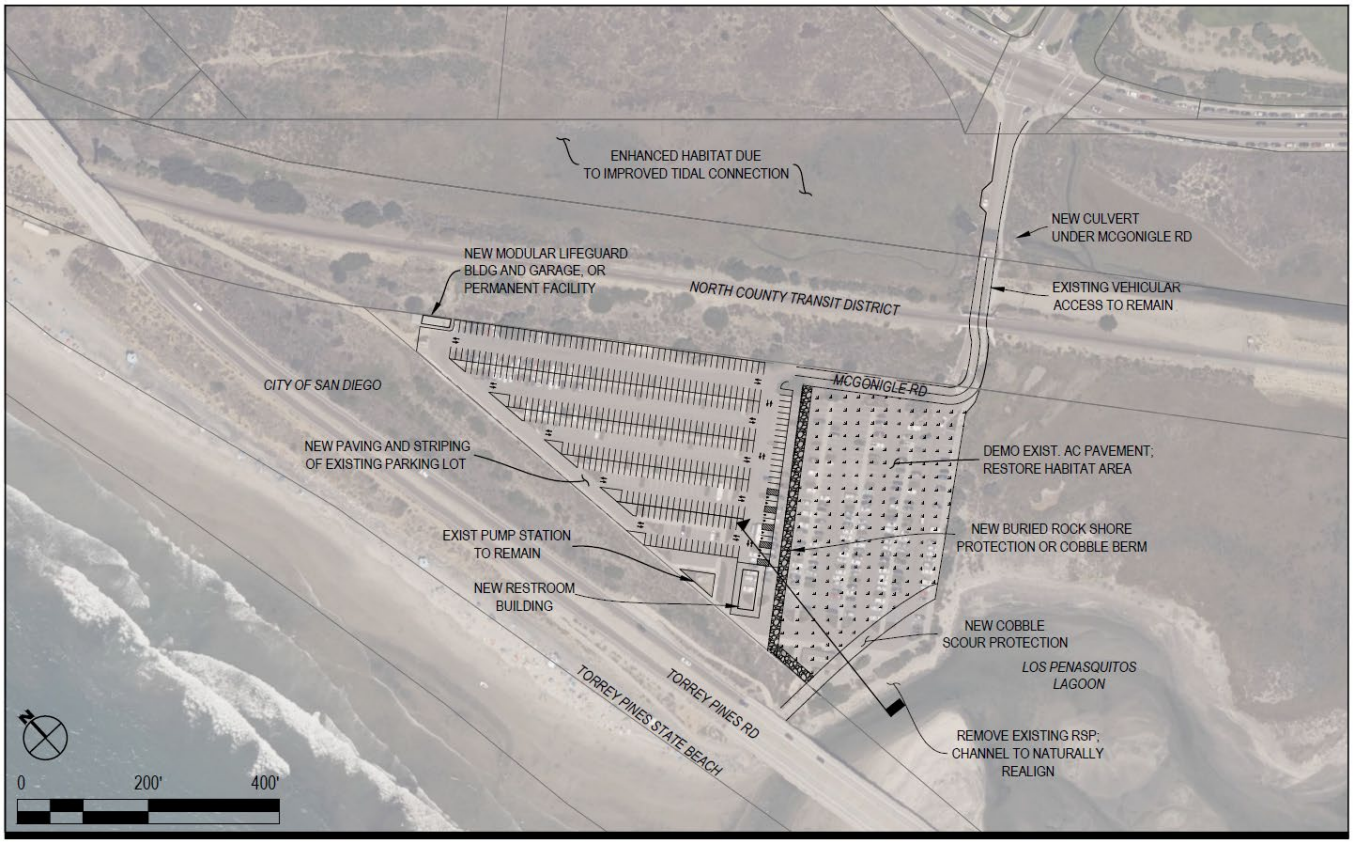

Figure ES2. Alternative 2 – Plan view

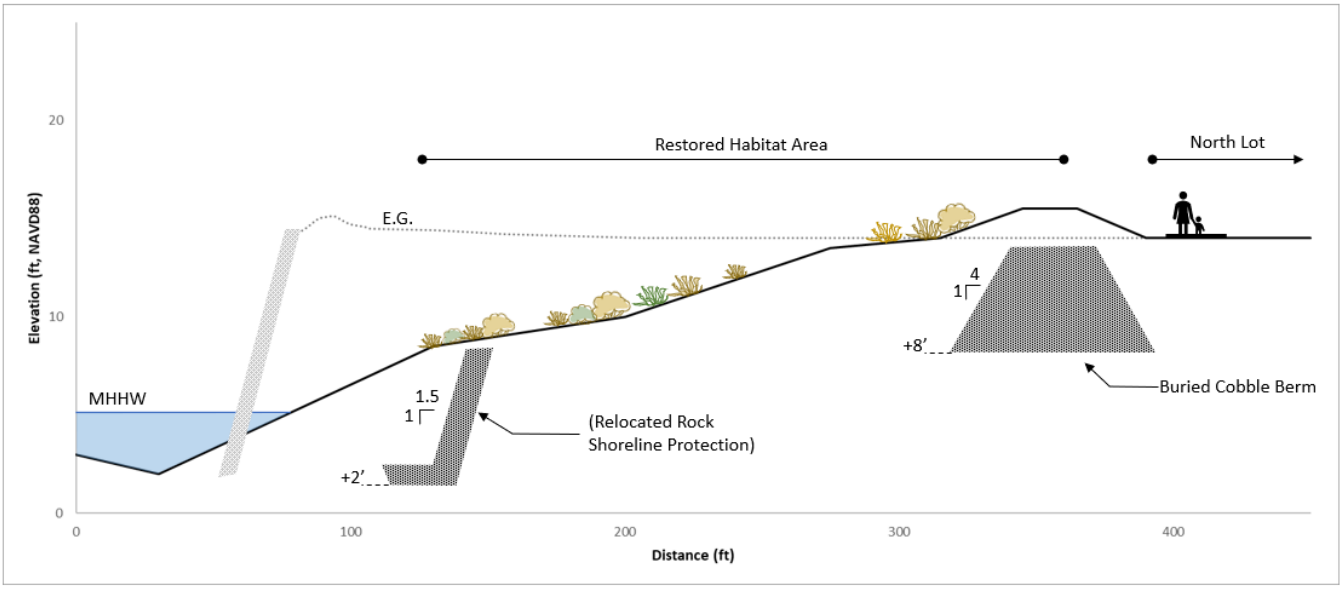

Figure ES3. Alternative 2 – Section View

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1. Introduction

The North Beach Day Use Parking Lot (North Lot) at Torrey Pines State Natural Reserve and State Beach (Reserve) has been identified as being vulnerable to projected rates of sea level rise, which will increase the frequency and severity of coastal flooding in this area. The projected flooding has the potential to limit public access and enjoyment of this heavily utilized coastal resource. Improving the North Lot in a manner that makes it resilient to climate change while recovering native habitats was identified as a priority project in the recently updated Los Peñasquitos Lagoon Enhancement Plan (Lagoon Enhancement Plan). In 2019, the Los Peñasquitos Lagoon Foundation (LPLF) in partnership with California State Parks (State Parks) was awarded grant funding from the State Coastal Conservancy (SCC) for the initial phase of Preserving Public Access to Torrey Pines State Natural Reserve (Project) that includes assessment of the project site and surrounding areas, stakeholder engagement, and performing a Feasibility Study (Study) to select the preferred alternative to be taken to 30% engineering design. Future phases of the Project include completion of the engineering design and environmental compliance (Phase 2) followed by construction (Phase 3).

1.1 Site Description

Located within the north-western portion of the City of San Diego and adjacent to the City of Del Mar's southern boundary, the North Lot is managed by State Parks as part of the Reserve and receives approximately 1.8 million annual visitors (based on 2016/2017 fiscal year data). The North Lot is an approximately six-acre, triangle-shaped, surface parking lot bound between the NCTD rail line to the east, the North Torrey Pines Road section of Highway 101 to the west and the Los Peñasquitos Lagoon and inlet to the south (Figure 1-1). The North Lot ranges in elevation between 9.5 feet and 14.5 feet NAVD and provides direct access to the northern section of Torrey Pines State Beach and the Reserve's Extension to the northeast (Figure 1-2).

There are a total of 502 parking stalls within the North Lot. Parking within the North Lot is fee-based and is operated by LAZ Parking under a lease to the State Parks. The pricing for parking at the lot is demand-based and typically ranges from $10 to $25 for a general day use pass per vehicle. There is no option to purchase hourly parking. The "California Explorer" pass is valid for the North Beach Lot and is currently priced at $195 per year.

There are five types of parking stalls within the lot including: no restriction, accessible, motor homes and large vehicles, clean air vehicles, and employee only. The breakdown of parking type by number of stalls is shown in Table 1.

Table 1. North Lot Parking Stall Types and Availability

Parking Stall Type	Available Number of Parking Stalls
Regular (No Restriction)	470
Accessible	14
Employee Only	2
Motor Home & Large Vehicle Only	8
Clean Air	8
Total	**502**

A significant portion of the public that visit the Torrey Pines Beach prefer to park their vehicles along Carmel Valley Road and other nearby surface streets in the vicinity of the North Lot to avoid day-use fees. Free, tandem parking exists along the northbound/southbound lanes of Carmel Valley Road and Del Mar Scenic Parkway. Together these roads comprise approximately 228 parking spaces with varying restrictions. Other parking locations include the residential streets south of the North Lot (i.e., Via Aprilla, Via Borgia, Via Cortina and Via Donada). These streets provide approximately 132 no-restriction parking spaces and one additional space with a 15-minute loading zone from 9am-10am.

There are two main paths to access the beach from the North Lot, both of which cross under North Torrey Pines Road. The most popular beach accessway is a paved sidewalk that runs adjacent to the Lagoon inlet and the restroom facility under the North Torrey Pines “low bridge” or Lagoon inlet bridge. The other beach access point is an about 600-foot-long dirt road/trail that begins at the northern extent of the North Lot and continues under the North Torrey Pines “high bridge” to the beach. This accessway is the only approved public access and emergency vehicle access south of 15th street in Del Mar. The high bridge access is also important for beach visitors, facilities maintenance staff and the State Parks Junior Lifeguard program. The high bridge is also the primary southern maintenance and repair access to the railroad right-of-way and is of critical importance to maintain the rail service.

The North Lot consists of several amenities including: a recently renovated restroom facility, a State Parks sewer pump station, temporary structures that serve as a lifeguard station with supporting storage and Junior Lifeguard facilities.

The North Lot is situated within a sensitive environmental area with the following existing vegetation communities in close proximity along with respective transitional areas:

- Diegan Coastal Sage Scrub
- Coastal Dune
- Coastal Salt Marsh
- Open Water
- Disturbed Habitat

These vegetation communities provide habitat for special status plants that include Nuttall’s lotus (*Acmispon prostratus)*, coast woolly heads (*Nemacaulis denudate* var *denudata*), red sand verbena (*Abronia maritima*), and listed bird species that include California gnatcatcher (*Polioptila californica*), Belding’s savannah sparrow (*Passerculus sandwichensis*), western snowy plover (*Charadrius nivosus nivosus; non-breeding*) and elegant tern (*Thalasseus elegans; non-breeding*).

Figure 1-1. Project Area

Figure 1-2. Project Vicinity

1.2 Phase 1 Project Goals and Objectives

The goal of Phase 1 of the Project is to select the preferred strategy and concept design for the managed retreat of the North Lot to generate multiple benefits that support the goals and objectives of the Lagoon Enhancement Plan and State Parks management policies for the Reserve. This will be achieved through the following key objectives:

- Utilize the Lagoon Enhancement Plan and State Parks management policies for the Reserve as the primary guidance documents for the Project.
- Conduct site assessments to better understand the project area and its existing features to determine opportunities and constraints.
- Implement stakeholder engagement through public workshops, online surveys, and advisory committee meetings with State Parks staff to inform development of concept design alternatives.
- Develop Design Concepts that consider the following:
    - Preserve and maintain public access to Torrey Pines State Beach.
    - Maximize areas for habitat restoration while providing sufficient parking capacity at the North Lot for the public.
    - Develop a plant palette that supports resilient habitats, special status plants and wildlife species, and ability to sequester carbon to support abatement efforts with regard to climate change.
    - Improve conveyance of tidal waters within lagoon channels to improve water quality and reduce threats to public health from vector-borne disease and enhance areas of salt marsh.
    - Improve stormwater management to improve water quality and eliminate areas of invasive glycophytic plants.
    - Improve and protect State Parks facilities and amenities at the North Lot
    - Implement educational and interpretive elements to support coastal stewardship and Native American heritage.
- Perform a Study to determine the preferred alternative that will be taken to 30% Engineering Design needed to initiate Phase 2 of the Project.

1.3 Background

The Lagoon has a rich history of evolving land use and estuarine dynamics. In the early 1800's, it was primarily salt marsh similar to the condition shown in Figure 1-3. From the mid-1800's to present, several major infrastructure projects altered the Lagoon's hydrology and ecosystem. The major projects were transportation based and included the development of the:

- 1888 Railway Alignment;
- the 1915 Railway Alignment;
- the Coast Highway;
- The North Torrey Pines Road section of Highway 101; and the
- Interstate 5 and 805.

The first railway alignment through the Lagoon was in constructed in 1888 and located near what is now Sorrento Valley Multi-Use Trail. A Coast Highway was completed prior to 1910 to allow vehicular access between San Diego and Los Angeles through what is now the Reserve. The 1888 railway alignment was abandoned when the current railway alignment that bisects the Lagoon was completed in 1915. The relocated railway alignment resulted in the severing of historic tidal channels, and the Lagoon was divided into an eastern and western basin (LPLF, 2021). In 1932, the Coast Highway was replaced with North Torrey Pines Road section of Highway 101 which permanently relocated the Lagoon's inlet to its current location. This alteration of the lagoon hydrology

resulted in the transformation of the Lagoon from a marine-dominant system to a modified system that is similar to bar-built estuaries with frequent and prolonged inlet closures. Interstate 5 was extended south along the Lagoon's eastern boundary in 1964 and was later followed by the construction of the Interstate 805 in 1975.

Figure 1-3. Los Peñasquitos Lagoon and the North Beach Parking Lot circa 1910 (credit: San Diego History Center)

1.3.1 History of the North Beach Parking Lot

Historically, the North Lot area was primarily open water before the relocation of the Lagoon inlet as shown in Figure 1-3. The North Lot was built in an area previously known as Sunken City, which consisted of 15 cabins and a brine shrimp pond. The structures within this area were originally beachfront cabins, which needed to be relocated to the east with the construction of the North Torrey Pines Bridge section of Highway 101 (completed in 1932). The relocation of the cabins can be seen below in Figure 1-4 and Figure 1-5, displaying the beachfront homes in the early stages of the Sunken City before and after the completion of Highway 101. The Sunken City cabins were later removed or relocated again in the 1950's when land ownership was transferred to State Parks. Construction of the North Lot (Figure 1-6) followed, which was fully paved in 1968.

The North Lot now serves as one of two primary parking lots that serve the Reserve, providing access to the northern section of Torrey Pines State Beach, the Reserve Extension to the northeast, and regional trail networks that include the California Coastal Trail and Trans County Trail. The North Lot's vulnerability to flooding from sea level rise and other issues that include outdated and maintenance intensive infrastructure make it a priority for redesign through managed retreat so that it can remain a viable staging and access point for the public while also providing key amenities that include bathrooms and a lifeguard station.

Figure 1-4. Construction of North Torrey Pines Low Bridge circa 1932 (credit: California State Parks / San Diego History Center)

Figure 1-5. Sunken City at North Lot circa 1943 (credit: California State Parks / San Diego History Center)

Figure 1-6. Construction of the North Lot circa 1952 (credit: California State Parks / San Diego History Center)

1.3.2 Ongoing & Planned Restoration of the Los Peñasquitos Lagoon

1.3.2.1 Lagoon Enhancement Plan

The Lagoon Enhancement Plan (ESA 2018) was developed in partnership with the SCC, State Parks and key stakeholders including, the City of San Diego, local residents, the Torrey Pines Conservancy, and Torrey Pines Docent Society. The original Lagoon Enhancement Plan was certified in 1985 and was recently updated in 2018 to address new stressors and shifting management priorities. The main purpose of the Lagoon Enhancement Plan is to provide planning and implementation guidance to maintain the health of the Lagoon and mitigate the potential effects from future development around the site. The Lagoon Enhancement Plan also developed a number of restoration and enhancement concepts to guide future management of the Lagoon using habitat trajectory modelling informed by recent vegetation mapping and over 30 years of continuous monitoring. A comprehensive public and stakeholder outreach program was implemented early in the planning phase and used to identify and refine of goals and concepts of the Lagoon Enhancement Plan followed by the development a pipeline of projects to be phased over time in consideration of opportunities and constraints.

Redesign and managed retreat of the North Lot was identified as a priority project in the Lagoon Enhancement Plan. The proposed concepts developed and evaluated for the managed retreat of the North Lot as part of the Project will work to align with the planning efforts set forth in the Lagoon Enhancement Plan and support its following goals (referenced in ESA 2018):

- **Habitat** – Goals 1, 2, 3, 5, 9, 13
- **Public Access, Safety & Education/Cultural Resources** – Goals 4, 6, 7, 10, 13
- **Sustainability** – Goals 5, 8, 9, 11, 12 13

A program-level Environmental Impact Report (PEIR) was prepared for the Lagoon Enhancement Plan and certified in 2021. The PEIR sets the background and concept-level analysis for key projects identified in the Lagoon Enhancement Plan. Future projects at the Lagoon and along its boundaries have the ability to tier off the PEIR with lower-level focused documents, provided they are consistent with the program level document under the California Environmental Quality Act (CEQA).

1.3.2.2 Lagoon Restoration and Enhancement

Identified as a key priority project in the Lagoon Enhancement Plan, large-scale habitat restoration and enhancement is currently planned for the Lagoon using a phased approach. Central to the restoration design is improving Lagoon hydrology to reduce retention times of fresh and storm water flows that currently impact the Lagoon's native habitats while improving tidal circulation in the upper regions of the marsh. Currently in 60% design, Phase 1 integrates floodway improvements in Sorrento Valley with the enhancement of a riparian corridor and restoration of salt marsh habitat in an area currently dominated by invasive rye grass (*Festuca perennis*). Phase 1 is estimated for completion by 2028. Phase 2 will focus on the area within Lagoon just below the terminus of Carmel Creek and its design will be informed by the results of Phase 1. Modifications to the North Lot's current revetment structure on its southern edge and improvements to tidal connectivity could provide benefits that support both Phase 1 and Phase 2.

1.3.3 Potential Large-scale Infrastructure Realignments

The current railroad alignment through the Lagoon will be modified to remove it from the coastal bluffs north of the Lagoon within the City of Del Mar. SANDAG has developed several re-alignment alternatives and is currently pursuing two options through their San Diego Regional Rail Alignment Study. The West Alignment will maintain most of the current railroad alignment through the Lagoon. As it nears the North Lot, it will move slightly eastward and tunnel under Camino Del Mar. The East Alignment would abandon most of the current railroad alignment as it moves northward through the Lagoon and would tunnel through an open parcel adjacent to Portofino Drive. Both the West Alignment and East Alignment options present potential opportunities to expand on the final design of the North Lot in the future.

1.4 Lagoon Inlet Management

To the immediate south of the North Beach parking lot is the Lagoon's inlet mouth that drains to the Pacific Ocean. Historically, this inlet remained open but due to several factors, most of which relate to major infrastructure projects and urban development, this inlet now closes seasonally. Closures can occur in the winter months as sand is deposited within the entrance by higher energy waves. Sand deposited offshore during the winter also lends to inlet closures in the spring when tides and wave energy promote beach building processes along the coast. These inlet closures deteriorate the health of the Lagoon ecosystem, especially during summer months when aquatic and terrestrial habitats are more vulnerable to impacts. Inlet maintenance was identified as a management priority in both the original and updated Lagoon Enhancement Plan. As such, LPLF has worked with State Parks and resource agencies to conduct inlet maintenance since 1985. Inlet maintenance includes emergency openings and emergency breaches, both of which typically take place during the spring months. The dredged sand is hauled onto Torrey Pines State Beach and placed along the waterline, south of the lagoon inlet. Contemporary records of inlet maintenance indicate that just under 30,000 cubic yards of marine sand is removed annually from the Lagoon's inlet. Recorded volumes of sand removed from the inlet have been greater in periods following large-scale beach nourishment programs, such as SANDAG's Regional Beach Nourishment Projects I and II, which occurred in 2001 and 2012; respectively.

2. Site Assessment

2.1 Coastal Setting

The Project site is located adjacent to Torrey Pines State Beach, a north-south oriented sandy beach situated in the southern portion of the Oceanside Littoral Cell (OLC) (Figure 2-1). The OLC is a theoretical compartment of sand that extends from Oceanside Harbor to the north to the La Jolla Submarine Canyon to the south. The OLC is in a sediment deficient due to the impounding of sand behind coastal structures (jetties, seawalls), dams and reduced sediment supply from rivers Torrey Pines State Beach is eroding at a rate of about one foot per year based on bi-annual monitoring data between 1984 and 2021 for a transect just south of the Lagoon mouth (TP-0530). Although, there is variance in the short-term beach width due to variables such as seasonal trends, beach management activities (i.e., nourishment), and oceanographic conditions (Figure 2-2). For instance, seasonal

wave and sediment transport patterns typically result in greater beach widths in the fall versus the spring months. (Figure 2-2).

The North Lot is separated from the beach by North Torrey Pines Road, a four-lane roadway whose seaward slope is protected by rip rap. The North Lot's southern edge abuts the Lagoon inlet. The majority of the slope adjacent to the Lagoon is also protected from erosion via a rock revetment (Figure 2-3).

Figure 2-1. Torrey Pines State Beach

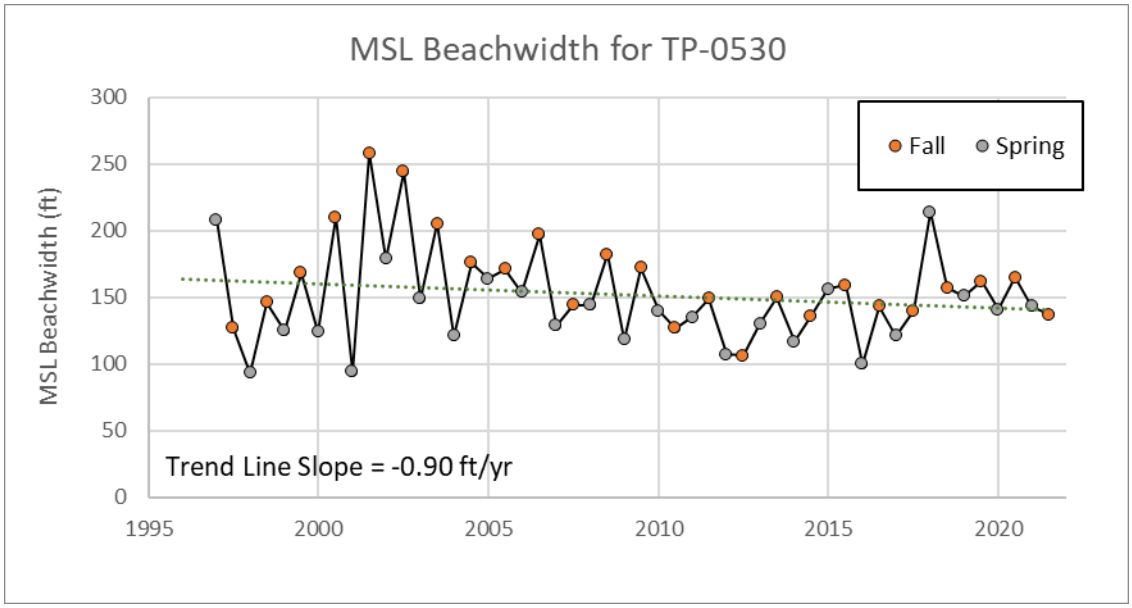

Figure 2-2. Beach Width Change at Torrey Pines State Beach (CFC, 2021)

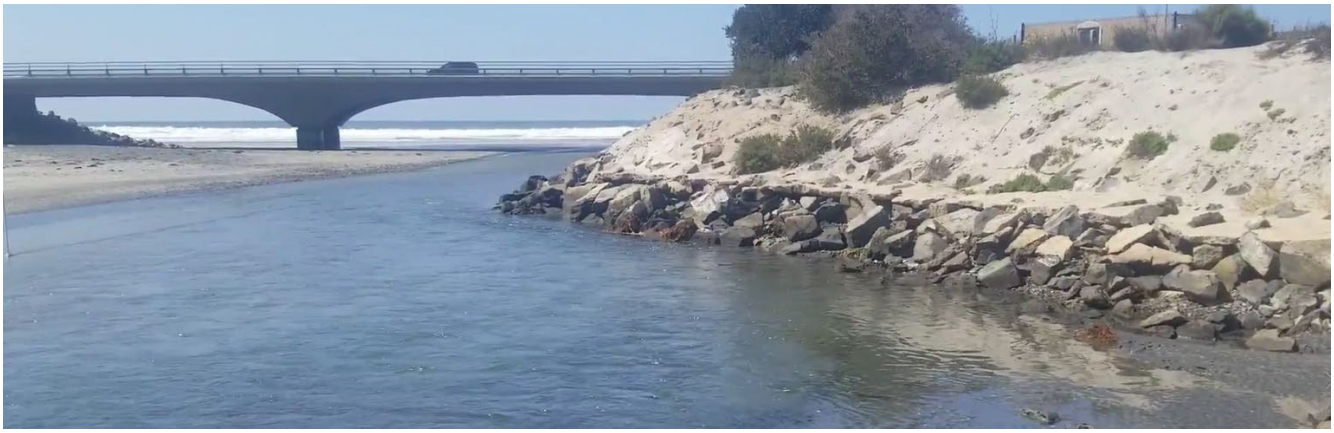

Figure 2-3. Revetment along the North Lot's southern edge

2.2 Water Levels

2.2.1 Coastal Water Levels

Water levels generally provide a good estimation of tidal flow into the Lagoon on a typical day, however the actual tidal circulation within lagoon channels is largely controlled by the status of the inlet. The tide cycle in southern California is mixed semi-diurnal, meaning that there are two uneven highs and lows for each lunar day (approximately a 25-hour time period). The La Jolla tidal gauge is the nearest station to the Project site and was chosen to represent water levels. The water level datums for the NOAA La Jolla tide station (Station 9410170) are shown in Table 2.

Table 2. Tidal Datums for La Jolla (NOAA Sta. 9410203)

Datum	Feet, NAVD88	Feet, MLLW
Highest Observed Water Level (11/25/2015)	7.62	7.81
Highest Astronomical Tide (HAT)	6.95	7.14
Mean Higher High Water (MHHW)	5.13	5.32
Mean High Water (MHW)	4.41	4.60
Mean Sea Level (MSL)	2.54	2.73
NAVD88	0.00	0.19
Mean Low Water (MLW)	0.71	0.90
Mean Lower Low Water (MLLW)	-0.19	0.00
Lowest Astronomical Tide (LAT) (01/28/1987)	-2.07	-1.88
Lowest Observed Water Level (12/171933)	-3.06	-2.87

2.2.2 Lagoon Water Levels & Tidal Circulation

A tidal prism is the volume of water in an estuary between mean high and mean low tide. An estuary's tidal prism is a useful metric to describe the ocean water circulation within an estuary or lagoon. An adequate tidal prism is critical to maintaining the overall health of the Lagoon, as ocean water regulates various factors such as water temperature, dissolved oxygen levels, and salinity. The circulation of water within the Lagoon or within tidal channels in the Lagoon system can become constrained by natural or unnatural impediments, which results in tidal

muting. Tidal muting is when the fluctuation in water level in a system or in a portion of the system is lower in amplitude than a neighboring water body, such as the ocean. Tidal muting is common in southern California estuaries as a result of development induced impediments and sedimentation.

A tidal circulation study was conducted within the Lagoon in which water level monitoring was undertaken from 2015 to 2016 at five monitoring locations, as shown in Figure 2-4. The calculated water level datums associated with each station are provided in Table 3. The diurnal tide range, or difference between mean higher high water (MHHW) and mean lower low water (MLLW), represents the typical tidal fluctuations during each lunar day. The locations with the greatest diurnal tide range of 2.9-ft are the Bridge and West Gauge stations, which is expected as these monitoring stations are located closest to the Lagoon mouth. The tides at the North Gauge station (just upstream of McGonigle Road within the Project area) revealed the most muting, as it has the smallest diurnal tide range of 1.3-ft and the water level on a typical low tide did not drop below 4-ft (NAVD88). This muting at the North Gauge is largely due to the undersized culvert at McGonigle Road, which constricts tidal flow to the northern marsh area.

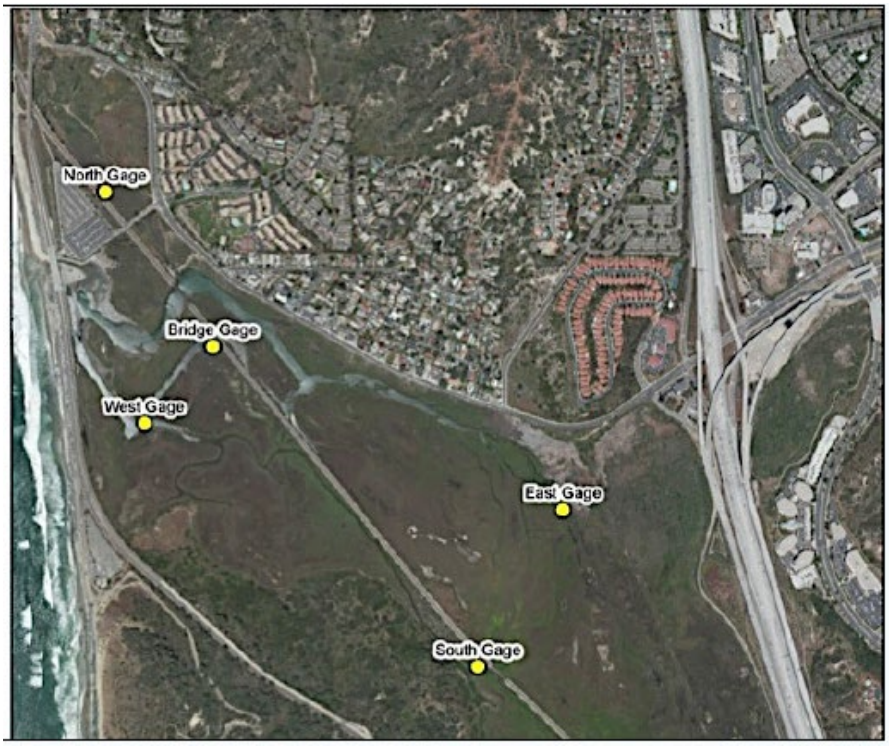

Figure 2-4. Water Level Monitoring Well Locations (ESA, 2015)

Table 3. Tidal Datums within the Los Peñasquitos Lagoon (ESA, 2015)

Datum	Feet, NAVD88				
	Bridge Gage	North Gage	West Gage	East Gage	South Gage
MHHW	5.27	5.50	5.55	5.64	5.58
MHW	4.67	5.33	4.88	5.08	5.03
MSL	3.73	4.61	4.02	4.27	4.25
MLW	2.53	4.24	2.70	3.46	3.38
MLLW	2.39	4.22	2.64	3.44	3.35
Diurnal Tide Range	**2.9**	**1.3**	**2.9**	**2.2**	**2.2**

2.3 Coastal Hazards

There are several coastal hazards that pose a risk of flooding and erosion of the North Lot. The most prominent hazards include coastal flooding due to extreme ocean water levels, fluvial flooding during extreme precipitation events or during periods of inlet closures, and inlet bank erosion from high velocity flows at the inlet or ocean wave propagation through the inlet. Sea level rise threatens to increase the frequency and severity of these hazards over time. These hazards and the basis of sea level rise projections are discussed in this section.

2.3.1 Sea Level Rise

The Ocean Protection Council (OPC) provides sea level rise (SLR) projections for 12 active tidal gauges along the coast of California. The California Coastal Commission SLR Policy Guidance, updated in 2018, recommends the use of these projections for planning, permitting and other coastal management decisions. The representative tide gauge for this Project where SLR projections are provided is La Jolla. These projections are listed in Table 4 and shown graphically in Figure 2-5.

Table 4. Sea Level Rise Projections for La Jolla (OPC, 2018)

Time Horizon	Low Risk Aversion		1-in-20 Chance	Medium-High Risk Aversion
	Likely Range, 66% Probability SLR is Between… (ft)		5% Probability Projections (ft)	0.5% Probability Projections (ft)
2030	0.7	1.2	0.7	2.0
2050	1.1	2.0	1.4	3.6
2070	1.8	3.6	2.5	7.1
2100	2.3	4.3	4.6	8.8

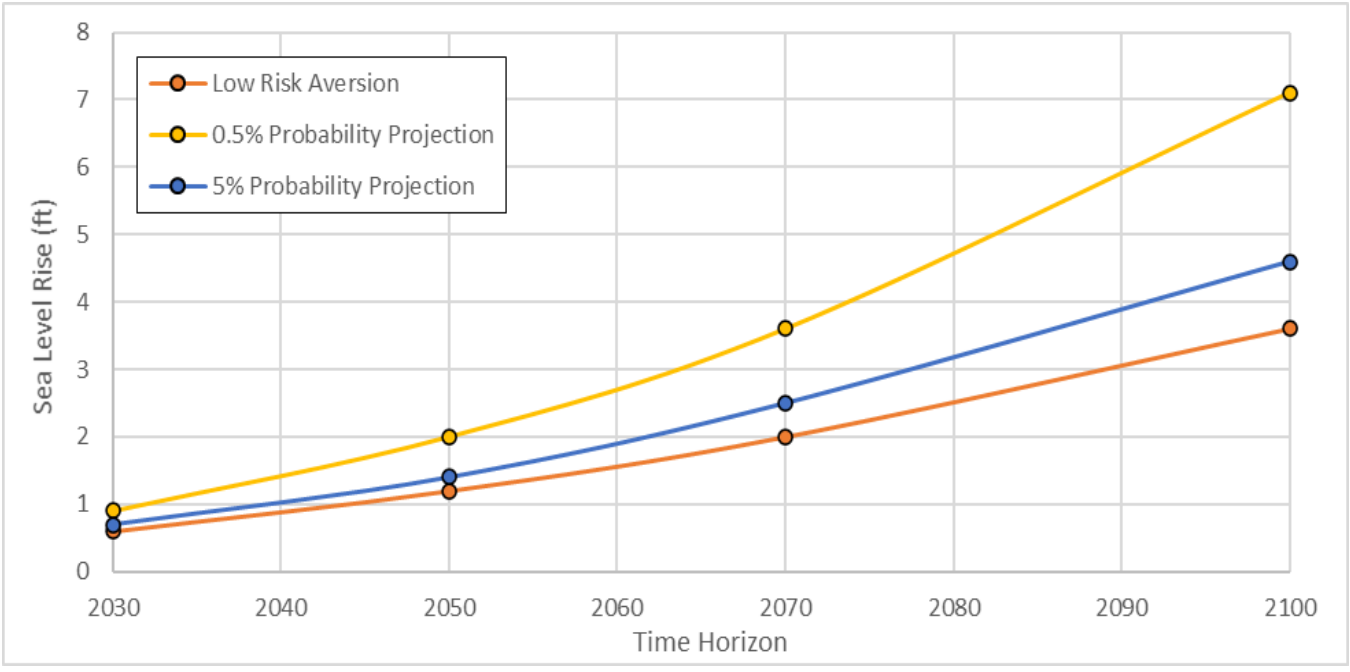

Figure 2-5. SLR Projections for La Jolla (OPC, 2018)

When using these SLR projections it is important to consider risk tolerance, risk aversion and the Project's design life when evaluating the effects of SLR on various coastal development projects. The OPC defines risk tolerance as "the level of comfort associated with the consequences of SLR and associated hazards in project planning and design". Whereas risk aversion is defined as the strong inclination to avoid taking risks in the face of uncertainty

(OPC, 2018). SLR projections are presented with various occurrence probabilities that correspond to risk aversion scenarios. The applicable risk aversion categories outlined in the state guidance include:

- **Low risk aversion**: Refers to the upper limit of the "likely range" (66% probability) SLR projections and is intended for projects with higher adaptability, meaning projects would suffer little to no damage or disruption if SLR exceeded this projection.
- **Medium-high risk aversion**: Refers to the 1-in-200 chance (0.5% probability) and is intended for projects which would suffer greater consequences (damage and disruption) if SLR exceeded this projection.

Based on the State SLR Guidance document and the California Coastal Commission Sea Level Rise Policy Guidance, the appropriate risk category for the Project is assumed to be the "medium-high risk aversion", corresponding to the 0.5% probability SLR projections.

2.3.2 Coastal Flood Hazards

The Project site is low-lying and vulnerable to flooding and inundation from the Pacific Ocean with future SLR. Site specific flood mapping was undertaken to assess the North Lot's vulnerability based on the existing site topography along with a review of the U.S. Geological Survey (USGS) Coastal Storm Modelling System (CoSMoS). Coastal flood scenarios were determined by coupling SLR with the 100-year extreme water level (EWL) for the La Jolla tidal gauge (NOAA Sta. 9410170). The SLR projections utilized for this assessment are the medium-high risk aversion scenario for La Jolla (OPC, 2018). The coastal flood hazard scenario water levels are provided below in Table 5.

Table 5. Coastal Extreme Water Levels

Time Horizon	100-yr Extreme Water Level (ft, NAVD88)	Medium-High Sea Level Rise Projections (ft)	100-yr Extreme Water Level + Sea Level Rise (ft, NAVD88)
2030	7.4	0.9	8.3
2050		2.0	9.4
2070		3.6	11.0
2100		7.1	14.5

An analysis of coastal flood pathways to the North Lot was conducted to understand its vulnerabilities to extreme water levels. Flood pathways describe how the water will travel to the site and is based on elevation with consideration of flood obstructions. Based on our analysis, elevated Lagoon water levels will overflow into the North Lot from a flood pathway along McGonigle Road at the entrance of the North Lot and in the vicinity of the existing culvert (Figure 2-6) starting at an elevation of 9.5 feet NAVD88. The southeast portion of the North Lot and McGonigle Road becomes flooded at this elevation (Figure 2-7– flood pathway 1). Elevations greater than 9.5 feet increase the extent and severity of flooding within the lot and will limit public access. A second flood pathway was identified in the vicinity of the culvert, for which there is a low point of 11 feet (Figure 2-8– flood pathway 2). Water levels greater than 14 feet NAVD88 have the potential to result in flooding of the North Lot from both of these pathways.

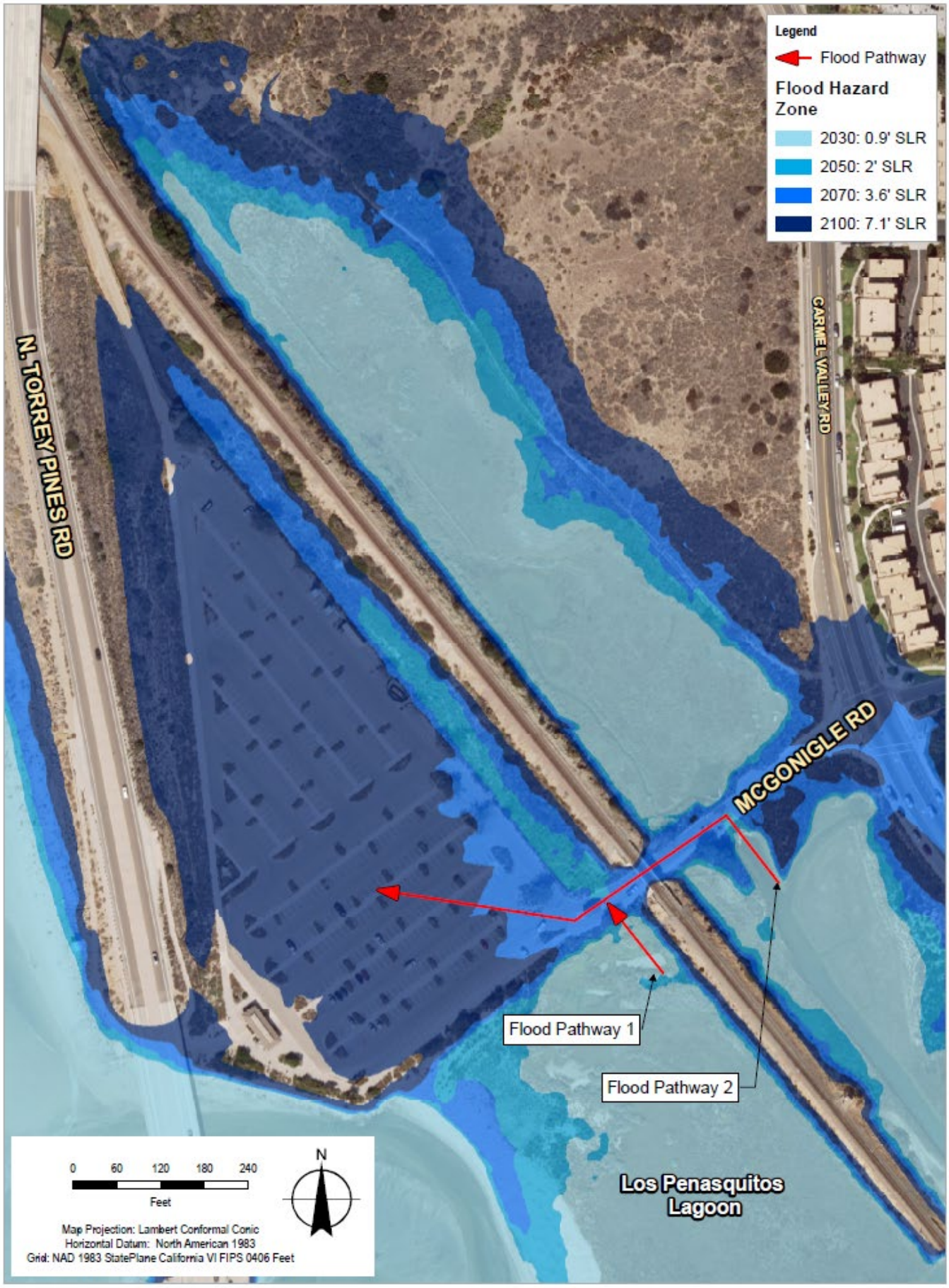

Figure 2-6. Coastal Flood Hazards

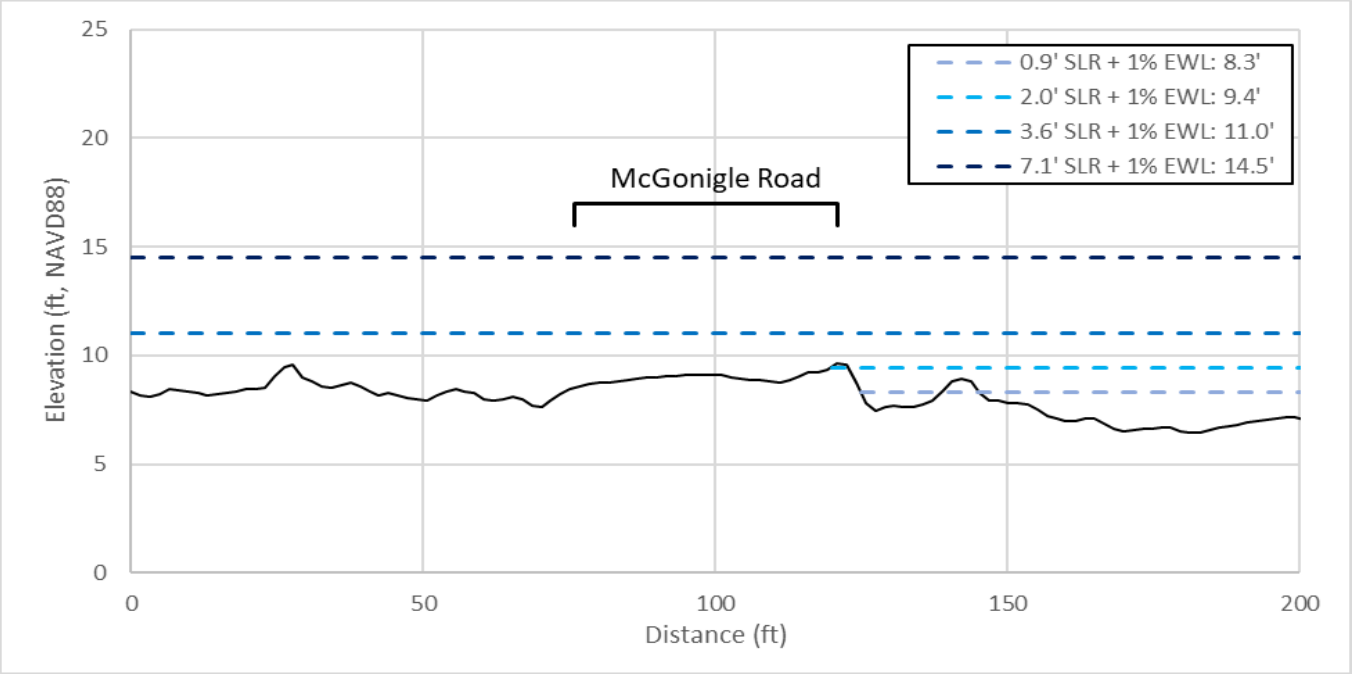

Figure 2-7. Flood Pathway 1 – Potential flood pathway into the North Lot over the Southern Bank at McGonigle Road

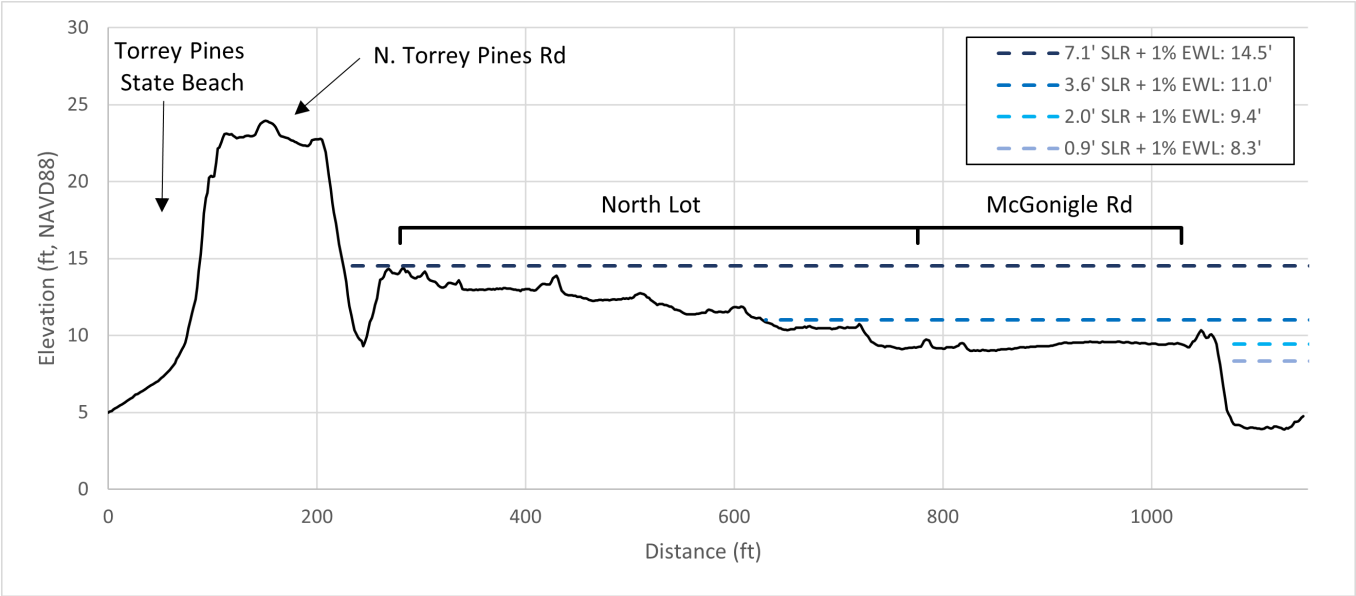

Figure 2-8. Flood Pathway 2 – Flood pathway into the North Lot from Extreme Water Levels and Sea Level Rise

2.3.3 Fluvial Hazards

The North Lot lies adjacent to the Lagoon inlet, and as such it is exposed to extreme water levels as a result of fluvial conditions (i.e., extreme precipitation events). The Lagoon's watershed is 59,212 acres so upstream input as well as the lagoon inlet's connectivity (i.e., how open or closed the inlet is) will dictate water levels. The Federal Emergency Management Agency (FEMA) provides base flood elevations (BFE) with various zone designations to characterize hazards. A BFE is defined as an extreme event that corresponds to a 1% annual exceedance probability (100-year storm). The Project area has a BFE ranging between 13 feet and 13.9 feet (Figure 2-9). During this BFE the entirety of the North Lot is flooded, which is consistent with the critical elevations determined during the flood pathways analysis above.

It is important to note that the status of the Lagoon's inlet (open vs closed) has a significant influence on water levels within the lagoon channels and can be independent of coastal and fluvial hazards. During inlet closures, water levels rise due to daily inputs of nuisance freshwater flows from the watershed. Prolonged inlet closures

often result in lagoon waters overtopping channel banks and flooding areas of high salt marsh and the marsh plain without stormwater inputs from rain events. Extreme water levels within the Lagoon can occur when precipitation events coincide with a closed lagoon inlet mouth, as shown in Figure 2-10 (LPLF, 2022).

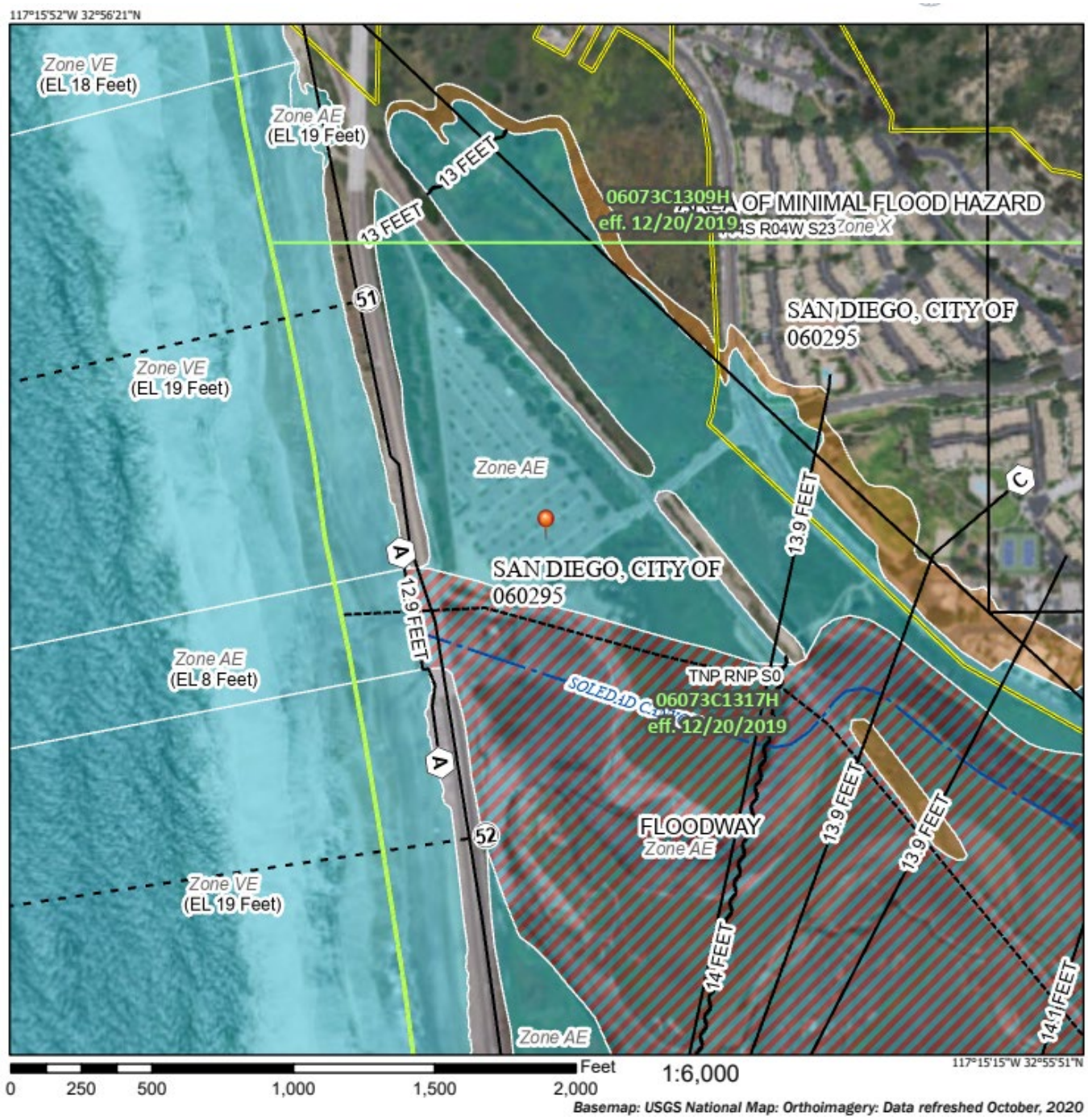

Figure 2-9. FEMA Flood Insurance Rate Map (FIRM) for the Project Area (FEMA, 2019)

Figure 2-10. Example of extreme Lagoon water levels as a result of a closed inlet mouth and coincident precipitation event (City of San Diego / LPLF, 2022)

2.3.4 Inlet Bank Erosion & Stabilization

High velocity tidal and fluvial flows through the Lagoon's inlet channel make the North Lot's southern shoreline susceptible to erosion. The shoreline is located adjacent to inlet channel's cutbank. This side of the channel is subject to erosion as high velocity tidal currents and fluvial flows act against the bank. Furthermore, during periods of high waves and tides, ocean waves can propagate through the inlet mouth and impact this shoreline (Figure 2-11). For these reasons, the shoreline has been stabilized with rock shoreline protection (RSP). The RSP appears to have been filled with concrete grout- or gunite in upper sections of the profile (Figure 2-12). The RSP begins under the low bridge where it serves as protection to the bridge abutment and beach accessway. From the bridge abutment, the structure then trends generally southeast for about 250 feet before making a 45 degree turn to the northeast (Figure 2-13). The turn or dogleg in the RSP is the location of increased bank erosion as ebb tidal currents and/or storm water runoff approach the structure head on and create eddy currents. The grouted rip rap slope is being undermined in areas at the time it was observed for this Study.

Figure 2-11. Ocean Waves Propagating into the Lagoon inlet mouth and approaching the North Lot's Southern Shoreline (Photo: LPL Inlet Camera on 12/15/2015)

Figure 2-12. Rock Shoreline Protection at the North Lot's Southern Shoreline

Figure 2-13. Rock Shoreline Protection Orientation at the North Lot's Southern Shoreline

2.4 Parking Lot Design

2.4.1 Parking Demand Study

A parking demand study was carried out to assess capacity and use of the North lot in comparison to parking capacity and use along adjacent surface streets during peak use days in the summer. The key objective of this study was to determine if reducing the size of the North Lot would result in more vehicles parking on surface streets within the adjacent communities adjacent to Carmel Valley Road. This concern was raised during stakeholder engagement. Three separate days were selected (holiday and non-holiday) to represent peak demand for on- and off-street (i.e., North Lot) parking with the intent of capturing public use patterns of the North Lot and surrounding area during this peak recreational period.

The survey data revealed that peak daily demands at the North Lot occurred during the hours of 11am - 4pm and reached a standard space maximum occupancy rate of 65% (303 out of 470 standard spaces) (Figure 2-14a). On-street parking demand was found to be greatest at the street segments immediately adjacent to the Lagoon that exceeded 80% occupancy by 10am and peak demand primarily observed between the hours of 11am – 1pm (Figure 2-14b).

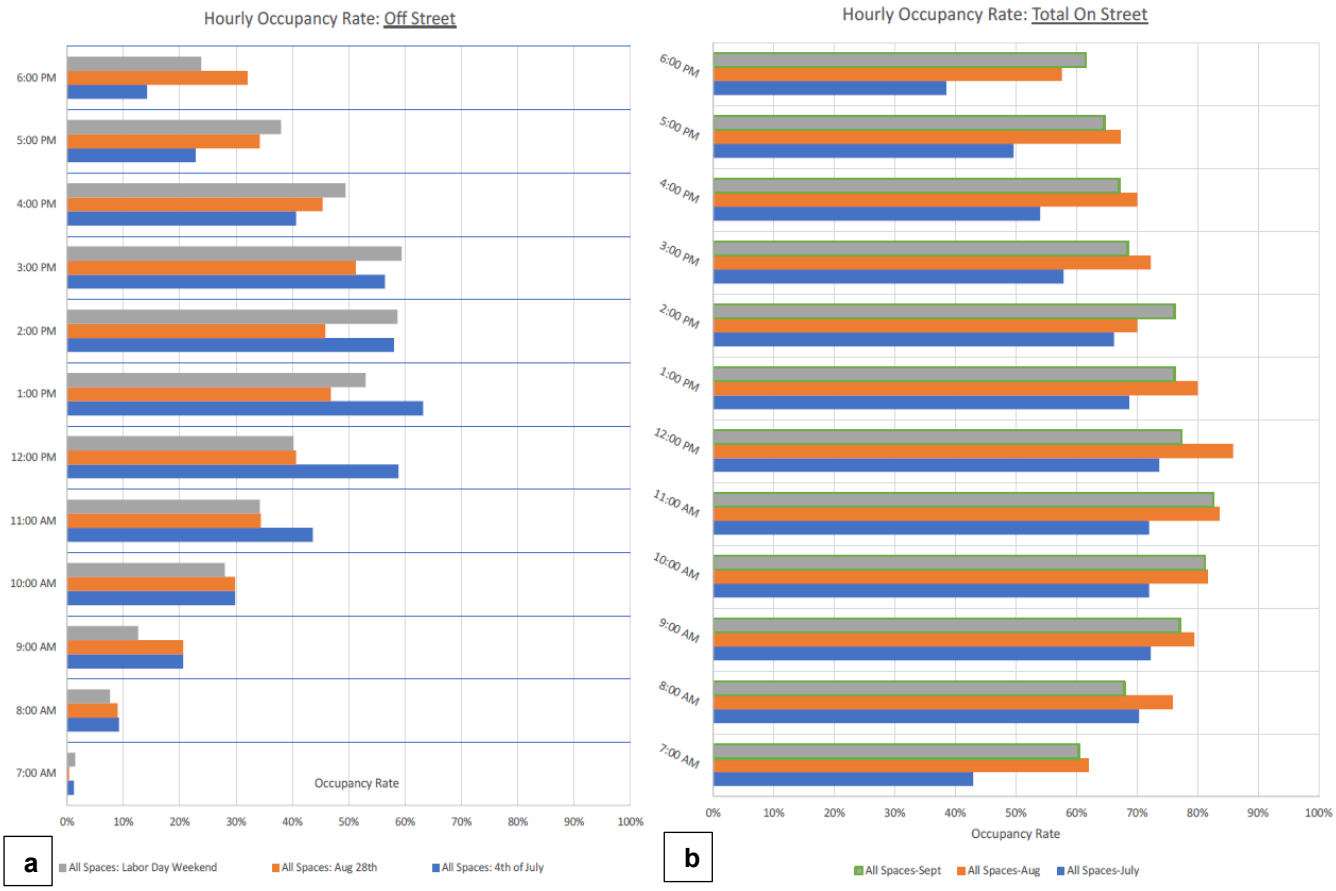

Figure 2-14. Parking Demand Study Results - Hourly Occupancy Rates for the North Lot (left) and off-street spaces (right)

Based on the findings from the parking demand study, it was determined that 121 parking spaces could be reduced from the North Lot to meet the current demand and a 15% buffer. This reduction was derived from the peak observed occupancy rate of 303 spaces with a 15% buffer (additional spaces) to account for utilization and design factors and the total count of existing standard spaces. The basis for this reduction is as follows:

- **Utilization and Design Factors:**
  - 303-space peak demand x 15% (utilization and design factors) = 46 spaces
- **Adjusted Peak Parking Demand with Utilization and Design Buffer:**
  - 303 space peak demand + 46 spaces = 349 spaces
- **Estimated Reduction in Parking Spaces:**
  - 470 existing standard spaces for non-RV vehicles – 349 spaces = 121 spaces
- **Estimated Reduction - Adjusted Total Parking Space Supply (Standard and Other Spaces):**
  - 502 total spaces – 121 spaces = 381 spaces

As shown above, 46 spaces would have to be added to the peak recorded parking demand of 303 spaces to allow for an adequate utilization and design buffer, yielding an adjusted peak parking demand of 349 spaces. And based on a total supply of 470 standard parking spaces (i.e., non-RV spaces), the number of spaces that could be reduced from the North Lot is 121. Currently, the lot has an available 502 spaces (470 standard and 32 “other”

spaces), thus the new design should allow for a minimum of 379 spaces. The full parking study and report is included as Attachment 1.

2.4.2 Reduced Parking Layouts

Several striping conceptual layouts were developed based on the proposed parking space reductions determined to be viable to meet current demands within the Parking Demand Study. These layouts reconfigure the parking design and vehicular circulation to optimize the parking space output within the smallest possible footprint. Minimizing the parking footprint allows for more habitat restoration area.

In total, four parking layout concepts were developed for the North Lot. Two concepts were developed which utilize vehicular access via McGonigle Road, and two concepts were developed that create a new vehicular access from Torrey Pines Road. These concepts use either angled or straight parking spaces, which allows for a varying total space counts and vehicular circulation. All concepts were developed with a total of eight accessible spaces.

The two concepts that were developed for access via McGonigle Road and Torrey Pines Road are shown below in Figure 2-15 and Figure 2-16, respectively. The first concept presents a combination of angled and straight parking spaces, while the second presents only straight parking. The McGonigle Road access layouts display a total of 333 spaces for the angled and straight combination, and a total of 378 spaces for the straight space layout. The Torrey Pines Road access layouts present a total of 335 spaces for the angled and straight space combination, and the straight space layout displays a total of 383 spaces. In both access options, the straight space layout allows for more parking spaces. Further parking space optimization design work will take place in the next phase of this project to balance the functionality and efficiency of the lot while minimizing its footprint.

Figure 2-15. Parking Layout Alternatives for McGonigle Road Access (Top – diagonal striping; bottom – straight striping)

Figure 2-16. Parking Layout Alternatives for Torrey Pines Road Access (Top – diagonal striping; bottom – straight striping)

2.5 Tidal Hydraulics at McGonigle Road Culvert

A 2-dimensional hydraulic model was developed for the Project area, specifically focusing on the McGonigle tidal channel that extends north from the Lagoon channel under the McGonigle Road via culvert. The model and hydraulic analysis were needed to assess the site conditions in the northern marsh, specifically the tidal muting that is attributed to the undersized culvert under McGonigle Road. The objective of the hydraulic analysis was to assess the water levels and velocities within the adjacent tidal channels, marsh and McGonigle Road culvert to identify feasible alternatives to improve circulation and reduce ponding on the north side of the culvert. The study area for the hydraulic analysis was modelled using the existing channel geometry and structures, and then with proposed Project conditions which would allow for unmuted tidal flow. The complete tidal hydraulics memorandum is included as Attachment 2.

2.5.1 Existing Conditions

The existing topography appears to limit the elevation of the low tides in the tidal channel extending from the northern marsh to the confluence with the main Lagoon channel. The tidal channel immediately downstream (south) of the culvert crossing is situated at 4 feet; therefore, water levels below elevation 4 feet would not have an effect on water levels upstream (north). Information regarding the culvert dimensions and elevations is sparse, though the diameter is estimated at 24-inches and the invert elevation is estimated to be below the tidal channel thalweg.

The hydraulic analysis of the site revealed that the McGonigle Road culvert crossing constricts flow, resulting in increased channel velocities. The analysis also revealed that culvert does not have a significant effect on water levels in the northern marsh. Velocities within the open tidal channel range from 0 to 0.5 ft/sec, while velocities within the culvert reach more than 2 ft/sec. This increase in velocity through the culvert, in combination with a low-lying invert elevation, likely contributes to scouring of sediment and persistence of the pools north and south of the culvert. Sediment that is scoured out of the culvert or pools is then put in suspension and carried to other areas of the tidal channel, where it is deposited. Accumulated sediment within the tidal channel has created topographic barriers that reduce the tidal influence in the northern marsh.

2.5.2 Proposed Conditions

The hydraulic analysis of the northern marsh and existing culvert under McGonigle Road presented above shows that topographic features within the tidal channel and immediately upstream and downstream of the culvert result in significant limitations to tidal range and prism that result in poor tidal circulation. Restoration of tidal range by excavating a dendritic tidal channel in the northern marsh and replacement of the culvert crossing to accommodate the restored tidal channel dimensions will increase the tidal prism and restore channel forming processes. The southern tidal channel is anticipated to adjust to the increased tidal prism or could alternatively be excavated to restore mature tidal channel geometry and elevations, subject to further geotechnical and hydraulic analyses. Conceptual designs of tidal channel restoration in the northern marsh are presented in Figure 2-17. The bottom elevation and geometry of the proposed tidal channel may be optimized using the empirical equations described above, habitat goals, McGonigle Road crossing design constraints, and geotechnical considerations.

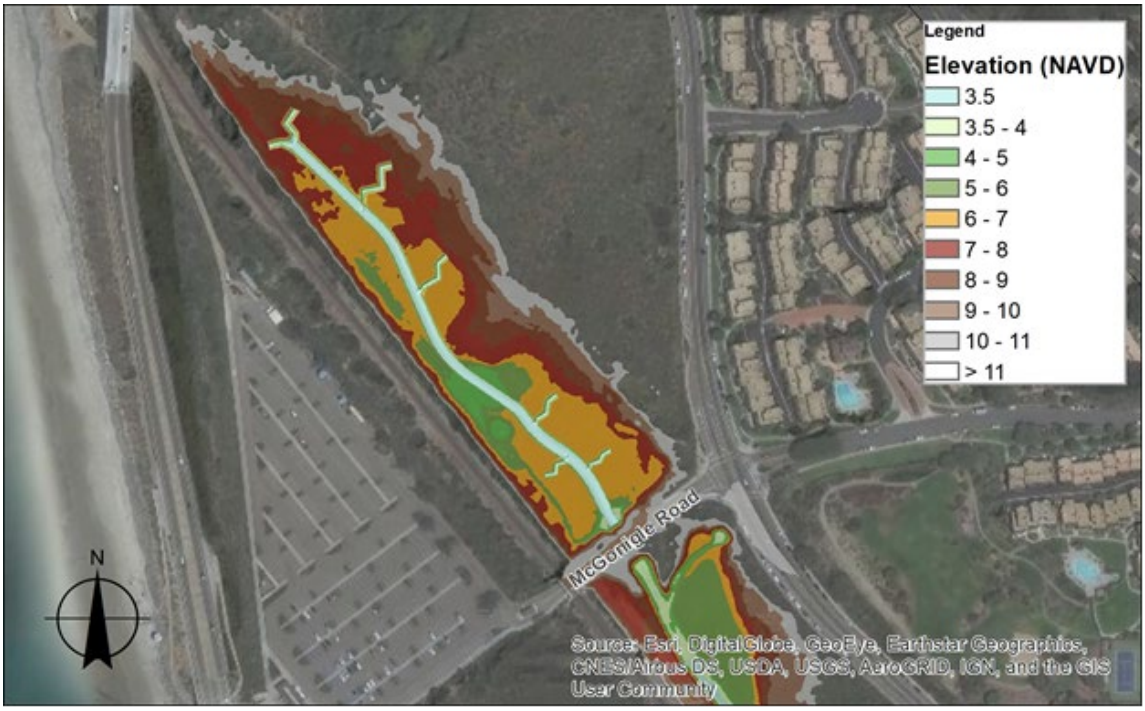

Figure 2-17. Conceptual tidal channel restoration in the northern marsh

2.6 Biological Setting

2.6.1 Vegetation

Upland vegetation types within the Project vicinity include coastal sage scrub, southern foredune, and ornamental vegetation. (SDCD, DNR, & CSP, 2015). Along the channel that flows through the McGonigle Road culvert there is a mix of halophytic wetlands southern coastal salt marsh and cismontane alkali marsh. This area also includes a small stand classified as valley sacaton grassland (composed mainly of salt grass (*Distichlis spicata*) and mudflats along this channel. Vegetation on the southern edge of the North Lot includes coastal sage scrub, southern foredunes, coastal saltmarsh and a small freshwater area that supports a stand of yellow-flag iris (*Iris pseudacorus*). This non-native species, has invaded a mudflat that that receives stormwater runoff from the parking lot.

2.6.2 Avian

The Lagoon supports a wide variety of avian species with over 164 species observed in 2021 (LPLF, 2021). There are five listed species that are known to nest or seasonally inhabit the Lagoon, including the light-footed Ridgeway's rail (*Rallus obsoletus levipes*; nesting), least Bell's vireo (*Vireo bellii pusillus*; no nesting observed), western snowy plover (*Charadrius nivosus nivosus*; winter foraging), California gnatcatcher (*Polioptila californica;* nesting) and Belding's savannah sparrow (*Passerculus sandwichensis;* nesting) (LPLF, 2021). Elegant tern (*Thalasseus elegans;* no nesting observed) is a special status species then is often observed resting on the sand spit near the lagoon inlet. The status of these species is listed in Table 6.

Table 6. Listed Avian Species in the LPL (ESA, 2018; LPLF, 2021)

Species	Status
Light-footed Ridgeway's rail (*Rallus obsoletus levipes*)	Federal: Endangered State: Endangered
Least Bell's vireo (*Vireo belii pusillus*)	Federal: Endangered State: Endangered
Western snowy plover	Federal: Threatened

Species	Status
(*Charadrius nivosus nivosus*)	State: Species of Special Concern
California gnatcatcher (*Polioptila californica*)	Federal: Threatened State: Species of Special Concern
Belding savannah sparrow (*Passerculus sandwichensis*)	State: Endangered
Elegant tern (*Thalasseus elegans*)	IUCN: Near Threatened

Of the listed species stated above, the California gnatcatcher and Belding's savannah sparrow are the listed bird species most likely to be found within the Project area. Based on data from recent surveys undertaken by ECORP (2020), the California gnatcatcher territory has been identified as the area between North Torrey Pines Road and the North Lot (Figure 2-18). A 2019 survey undertaken by Schaefer Ecological Solutions revealed that the Belding's savannah sparrow territory nests south of the Project vicinity but can be observed foraging within the North Lot and along its boundaries.

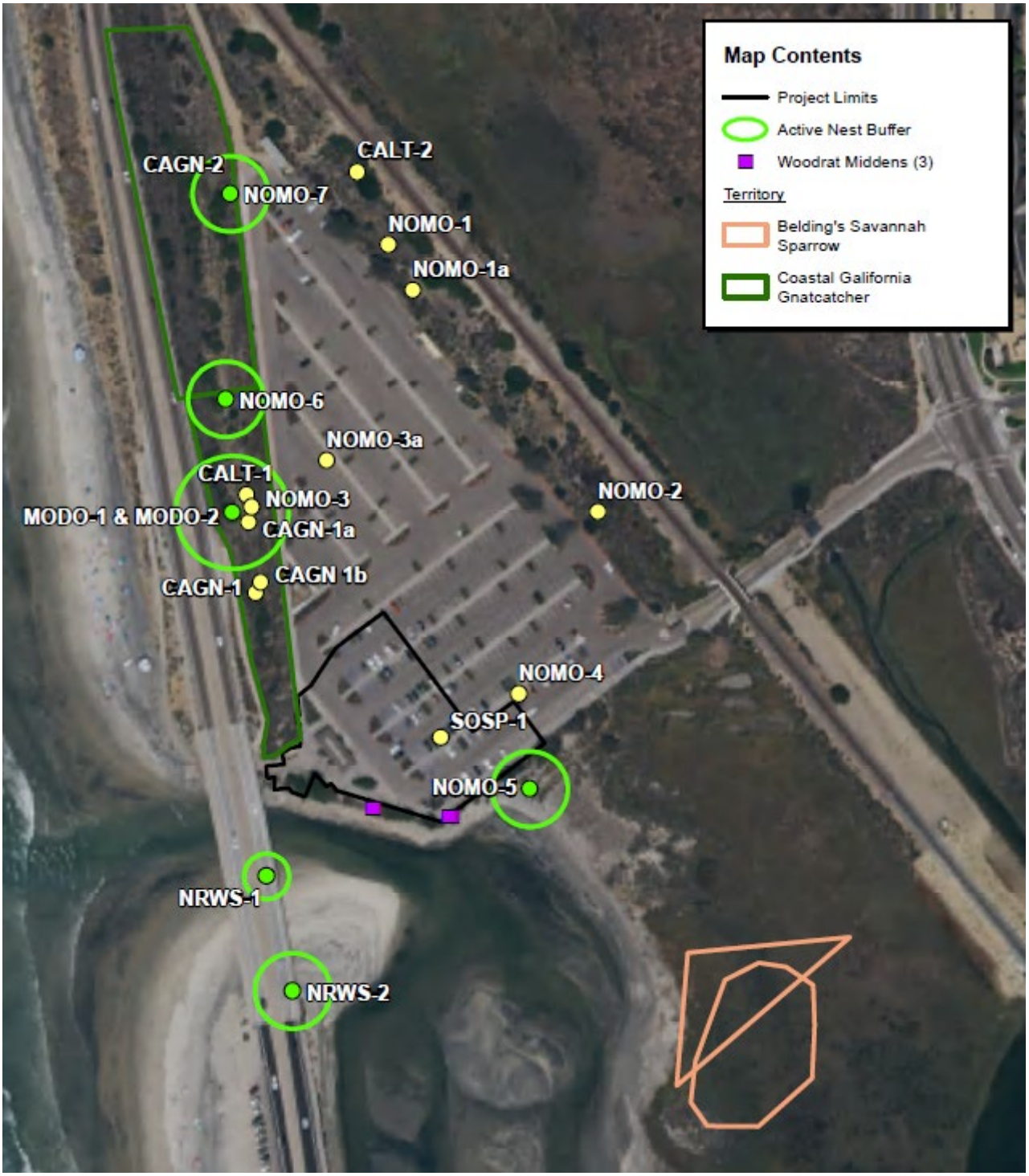

Figure 2-18. Active Avian Nests, Nest Buffers, and Territory within the Project Area (ECORP Consulting, Inc, 2020)

2.6.3 Other Special Status Plant and Wildlife Species

Several special status species can be found within the Project vicinity including wandering skipper (*Panoquina errans*), Nuttall's lotus (*Acmispon prostratus*), coast woolly heads (*Nemacaulis denudata*), red sand verbena (*Abronia maritima*). The wandering skipper is a butterfly found in high salt marsh that uses saltgrass as its larval host (ESA, 2018). It is classified as threatened under the International Union of Conservation of Nature and Natural Resources (LPLF, 2021). Nuttall's lotus is a plant species that is found in southern foredunes and is classified by CNPS as Rare & Endangered and is threatened or endangered in California (ESA, 2018). The habitat and territory of these species are shown in Figure 2-19.

Figure 2-19. Sensitive Habitat, Vegetation, & Nesting Bird Observations

3. Adaptation Strategies

Three broad adaptation strategies were initially considered in this Study and included reducing the North Lot's footprint (Reduced Footprint), relocating the North Lot to an upland location (Upland Relocation) or relocating the North Lot to an offsite location (Offsite Relocation). A number of conceptual alternatives and comparison charts

were developed for the Reduced Footprint and Upland Relocation strategies in order to receive direction from the Project team, stakeholders, resource agencies and the public. Details on each of the adaptation strategies and the concepts developed within each of these strategies are described in this section. While Offsite Relocation was presented in during stakeholder engagement, it was later abandoned since a viable offsite location could not be found within the vicinity of the northern section of the Lagoon. All concepts and comparison charts are provided in Attachment 3.

3.1 Reduced Footprint

The Reduced Footprint strategy included concepts that would decrease the total number of parking stalls in order to align more closely with the existing demand with allowance for a reasonable additional buffer (i.e., 15%). With this option, impacts to sensitive species would be minimized during construction and areas of removed infrastructure restored to native habitat and trails. Four concept designs were developed for the Reduced Footprint strategy, which included:

- **Retreat Lot to the South**: Eliminate parking spaces from the northern and eastern portions of the North Lot to make space for a restored habitat area (Figure 3-1).
- **Retreat Lot to the North**: Eliminate parking spaces from the southern portion of the lot to make space for a restored habitat area and create a buffer area for the potential northbound migration of the Lagoon inlet during flooding events (Figure 3-1).
- **Green Roof** (Two alternative layouts): Either of the above configurations constructed as an underground parking garage with a green roof (i.e., the roof of the parking garage would be planted with native vegetation) (Figure 3-2).

The Retreat to the South and North options were found to be the lowest cost for both construction and maintenance with the least amount of disturbance to sensitive species and native habitats. A key difference between these two options is related to alignment of the Lagoon inlet. Retreating the lot to the north would allow for a new inlet alignment at the entrance with a more natural curve, while retreating to the south would constrain the inlet to its existing alignment. Note that the trails shown in the strategies below are conceptual and have not been vetted with the stakeholder groups, resource agencies and the public. Further refinement would be needed to optimize the balance between recreation and habitat impacts. For instance, the trails would likely have to be more linear to avoid sensitive habitat and reduce edge effects, which is when habitat around the trail is impacted by foot traffic.

Figure 3-1. Retreat to the South (left) and North (right) Concepts

Figure 3-2. Reduced Lot with Green Roof Concepts

3.2 Upland Relocation

The Upland Relocation strategy proposes to abandon and demolish the North Lot at its existing location, reverting the area to native habitats. A new lot would be constructed at an upland location along Carmel Valley Road near its intersection with North Torrey Pines Road (Figure 3-3). Two concepts were developed for this strategy, as follows:

- **Surface Lot at Carmel Valley Road**: Relocate the North Lot to an undeveloped upland along Carmel Valley Road near its intersection with North Torrey Pines Road.
- **Carmel Valley Road Lot with Green Roof**: Relocate the North Lot to the same area and construct a green roof to 'cap' the parking lot.

Each of the concepts developed for the Upland Relocation strategy would essentially retain the overall size of the existing lot, with no net loss of spaces. This option could be scaled back to reflect a parking space reduction, if needed. Vehicular access could occur from either Carmel Valley Road or North Torrey Pines Road. New beach access pathways would be constructed with the potential for additional trail networks. McGonigle Road could also be repurposed as a drop-off area to utilize the existing beach access and/or provide access to first responder facilities. Similar to the Reduced Footprint strategy, capping the new North Lot with a green roof was also considered within this strategy.

The Upland Relocation strategy provides more long-term resiliency to SLR and coastal hazards which could justify more investment in amenities (e.g., interpretive center) and infrastructure (improved first responder facilities). Key disadvantages associated with the Upland Relocation strategy were the proximity to private commercial property (i.e., Del Mar Car Care), walking distance to the beach, and impacts to coastal sage scrub that provides habitat for listed species.

Figure 3-3. Concept designs for Carmel Valley Road Large North Lot (left) and green roof (right)

3.3 Offsite Relocation

The Offsite Relocation strategy of the North Lot proposed to abandon and remove the North Lot at its existing location, restoring the area to native habitats. A new lot would be moved to an offsite location within the vicinity of the North Lot's current location. The Sorrento Valley Park and Ride lot at I-5 and Carmel Valley Road and a nearby Caltrans lot used to store equipment and material were determined to be the only spaces available for the relocation of the North Lot. Both would require acquisition of this lot from Caltrans and a shuttle system to bring users to the beach. Neither location was considered viable based on conversations with the stakeholders and agreement from the Project team. The offsite strategy was not carried forward.

4. Community & Stakeholder Outreach

Stakeholder engagement was conducted early in the Project's planning phase to solicit input from users that included residents of nearby communities, non-profit groups active in the Reserve, and those that access the North Lot by automobile. Efforts consisted of direct engagement to specific groups, public workshops and online surveys to implement a stakeholder driven process that helped guide the development and selection of managed retreat approaches and design concepts for the North Lot.

4.1 Stakeholder Meetings

Direct engagement to stakeholder and resource agencies included in the outreach process included:

- Torrey Pines Conservancy and Torrey Pines Docents
- University City Planning Group
- Torrey Pines Community Planning Board
- Del Mar City Council
- State Parks Junior Lifeguard Program
- Surfrider Foundation
- Native American Tribes

These events and meetings are summarized below.

4.1.1 Torrey Pines Conservancy and Torrey Pines Docents

LPLF worked closely with the Torrey Pines Conservancy and the Torrey Pines Docents, targeting their large membership base with emails and website updates for the project and notifications for public workshops. LPLF was invited to present the project to the Torrey Pines Conservancy's Board of Directors on 18 September 2019 and later to the Torrey Pines Docent's Board of Directors on 8 August 2020. LPLF was then invited to present in the 2020 Torrey Pines Speaker Series where the project was introduced to membership of both groups on 26 September 2020 as part of the updated Lagoon Enhancement Plan. Overall feedback was very positive given the project's approach to recover habitat by reducing the parking lot in its current location with some concern expressed about relocating the lot to an upland location due to impacts to coastal sage scrub habitat. Some members even supported removing the North Lot completely, though they acknowledged potential impacts to park visitors, especially those from inland communities.

4.1.2 University City Planning Group

LPLF was invited to present the project to the University City Planning Group (UCPG) on 13 October 2020. UCPG represents community members and local businesses located primarily in Sorrento Valley and near the University California San Diego campus. Similar to the presentation given to the Torrey Pines Conservancy and Torrey Pines Docents, the project was presented within the context of the updated Lagoon Enhancement Plan and did not receive any comments.

4.1.3 Torrey Pines Community Planning Board

LPLF was invited to present the project to the Torrey Pines Community Planning Board and members of the community on 12 November 2020. The community of Torrey Pines is located adjacent to the Lagoon along its northern border along Carmel Valley Road. A PowerPoint presentation was provided followed by Q&A session. Several members of the community have expressed concern that reducing the size of the North Lot will impact parking on residential streets which already receives a high volume of parking for beach goers and for businesses that include several restaurants, a salon, chiropractor office and coffee shop. As a result, a Parking Demand Study was conducted for the North Lot and adjacent surface streets (as discussed in Section 2.4). Results of the study

indicate that the lot is underused even during peak hours on summer holiday weekends and that street parking reaches capacity early in the day with capacity sustained through the day during peak use days.

4.1.4 City of Del Mar Council Meeting

LPLF was invited to present the project to the Del Mar City Council and members of the Del Mar community in attendance on 2 February 2021. The City Council meeting was held on Zoom due to public gathering restrictions caused by the COVID pandemic. It was attended by 204 viewers and the following councilmembers:

- Terry Gaasterland (Mayor)
- Dwight Warden (Deputy Mayor)
- Dave Druker
- Dan Quirk
- Tracy Martinez

Comments received during the City Council meeting included considerations to potential railway alignments and including a platform at the North Lot. There was also a question regarding modelling of sea level rise and whether it included waves and storm surge. Overall, councilmembers preferred the Reduced Lot Footprint strategy and had issues with the proposed Upland Retreat strategy due to:

- it being within the City of Del Mar,
- conflicts with existing buildings (auto shop and real estate office),
- potential impacts to view corridors from houses,
- potential impacts to recent improvements to storm drain outfalls,
- increasing the distance of beach accesses, and
- habitat impacts.

4.1.5 State Parks Junior Lifeguard Program

The State Parks Junior Lifeguard Program uses the North Lot as a staging area that includes drop off and pickups at the northern beach access trail for this popular program. LPLF requested and received their 2021 master email list to include in email blasts for public workshops and online surveys since the Junior Lifeguard Program represents a large user group active in the North Lot.

4.1.6 Surfrider Foundation

Another key user group at the North Lot are surfers. The San Diego Chapter of the Surfrider Foundation was contacted to disseminate information to its membership about the project, invitations to public workshops and links to the online surveys. Follow up communication included briefing Surfrider Foundation staff on the project, approaches considered for managed retreat, potential project elements and timeline.

4.1.7 Native American Engagement

State Parks cultural resource management staff contacted Native American Tribes to identify those interested in the project. Correspondence indicating interest in the project was received from the San Pasqual Band of Mission Indians and a PowerPoint presentation was given to tribal representatives on the on 17 November 2021 with offers to further coordinate efforts when the project moves toward full design and CEQA.

4.2 Resource Agency Engagement

Direct engagement with resource agency staff was conducted to solicit input and guidance, as well as identify any potential “red flags” from a coastal planning and regulatory perspective with regard to the preferred approach and design concepts developed for the managed retreat of the North Lot. A virtual workshop was held on 8 March 2022 with representatives from the following resource agencies participating:

- State Parks
- State Coastal Conservancy (SCC)
- California Coastal Commission (CCC)
- California Department of Fish & Wildlife
- San Diego Regional Water Quality Control Board (RWQCB)
- U.S. Army Corps of Engineers (USACE)
- U.S. Fish & Wildlife

Overall, the agencies preferred the Reduced Lot Footprint (Northern Retreat of lot) strategy that keeps McGonigle Road as the access point for vehicles. Specific comments and concerns received from the agencies included the following:

- Realignment of the revetment will require strong justification since CCC will prefer no revetment.
    - Need to show why not having scour protection is infeasible.
    - Provide analysis of design alternatives to staff and provide a “least impactful” option.
    - Protection of rare/sensitive habitat is typically favored over public access.
- Replacing McGonigle Road with an entrance/exit at North Torrey Pines Road could be difficult.
    - Traffic impacts along a major coastal corridor would be a major concern.
    - Would require City of San Diego support, input that may include requiring additional elements (e.g., traffic light).
- Concerns regarding trails in upland area, north of McGonigle Road.
    - Potential concern for impacts associated with trail footprint for habitat and listed species (e.g., California gnatcatcher).
    - May want to consider a more linear approach to shorten trail length to reduce impacts and minimize use of view platforms or eliminate them completely.
- Upland retreat options may not be possible due to impacts/take of pristine habitat that will be considered ESHA.

4.3 Public Workshops & Online Surveys

In total, two public workshops were conducted in a virtual setting due to the Covid in-person limitations. The general format of these workshops included a Project presentation, facilitated discussion, and interactive surveys. The two public workshops are summarized below.

4.3.1 Public Workshop 1

The first public workshop was held on February 17, 2021 via Zoom. This workshop was held to introduce the discussion about the need to proactively plan for climate change and concepts such as managed retreat and living shorelines. The presentation included the purpose and timing of stakeholder engagement early in the planning process, the Project need, background, key components and timeline. The workshop then touched upon the history of the North Lot and why its current design makes it vulnerable to inundation from projected sea level rise scenarios. The presentation concluded with draft concepts and selection criteria that were generated to identify

different approaches that included working within the existing footprint of the North Lot, retreating the lot to an upland location, a hybrid of these two approaches and offsite relocation. Interactive surveys were also conducted during the presentation to gain a better understanding of the participants and what they valued most at the North Lot. Results from these surveys are provided in Attachment 4 with some key findings provided below:

- Primary Use (Multiple Choices Allowed): 97% of respondents selected active recreation as the top reason for using the North Lot, followed by access to amenities (49%) and passive recreation (46%).
- Access to the Lot: 58% of the respondents access the North Lot by automobile and 36% by walking or riding their bike.
- Proximity to the Lot: 50% of the respondents lived near the North Lot (e.g., Del Mar or Torrey Pines), 28% lived in a community 5-15 miles away, 19% lived in a community up to 5 miles away and 3% lived in a community further than 15 miles away.
- Additional Features (Multiple Choices Allowed): 78% of the respondents preferred native habitats and landscapes and 73% chose hiking trails and overlooks.
- Most Valued Features (Multiple Choices Allowed): 97% selected access to the beach, 62% available parking, and 62% showers and bathrooms.

4.3.2 Public Workshop 2

A second public workshop was held on March 30, 2021 via Zoom. Beginning with an overview and summary of Public Workshop 1, participants then joined breakout groups to review, evaluate and provide input on the proposed approaches and design concepts for managed retreat using a reduced footprint at the existing location of the North Lot, upland relocation of the lot, a hybrid version that mixed a reduced footprint with upland relocation, and offsite relocation with the current parking lot area returned to habitat. Interactive surveys were also conducted during the presentation to gain a better understanding of the participants and what they valued most at the North Lot. Results from these surveys are provided in Attachment 4 with some key findings provided below:

- 57% of respondents preferred the hybrid approach (reduced footprint and upland relocation) with the possibility of phasing upland retreat later when needed.
- 43% of the respondents preferred either the reduced footprint or upland relocation.

4.3.3 Online Surveys

Online surveys using Microsoft Forms and Sogo Survey platform (sogosurvey.com) were used to better solicit input from the public and to interact with individuals and user groups who were unable to attend presentations and public workshops. Links to the surveys were disseminated via email blasts from targeted groups (e.g., State Parks Junior Lifeguards, Torrey Pines Conservancy, Torrey Pines Docents, Surfrider), provided in presentation slide decks, provided on the LPLF website (http://www.losPeñasquitos.org/managed-retreat-north-beach-parking-lot/) and posted onsite at the North Lot at the trailhead of both beach access points.

The online surveys were the most successful in gathering user group input and preferences for managed retreat of the North Lot. Two online surveys were held throughout the outreach process. With 218 respondents, Survey 1 one provided information on user group backgrounds, priorities and preferences. Top ranking answers were the following:

- 95% of participants cite access to active recreation as their primary use of the lot.
- 32% of participants either lived in a community located near or within 5 miles the North Lot and 30% lived between 5-15 miles away from the lot.
- 84% of participants access the North Lot by automobile.
- 89% of participants value access to the beach and 86% for available parking.
- 55% of participants would like to see the addition of trails and overlooks as new features of the North Lot, while 51% preferred native habitat and landscapes.

With 124 respondents for Survey 2, participants were able to rank approaches and design concepts for managed retreat of the North Lot. A reduced parking lot option ranked highest as the preferred approach with habitat being restored in the vacated area. The results indicated that the top three concepts are:

1. Reduced Lot in Existing Footprint: Retreat to the North
2. Reduced Lot in Existing Footprint: Retreat to the South
3. Reduced Lot in Existing Footprint: Retreat to the South with Green Roof

4.4 Stakeholder Engagement Results

Stakeholder engagement provided insightful and valuable input with regard to the managed retreat approaches, strategies, design concepts, and valued amenities for the North Lot. Overall, the Reduced Footprint: Retreat to the North strategy ranked the highest among stakeholders. This preference was also supported by State Park and resource agencies as it provided the opportunity to preserve public access while incurring the least amount of impacts to sensitive habitats, listed species, and cultural resources. Selecting this strategy also allowed for a phased approach whereby a low-cost option could be pursued in the near-term within the existing footprint with the understanding that the North Lot could eventually be relocated to an upland location if needed due to SLR. Based on these reasons, the Reduced Footprint: Retreat to the North strategy was carried forward into alternative development and refinement.

5. Project Alternatives

Three alternative design concepts were developed based on the Reduced Footprint: Retreat to the North strategy. Each alternative aimed to balance stakeholder values and preferences with the Project's stated goals and objectives. The alternatives design concepts developed were as follows:

- Alternative 1 – Reduced Lot Footprint: Enhance Existing
- Alternative 2 – Reduced Lot Footprint: Replace and Reconfigure
- Alternative 3 – Reduced Lot Footprint: Replace and Reconfigure with new Access Point

Common elements provided by each of the three alternative concept designs include:

- Reduce the North Lot by 121 parking spaces.
- Convert removed infrastructure to restored habitat area.
- Improve State Parks Lifeguard facilities.
- Construct a stormwater infiltration swale along the edge of the proposed North Lot to capture and treat runoff.
- Provide improved tidal connection to the salt marsh area north of McGonigle Road.
- Provide other amenities, such as nature trails, interpretive panels and parking lot amenities (i.e., EV charging stations, ADA, etc.).

Each alternative concept design is described in detail in the following sub-sections.

5.1 Alternative 1 – Reduced Lot Footprint: Enhance Existing

Alternative 1 proposes to utilize most of the existing infrastructure of the North Lot in its current configuration. Vehicular access would continue via McGonigle Road and the reduced parking lot will remain mostly unchanged in terms of striping, islands, etc. The two acres of demolished parking lot would be converted to Diegan Coastal Sage Scrub habitat and the existing restrooms and beach access paths would remain in place. The RSP along the south end of the North Lot would also remain in its current location and elevation. Stormwater improvement retrofits would be constructed to direct stormwater flows to new biofiltration areas for capture and treatment to improve the water quality. The undersized culvert at McGonigle Road would be replaced with a new widened, natural-bottom culvert to improve tidal connectivity to the marsh north of McGonigle Road. Alternative 1 is shown below in Figure 5-1 (plan) and Figure 5-2 (section).

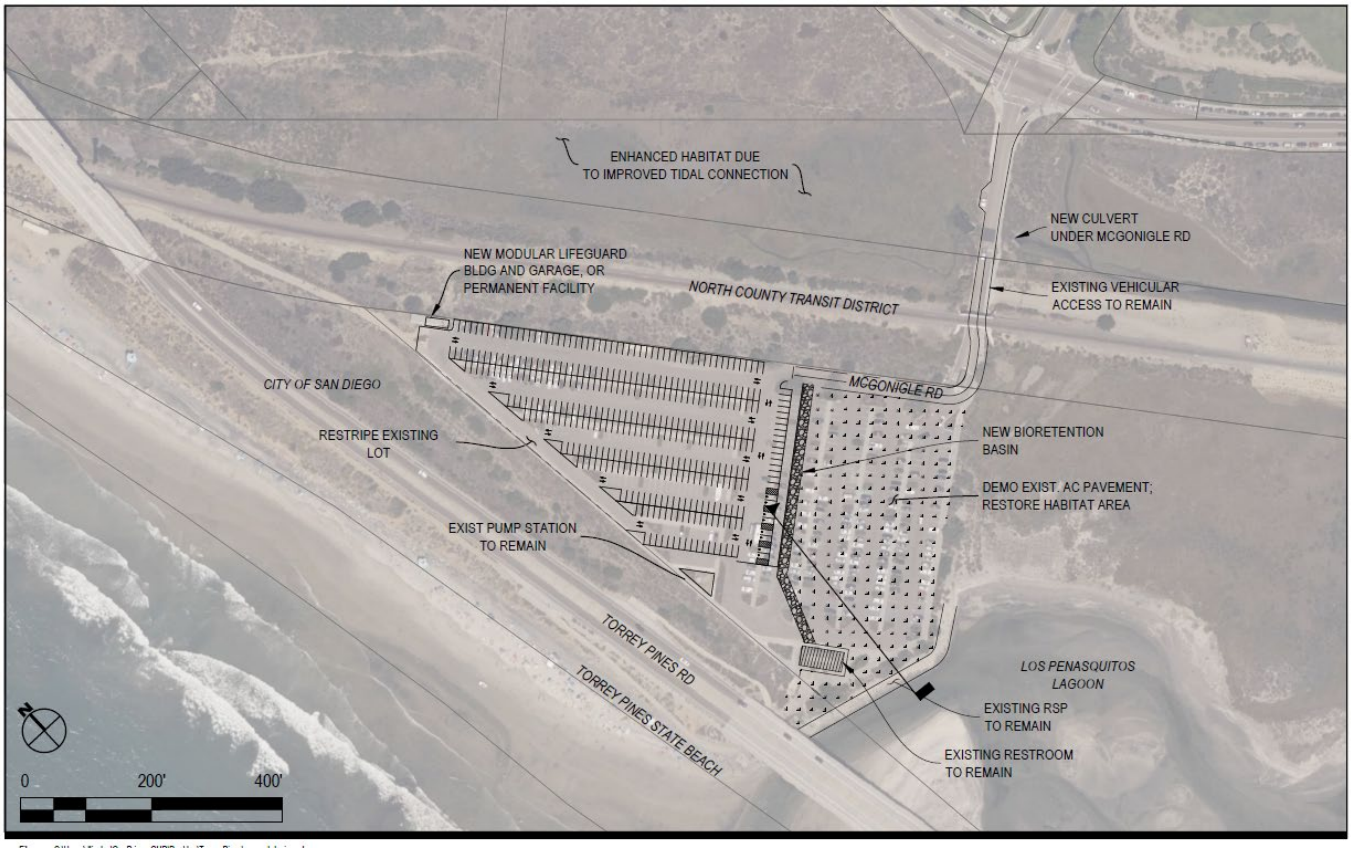

Figure 5-1. Alternative 1 - Plan View

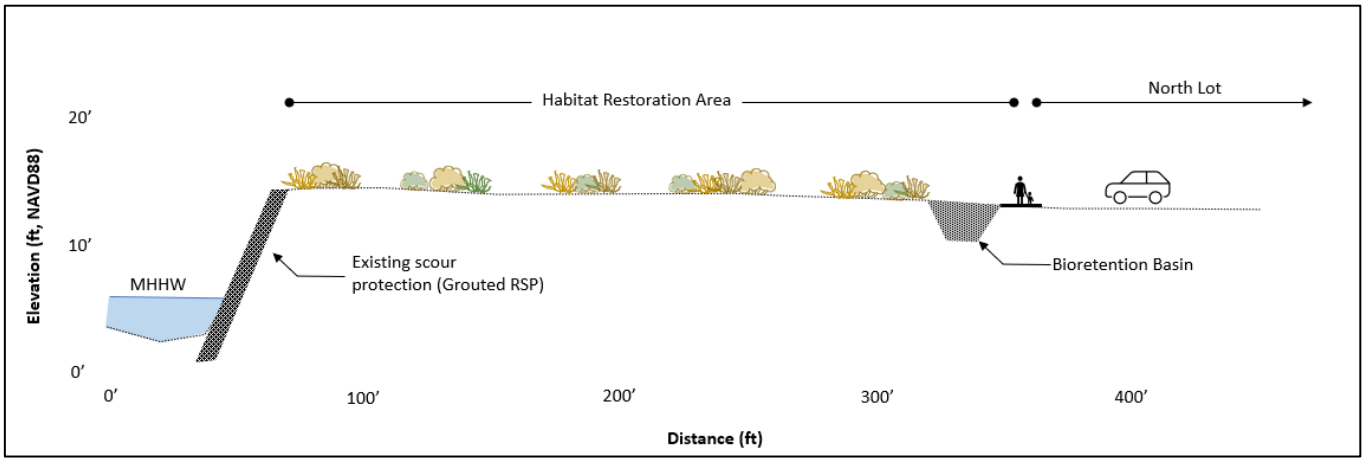

Figure 5-2. Alternative 1 – Section View

5.2 Alternative 2 – Reduced Lot Footprint: Replace and Reconfigure

Under Alternative 2, the existing RSP along the Lagoon inlet will be removed and replaced with a more naturalized protection system to stabilize the shoreline along the inlet channel from erosion while providing flood protection to the lot from extreme water levels. The new structure would consist of a shallow crested and buried RSP along the inlet channel to provide scour protection from high velocity channel flows. A buried cobble berm and dune would be constructed behind the RSP to provide flood protection against extreme water levels. The area between these two shoreline protection elements would be restored to a Coastal Dune habitat type that would transition to Diegan Coastal Sage Scrub habitat with the increasing elevation (i.e., ecotone slope) to provide a diversity of habitat. All of the North Lot's pavement and related surfaces would be completely demolished as part of this alternative and would be replaced with a Low Impact Development (LID) / Green Infrastructure parking lot with pervious pavers,

bioretention features, etc. to improve the stormwater runoff water quality. The existing restrooms would be moved or a new restroom would be constructed at a more northerly location to allow for the new inlet configuration. Under this alternative, the existing undersized culvert at McGonigle Road will be replaced with a new widened natural bottom culvert to improve tidal connectivity to the marsh north of McGonigle Road. Alternative 2 is shown below in Figure 5-3 (plan) and Figure 5-4 (section). An example low impact development parking lot with many of the features being proposed within this alternative is Steven's Park in Santa Barbara (Figure 5-5).

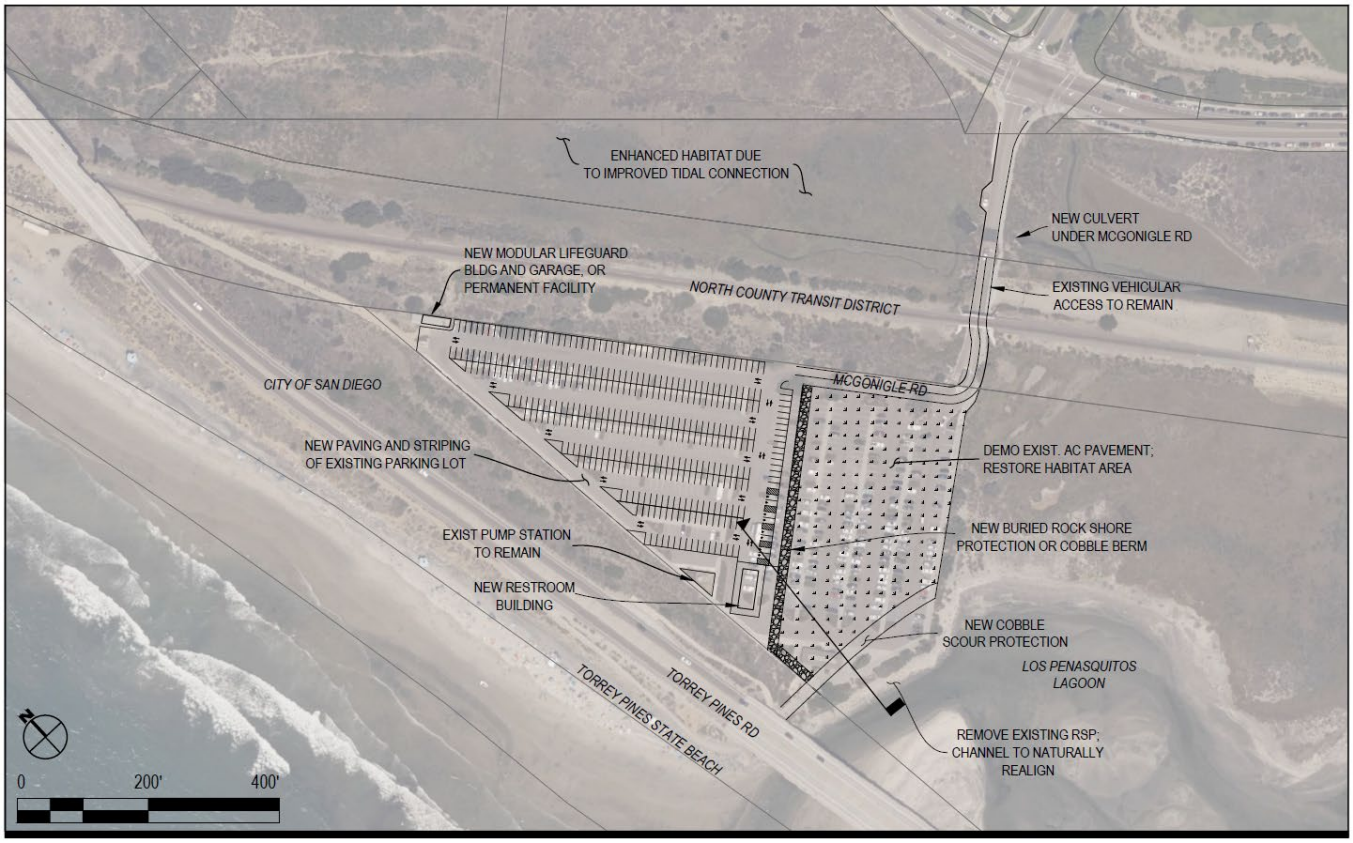

Figure 5-3. Alternative 2 – Plan view

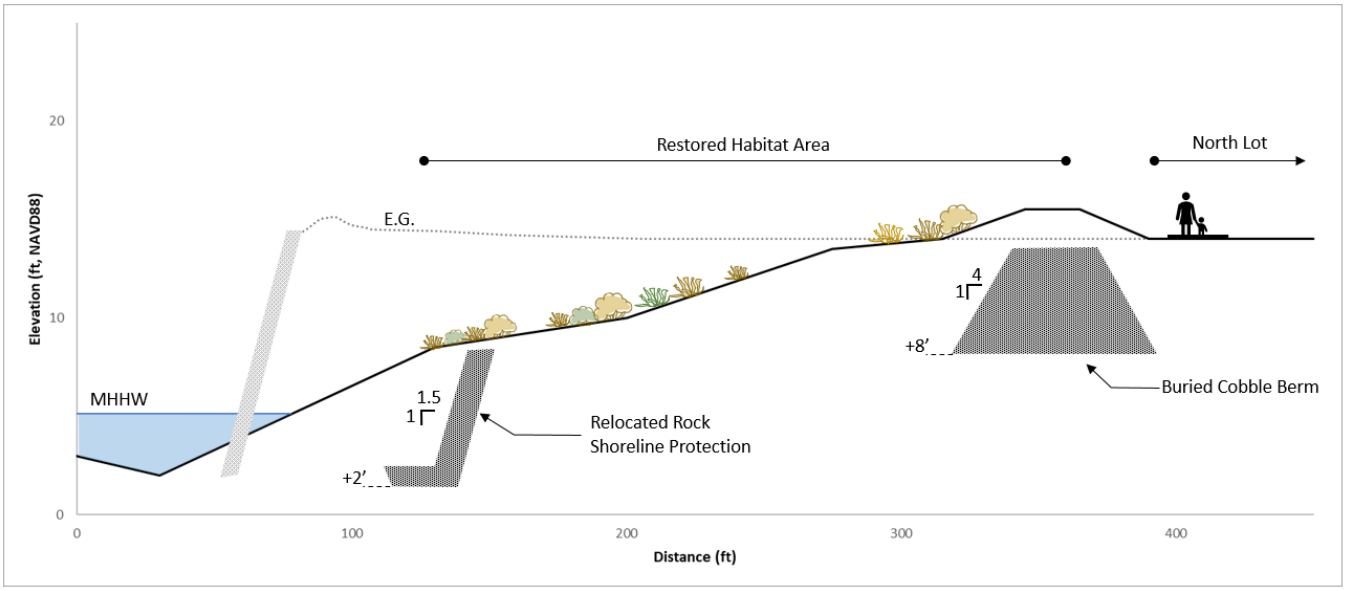

Figure 5-4. Alternative 2 - Section View

Figure 5-5. Example Low-Impact Development Parking Lot – Steven's Park, Santa Barbara

(Photo: https://santabarbaraparks.com/parks/stevens-park/)

5.3 Alternative 3 – Replace and Reconfigure with New Access Point

Alternative 3 is substantially similar to Alternative 2 except that it removes McGonigle Road as the access point to the North Lot and provides a new vehicular ingress / egress from North Torrey Pines Road. With this alternative, McGonigle road and its fill prism would be demolished and replaced by a new elevated boardwalk to allow for pedestrian access while improving hydrology and habitat connectivity to the area north of road's existing alignment. This alternative would include identical LID / Green Infrastructure elements as Alternative 2 and would similarly have to relocate or build a new restroom facility at a more northerly location. Close coordination with the City of San Diego would be required for this alternative since North Torrey Pines is a City of San Diego roadway. It is assumed that the City of San Diego would most likely require some type of traffic control measure (e.g., traffic signal) to provide safe access to and from the North Lot. Alternative 3 is shown below in Figure 5-6 (plan) and Figure 5-7 (section).

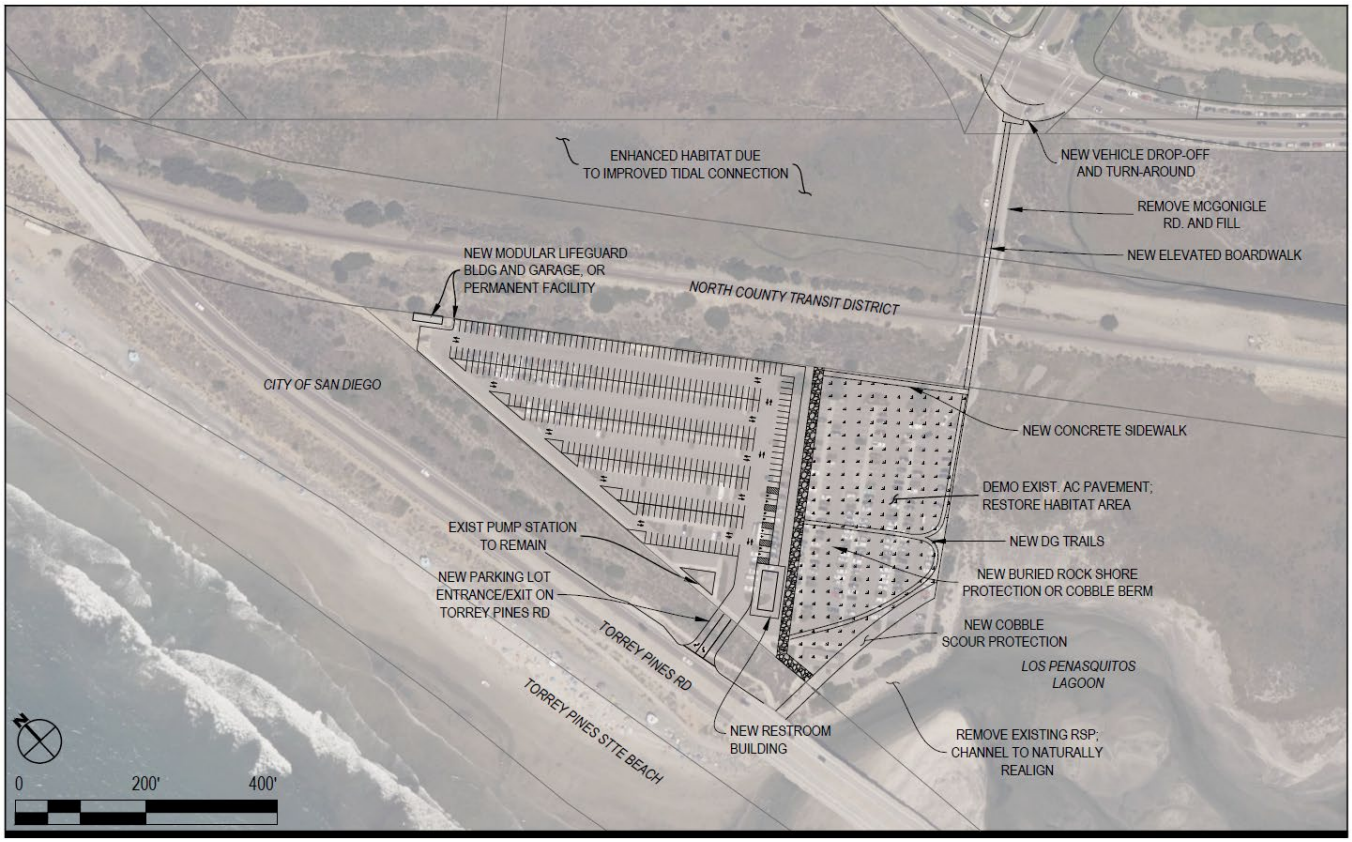

Figure 5-6. Alternative 3 – Plan View

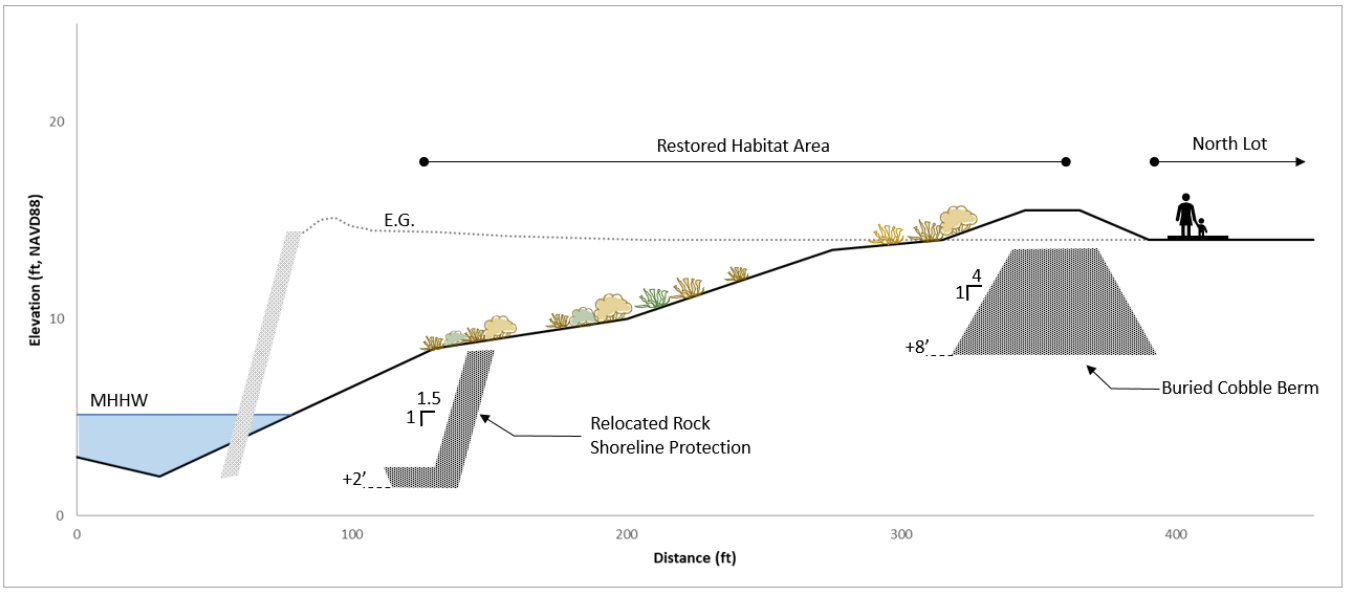

Figure 5-7. Alternative 3 – Section View

6. Construction Cost Estimates

Opinions of probable construction costs were developed for each of the three Project alternatives. The estimates include major elements of the alternatives as well as some level of maintenance and contingency. The estimates for each of the alternatives are summarized in Table 7. As shown, Alternative 3 is the most expensive option, while Alternative 1 is the least costly. The detailed estimates are provided in Attachment 5.

Table 7. Opinions of Probable Construction Costs for Three Alternatives

Item	Alternative 1 ($M)	Alternative 2 ($M)	Alternative 3 ($M)
Mobilization /Demobilization	$0.7	$0.7	$0.7
Demolition	$0.1	$0.5	$0.6
Earthworks	$0.4	$1.1	$1.2
Parking lot	$0.3	$1.5	$1.5
Buildings	$2.0	$3.0	$3.0
Site improvements	$0.7	$2.0	$6.2
Planting	$0.4	$0.4	$0.4
Closeout and Demobilization	$0.3	$0.3	$0.3
Construction Subtotal	**$4.9**	**$9.5**	**$13.8**
Non-Construction Subtotal (Fees / other construction costs)	$1.3	$2.6	$3.0
Construction & Non-Construction subtotal	**$6.3**	**$12.1**	**$16.9**
Total including 30% contingency	**$8.2**	**$15.7**	**$21.9**

7. Habitat Restoration Plan

Each of the alternatives consists of restoration of habitat in an area currently occupied by the North Lot. The area restored varies by alternative and is summarized in Table 8.

Table 8. Habitat Restoration Summary

Alternative No.	Area (ac)	Habitat Area Description	Restored Habitat Types
Alternative 1	2.2	Southern edge of North Lot	Diegan Coastal Sage Scrub
Alternative 2	2.1	Ecotone slope along the southern edge of North Lot.	Coastal Dune & Diegan Coastal Sage Scrub
Alternative 3	2.5	Ecotone slope along the southern edge of North Lot & Restoration of habitat along existing McGonigle Road alignment.	Coastal Dune & Diegan Coastal Sage Scrub

The proposed habitat types to be restored varies between Coastal Dune and Diegan Coastal Sage Scrub within the alternatives. Plant palettes were developed for both of these habitat types and is provided in Table 9 below.

Table 9. Plant Palette for Habitat Restoration Areas

Dune Habitat Plant Palette		
Scientific Name	**Common Name**	**Type**
Abronia umbellata	Pink sand verbena	rose pot/seed
Abronia maritima	Red sand verbena	rose pot/seed
Camissoniopsis cheiranthifolia	beach evening primrose	rose pot/seed
Distichlis littoralis	saltgrass	rose pot/cuttings
Diegan Coastal Sage Scrub Plant Palette		
Scientific Name	**Common Name**	**Type**
Artemisia californica	California sagebrush	gallon
Distichlis spicata	saltgrass	rose pot/cuttings
Encelia californica	bush sunflower	gallon
Eriogonum fasciculatum	California buckwheat	gallon
Eriogonum parvifolium	sea cliff buckwheat	gallon

Eriophyllum confertiflorum	golden yarrow	rose pot
Frankenia salina	alkali heath	rose pot
Lasthenia coronaria	royal goldfields	seed (lbs)
Leptosyne maritima	sea dahlia	gallon
Lycium californicum	California boxthorn	gallon
Rhus integrifolia	lemonadeberry	gallon

8. Multi-Criteria Analysis

The multi-criteria analysis (MCA) conducted for the Study provides an opportunity to analyze each alternative beyond the lens of a benefit-cost ratio, which is primarily influenced by economics. Instead, the MCA considers a range of additional criteria (e.g., habitat restoration opportunities/constraints, sustainability and resilience to climate change, difficulty/ease of permitting, etc.) that capture stakeholder input and reflect the multiple goals and objectives of the Project. The MCA also ensures that the preferred alternative supports the goals and objectives of the Lagoon Enhancement Plan and is consistent with State Parks planning documents and policies for the Reserve.

8.1 Alternative Analysis Criteria

The criteria developed for the MCA have been organized into five categories listed below.

- Habitat Enhancement
- Beach Access & Amenities
- Coastal Hazards
- Regulatory
- Financial/Economic

These categories are aligned with the Project objectives provide in Section 1.2 and public feedback gathered from meetings, workshops and online surveys. The specific criteria within each category are discussed in the following sections along with the basis for evaluation provided in Table 10.

8.1.1 Habitat Enhancement

Preserving natural resources and looking for opportunities to build coastal resilience are key elements of State Parks Sea Level Rise Adaptation Strategy (CSP, 2021). The Habitat Enhancement category includes criteria that evaluates how each alternative incorporates restoration, enhancement and preservation of the native habitats surrounding the Lagoon. The conversion of paved parking lot to natural habitat is the primary restoration activity in the Project area. Improvements to the damaged culvert beneath McGonigle Road is a Project element that will enhance tidal connectivity to the existing marsh north of this roadway embankment. Preservation of sensitive species habitat and improvements to Lagoon water quality are other important considerations for each alternative.

8.1.2 Beach Access & Amenities

High quality active and passive beach recreation are the most common activities according to results from the online public engagement survey. The majority of respondents live within a 15-mile radius of the Nort Lot and rely on it for beach parking and access. A significant minority (32%) also rely on the North Lot for pedestrian and bicycle access from adjacent communities. Lifeguard services and the State Parks Junior Lifeguard Program are also important features of the North Lot. This category includes several criteria used to evaluate how each alternative will satisfy considerations related to beach access and amenities provided by the North Lot.

8.1.3 Coastal Hazards

Located adjacent to the Lagoon inlet, the Project area is vulnerable to coastal flooding and erosion from wave energy, tidal currents, and extreme water levels. SLR will increase these hazards significantly, posing a challenge for maintaining the beach access & amenities provided in the North Lot. Project alternatives include a variety of adaptation measures to mitigate future hazards. The criteria in this category evaluate how these measures will perform in regards to long-term flood protection and the Project's effect on inlet stability and circulation within the Lagoon.

8.1.4 Regulatory

The Regulatory category includes several criteria related to the environmental documentation and permitting process required for the Project. Alternatives were evaluated based on the estimated length & complexity of the environmental review and analysis through CEQA/NEPA and the permitting process. The Project's alignment with State Parks policies is also an important consideration given their role in operating and maintaining the facilities.

8.1.5 Financial/Economic

This category includes criteria that evaluate the estimated lifecycle costs of each design alternative. These estimates are opinions of cost based on conceptual design drawings and are only intended to provide a rough order-of-magnitude estimate of potential Project costs for the sole purpose of comparing alternatives to one another. These opinions of cost do not reflect the actual cost of the Project and will be subject to refinement upon selection and optimization of a preferred alternative as it proceeds through engineering design. Lifecycle costs include estimated costs associated with initial construction cost and long-term maintenance costs.

Table 10. Categories and Criteria for Alternative Analysis

Category & Criteria	Basis of Evaluation
Habitat Enhancement	
Restoration	Supports restoration of coastal areas (i.e., acreage of paved areas converted to restored habitat native to the Lagoon).
Marsh enhancement (McGonigle)	Provides/supports enhancement of marsh areas north of McGonigle road and stormwater features to improve invasive species management.
Sensitive Species	Improves protection of sensitive species (e.g., Coastal California gnatcatcher, Belding savannah sparrow) through the expansion of native habitats that support them.
Water Quality / Vector	Improves water quality and/or eliminates areas of ponded water that contribute to vector breeding.
Ecosystem Resilience (Sustainability)	Provides adaptive strategies and/or elements to support ecosystem resilience to SLR within Project area (e.g., gradients to support upslope habitat migration).
Beach Access & Amenities	
Pedestrian Access	Provides and preserves pedestrian coastal access and trail connectivity to adjacent public parking areas and neighborhood.
Vehicular Access	Facilitates North Lot vehicular access and circulation within lot.
State Park Facilities	Preservation of lifeguard, restrooms, and supporting facilities.
Aesthetics	Improves visitor aesthetics from viewshed and park user perspectives.
Temporary Access Impacts (Construction)	Degree and duration of temporary impacts to parking and beach access during construction.
Coastal Hazards	
Flood Protection / SLR Resilience	Provides resilience to flooding during extreme storm and/or coastal events and ability to accommodate SLR.
Inlet Stability / Hydraulics	Improves inlet dynamics to support scouring of inlet channel and potentially reduce inlet maintenance frequency and costs.
Regulatory	
CEQA/NEPA Process	Length, complexity, and cost associated with completing the CEQA/NEPA process.
Permitting Process	Length, complexity, and cost associated with obtaining the necessary permits (CCC, USACE, RWQCB, local site development permits)
Consistency with State Parks Plans & Policy	Does the Project balance public access and resource protection in compliance with the plans and policies of State Parks?
Financial/Economic	

Category & Criteria	Basis of Evaluation
Construction Cost	Initial estimated cost of construction to implement each alternative.
Long-term Maintenance & Operation Costs	Costs to maintain and adaptively manage the Project.

8.2 Weighting and Scoring System

The MCA scoring and weighting presented in this report reflects input from the multi-disciplinary Project team that includes State Parks (landowner) collected during multiple interactive workshops on June 9th and June 23rd, 2022. The goal of these workshops was to incorporate thoughts and opinions from a diverse group of Project team members in effort to reduce individual bias and subjectivity from influencing the results. The workshop contributors included representatives from the State Parks, LPLF, SCC and members of the consulting team (GHD), drawing on experience and knowledge from local experts and industry professionals.

The maximum potential score for each alternative based on how well it satisfies the criteria within the five general categories (Habitat Enhancement, Beach Access & Amenities, Coastal Hazards, Regulatory, and Financial/Economic). The MCA results presented in this report are based on a category weighting shown in Table 11, in which the total score in each category combine for a maximum score of 100% with the following breakdown: Coastal Hazards category has a maximum score of 30%, while Habitat Enhancement and Beach Access & Amenities each account for up to 25% of the total score. Regulatory and Financial/Economic each account for up to 10% of the total score.

Coastal Hazards was the highest weighted category (30%) since increasing resilience to current and future flood hazards is a primary goal of the Project. Habitat Enhancement and Beach Access & Amenities were also emphasized in the category weighting (25% each) because these criteria closely align with State Parks' guiding principles for SLR adaptation. Regulatory and Financial/Economic categories include important considerations, but the Project team did not see these as key factors in determining feasibility of the Project alternatives.

Table 11. Multi-Criteria Analysis Category Weighting

Category	Weighting
Habitat Enhancement	25%
Beach Access & Amenities	25%
Coastal Hazards	30%
Regulatory	10%
Financial/Economic	10%
Total	**100%**

The individual criterion within each category were also assigned a weighting to determine what percentage of the available score should be allocated to each. In all cases the criteria were equally weighted within each category, reflecting the feedback from the Project team that no single criterion was significantly more important than others.

Scoring was based on a scale of 1 to 5 for each alternative with a high score indicating an alternative has a good chance of satisfying the objectives of each criterion and a low score indicating an alternative has a poor chance of satisfying the objectives of each criterion. Discussion among participants of the relative merits and demerits of each alternative was a key focus of the MCA workshops. For some criteria (e.g., Flood Protection and Construction Cost) engineering analyses and calculations were available to support the scoring of each alternative. For other criteria, where metrics were unavailable to facilitate comparison, the scoring was based on consensus of Project team's best professional opinion.

Individual scores were multiplied by the criterion weighting and category weighting to arrive at a final score for each alternative. For example, if an alternative received a high score (e.g., 4 out of 5), it would be multiplied by the criteria weighting (e.g., 20%) and the category weighing (e.g., 25%) for a weighted score of 4.0% (i.e., 4/5 x 0.20 x

0.25 = 0.04). The weighted scores were then summed for each alternative and category to form a total score. Note, the weighted and total scores have been rounded to the nearest whole percentage in the results table.

8.3 Results & Analysis

The results of the initial MCA indicated the highest ranked alternative was Alternative 2, which consists of a reduced lot footprint, reconfiguration of the RSP along the Lagoon's inlet and ecotone slope. Alternative 3, which includes a new vehicular access via North Torrey Pines Road, finished a close second. The top two alternatives were separated by over 10% in total score from the third ranked alternative (Alternative 1) which was meaningful when considering the sensitivity of the scoring and weighting system (discussed in Section 8.4). The No Project alternative ranked last with significantly lower scores in each category, except for Financial/Economic. A detailed summary of the initial MCA is provided in Table 12. A summary of the rationale used to assign scores and differentiate among alternatives is provided in the following sections. Please refer to Attachment 6 for the detailed scoring matrix which includes the numeric score, weighted score, and comments for each criterion.

Table 12. Multi-Criteria Analysis Results Summary

Category		Alternative 1	Alternative 2	Alternative 3
	No Project	Reduced Lot Footprint – Enhance Existing	Reduced Lot Footprint – Replace and Reconfigure	Reduced Lot Footprint – Replace and Reconfigure with New Access Point
Habitat Enhancement (25%)	5%	16%	23%	23%
Beach Access & Amenities (25%)	17%	17%	16%	15%
Coastal Hazards (30%)	12%	18%	24%	27%
Regulatory (10%)	7%	8%	7%	5%
Financial/Economic (10%)	10%	5%	5%	4%
Total Weighted Score out of 100%	**51%**	**64%**	**75%**	**74%**
Alternative Ranking	*4*	*3*	*1*	*2*

8.3.1 Habitat Enhancement

Alternative 2 and Alternative 3 scored highest in the Habitat Enhancement category as these alternatives include a slightly larger restoration area than Alternative 1 and a modified RSP along the inlet which is expected to improve lagoon hydrology and benefit ongoing management and planned restoration efforts at the Lagoon. The LID features proposed for the improved parking lot of Alternatives 2 and 3 are expected to improve water quality management and vector control challenges that exist today. Alternative 3 scored highest in the habitat enhancement and ecosystem resilience criteria due to the removal of McGonigle Road fill prism which will enhance existing marsh area and create more space for wetland habitat to respond to SLR. Alternative 2 scored highest in the sensitive species criterion due to avoidance of known habitat areas and the potential for greater habitat diversity in the restoration area. Alternative 1 received mostly mid-level scores for the criteria in this category indicating that habitat enhancement would be expected with this alternative, but to a lesser degree than for Alternatives 2 and 3.

8.3.2 Beach Access & Amenities

Scores were relatively close among each alternative in this category (within 2% of one another). Pedestrian access and vehicular access are provided in the No Project scenario and for each alternative. Alternative 3 scored slightly lower because the vehicular access would be moved to North Torrey Pines Road, resulting in slightly longer travel times for beach goers arriving from inland locations. This alternative would also result in more disruptive temporary impacts due to the construction of a new ingress/egress from North Torrey Pines Road. Alternative 1 scored highest in the State Park facilities criterion because the existing restroom remains in place,

whereas the restroom would be relocated in both Alternative 2 and Alternative 3. Aesthetic benefits are assumed to be greatest for Alternative 3 because of the modified revetment and removal of McGonigle Road fill prism.

8.3.3 Coastal Hazards

Alternative 2 and Alternative 3 scored significantly higher than Alternative 1 and No Project in the Coastal Hazards category. The elevated and improved parking lot proposed for Alternatives 2 and 3 significantly reduces the potential for coastal flooding and SLR to impact the parking lot and associated recreational activities. McGonigle Road is vulnerable to flooding during high water level events (King Tides) with more than 3.5 feet of SLR, which could pose temporary access restrictions. Alternative 3 mitigates this vulnerability through the construction of a new vehicular access road and therefore was scored slightly higher than Alternative 2. The combination of parking lot and vehicular access improvements proposed for Alternative 3 would provide long-term resilience to 6 feet of SLR.

Alternative 2 and Alternative 3 scored slightly higher than Alternative 1 due to the potential of the modified RSP to improve hydraulic efficiency of lagoon outflows in scouring the inlet channel. Better hydraulic efficiency has the potential to reduce the inlet dredging amount and frequency. However, more detailed analysis of this potential benefit to lagoon inlet hydraulics will need to be verified (e.g., further modelled) as part of the next design phase of the Project.

8.3.4 Regulatory

Alternative 1 scored slightly higher than Alternative 2 in the Regulatory category due to a more streamlined environmental and permitting process. This scoring assumes that restoration activities and improvements proposed for Alternative 1 would qualify for a categorical exemption from CEQA/NEPA, and Alternative 2 would only require a streamlined Mitigated Negative Declaration (MND). Alternative 3 scored lowest in this category based on the assumption that the proposed vehicular access from North Torrey Pines Road would require a lengthy Environmental Impact Report (EIR). Alternative 3 would also require close coordination with the City of San Diego which owns and manages this coastal highway. Inability to coordinate efforts with the City of San Diego during this phase of the Project suggests that inclusion of this element of the Project may be problematic or potentially infeasible. However, confirmation of this with the City of San Diego is needed. Although each alternative would be consistent with State Parks' policies toward preserving access and natural resources, Alternative 2 and Alternative 3 better align with the State's SLR Adaptation Strategy by providing both enhanced habitat and increased resilience to SLR.

8.3.5 Financial/Economic

Aside from No Project, Alternative 1 and Alternative 2 scored slightly higher than Alternative 3 in the Financial/Economic category. Alternative 1 has the lowest construction cost (~$8 million), but is expected to have higher long-term maintenance costs based on the condition of the existing revetment and likely repairs needed over the next several decades. Alternative 2 has a higher construction cost (~$12 million) but is expected to have a lower maintenance cost over the next several decades, since the modified inlet protection will allow for greater adaptability/accommodation of SLR and the replacement of aged infrastructure. Alternative 3 had the highest construction cost (lowest score) of the three alternatives with the addition of a new vehicular access from North Torrey Pines Road and replacing McGonigle Road and related fill with an elevated boardwalk to provide pedestrian access from Carmel Valley Road.

8.4 Sensitivity

8.4.1 Scoring of Individual Criteria

The MCA scoring matrix generated questions from the Project team regarding sensitivity of the analysis. The key question being "How would these results change if one or two scores were revised up or down for each alternative?" There were only a few criteria in which the Project team had more difficulty arriving at a consensus score for a given alternative. One example was the scoring for aesthetics, which is somewhat subjective and dependent on a person's perspective and interests. In this case, changing a single score by one increment would

result in only a 1% change in the total score. For each alternative there were only one or two criteria in which scoring was debatable and, therefore, the overall scoring sensitivity was estimated to be ± 2% when considering the total score. When considering this scoring sensitivity, the differences between Alternative 2 and Alternative 3 become negligible, given the category weighting presented in Section 8.2. Alternative 2 and Alternative 3 scored significantly higher (>10%) than No Project and Alternative 1, indicating this separation would not be influenced by individual scoring sensitivity.

8.4.2 Weighting of Overall Categories

Sensitivity of category weightings was another area of interest to understand how the breakdown between Habitat Enhancement, Beach Access & Amenities, Coastal Hazards, Regulatory, and Financial/Economic influences overall results. The results presented in Section 8.2 are based on a breakdown of 25% for Habitat Enhancement, 25% for Beach Access & Amenities, 30% for Coastal Hazards, 10% for Regulatory and 10% for Financial/Economic. The consensus of the Project team was that Coastal Hazards, Habitat Enhancement and Beach Access & Amenities warranted a higher emphasis because their criteria closely match the Project's goals and objectives, feedback from key stakeholders, and provide the best indicator for Project success.

Figure 8-1 illustrates the total scores for each alternative for several different combinations of category weightings. Regardless of the category weightings applied, a clear pattern emerges in which Alternative 2 is consistently the highest ranked alternative. If an equal weighting is applied across all categories, Alternative 2 scores 6% higher than Alternative 3 and 10% higher than Alternative 1. The findings of this sensitivity analysis support Alternative 2 being the preferred alternative for the Project.

Alternative 3 was consistently the second highest scoring alternative, falling behind Alternative 2 due primarily to lower scores for both Regulatory and Financial/Economic categories. While Alternative 3 was deemed to be technically feasible and provide significant long-term benefits, the scope of this Project would require a lengthy environmental review and permitting process in addition to higher construction costs, as well as additional costs and delays caused by coordination with the City of San Diego. It's worth noting that implementing Alternative 2 today would not preclude a transition toward Alternative 3 in the future since the new vehicular access from North Torrey Pines Road and replacement of McGonigle Road with a boardwalk would remain viable long-term strategies for enhancing the North Lot's resilience to SLR and coastal hazards.

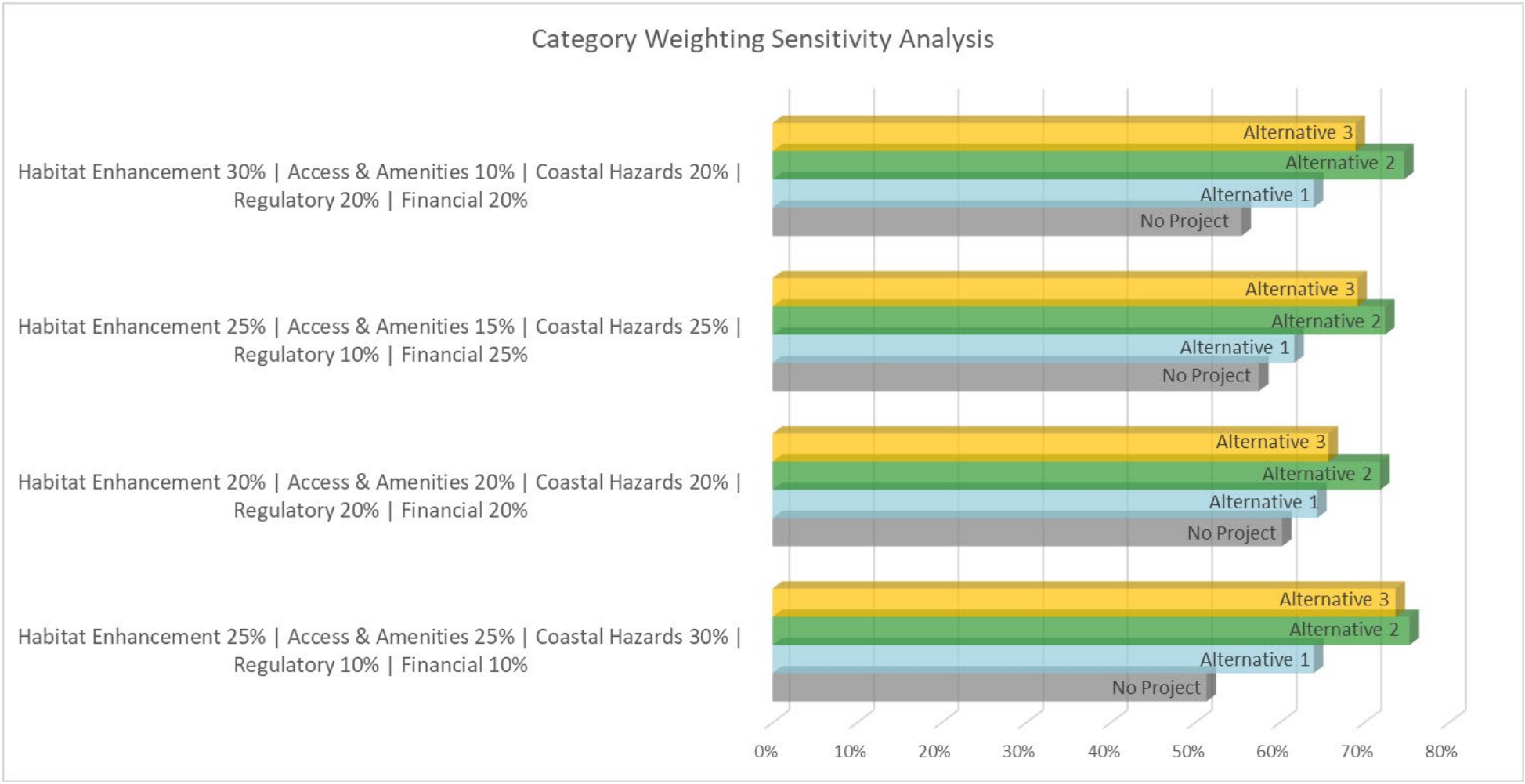

Figure 8-1. Multi-Criteria Analysis – Sensitivity to Category Weighting

9. Discussion & Next Steps

Based on the results of the Study, Alternative 2 is the preferred alternative. Alternative 3 scored relatively close since it is identical to Alternative 2 except for a new vehicular access to the lot from North Torrey Pines Road. This roadway connection requires additional regulatory challenges due to required coordination and permitting with the City of San Diego's Transportation Engineering Division. The extent of this permitting challenge is unknown at this time due to limited coordination with the City of San Diego during this Study. However, Alternative 2 will be designed in a manner that does not preclude a transition toward to moving the North Lot's vehicular entrance to North Torrey Pines Road should this opportunity become more viable in the future in response to SLR.

Next steps towards the development of Alternative 2 would be carrying the Project into the final engineering and environmental phase. This phase includes CEQA compliance, acquiring permits and preparing the final engineering plan set. Based on coordination with State Parks, the Project may be appropriate for a categorical exemption under CEQA. The Project would require permits through the USACE, RWQCB, California Department of Fish & Wildlife and the CCC. Additional permits from the City of San Diego may be required for improvements to McGonigle Road (e.g., replacing the undersized culvert). It is estimated that the permitting process would take about one year; contingent on agency staff availability and level of Project controversy around environmental issues (e.g., traffic, aesthetics, biology, etc.).

9.1 Project Phasing Opportunities

Opportunities were identified during the Study that could allow for the significant expansion of the Project over time. These identified Project phasing opportunities are as follows:

- Los Angeles to San Diego (LOSSAN) Rail Realignment Project: Due to erosion of the bluff adjacent to the rail line in the City of Del Mar, SANDAG is exploring the feasibility of realigning the NCTD rail line to the east and tunnelling under the City of Del Mar. The realignment could benefit the Project by providing additional space to the east of the North Lot's current footprint to provide additional elements (e.g., parking spaces, habitat, amenities). Further engagement with SANDAG staff will be pursued to identify such opportunities and incorporate them as the preferred alternative progresses through engineering design.
- Improvements to the North Torrey Pines Road Corridor: Many segments of Highway 101 in San Diego County are being improved to accommodate additional safety and mobility elements, such as pedestrian and bicycle trails and lanes. Sections of Highway 101 are currently vulnerable to coastal flooding and erosion, which will accelerate in frequency and intensity with SLR. The City of San Diego was not available to coordinate with the Project development team during this study to determine any future plans for the North Torrey Pines Road section of Highway 101. Response to SLR vulnerabilities and impacts may provide opportunities for the Project to include elements considered to be difficult to include during this study (e.g., new vehicular ingress/egress to the North Lot from N. Torrey Pines Road).
- Del Mar Car Care property: The Del Mar Car Care property is located within or adjacent to areas being considered within the upland relocation strategies of the North Lot. The property fragments the usable space for the lot, which limited its viability. It was identified that this property and building may be an ideal location for a LPLF visitor center as well as relocated North Lot should it become available to buy. Purchasing this property was identified as being an opportunity for the Project should it become available in the future.

10. Conclusions

This Study assessed the feasibility of relocating and redesigning the North Lot through innovative, nature-based strategies that increase coastal resilience while providing additional benefits to the users of the parking lot and surrounding lagoon ecosystem. Key findings of this Study are as follows:

- North Lot Parking Demand:
    - Based on a parking demand study conducted during the summer of 2021, the North Lot was found to be oversized for current demand.
    - Results show that most Park or beach visitors elect to park along nearby surface streets even when on-street capacity is limited and off-street (North Lot) parking is available. This is believed to be a result of the public's preference for free-parking options as opposed to the day use fees required at the North Lot.
    - It was determined that 121 parking spaces could be removed from the North Lot. The 379 remaining spaces is able to meet current demand with inclusion of a 15% additional buffer.
- McGonigle Road Culvert and Lagoon Hydraulics:
    - The undersized culvert at McGonigle Road currently restricts the flow of tidal waters to channels in the northern section of the Lagoon. The Project proposes to replace the culvert to eliminate tidal muting and enhance tidal salt marsh north of McGonigle Road. The new culvert could also improve dispersal of flood waters into lagoon channels and improve wildlife movement.
- Coastal Hazard Vulnerability of the North Lot:
    - The North Lot's vulnerability to coastal hazards was determined to come primarily from a flood pathway that begins in the vicinity of the McGonigle Road culvert. Water will travel from this low point into the North Lot's southeast corner starting at a water level of 9.5 feet NAVD88. This water level can be achieved in a variety of ways but was replicated in this analysis during a 100-year extreme water level and 3.5 feet of SLR. The flooding of the North Lot and McGonigle Road will increase in extent and severity with water levels greater than 11 feet.
- Community and stakeholder engagement:
    - A total of 10 meetings/workshops were held to engage stakeholder groups early in the Project's planning phase to help inform the selection of a managed retreat strategy and development of concept designs from the perspective of different user groups.
    - Two online surveys were conducted during the course of the Project with 342 responses that provided information on the following:
        - Identification of different user groups that utilize the North Lot.
        - Identification of individuals and user groups that park in the North Lot.
        - Better understanding of user group preferences and valuation of existing lot amenities and facilities at the North Lot (e.g., showers and bathroom).
        - Better understanding of user group preferences and valuation for future amenities and facilities that could be provided at the North Lot (e.g., EV charging stations, interpretive center).
        - User group preferences and rankings of managed retreat strategies and concept design alternatives.
        - Individual responses to adaptation strategies and concept design alternatives.
    - Results from stakeholder engagement indicated that the Reduced Lot Footprint – Northern Realignment was found to be the preferred adaptation strategy for the North Lot.
- Project Alternatives Development

    - Three alternatives were developed for the Project following Reduced Lot Footprint – Northern Realignment that ranged from enhancing existing facilities (Alternative 1); to complete replacement of the North Lot and its facilities (Alternative 2); followed by complete replacement of the North Lot and its facilities along with relocation of its entrance/exit (Alternative 3).
    - A MCA was conducted on each of the three alternatives comparing them against five categories that each contained their own sub-set of criteria. The five categories were the following: Habitat Enhancement, Beach Access & Amenities, Coastal Hazards, Regulatory and Financial/Economic.
    - Alternative 2 scored the highest to become the Project's preferred alternative. Alternative 3 scored relatively close but was discarded due to the assumption that relocating the North Lot's entrance/exit to North Torrey Pines would have inherent difficulties that could impact the Project's feasibility due to delays and additional costs.
- Future opportunities were identified to potentially expand or phase the Project over time as major infrastructure projects come to fruition or as properties become available for acquisition. Future opportunities could include: LOSSAN Rail Realignment, improvements to North Torrey Pines Road, and Del Mar Car Care property sale.

11. References

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Attachments

Attachment 1

Parking Demand Study

Technical Memorandum

24 September 2021

To	Los Peñasquitos Lagoon Foundation		
Attention	Mike Hastings, Executive Director		
From	Peter Galloway, Senior Transportation Planner Brian Leslie, Senior Coastal Scientist	**Project**	Preserving Public Access to Torrey Pines State Natural Reserve
Subject	Focused Parking Demand Analysis; Los Penasquitos Lagoon North Parking Lot	**Project no.**	11211806
CC:	Mr. Darren Smith, Senior Environmental Scientist, California State Parks; Joel Gerwein, South Coast Deputy Manager, State Coastal Conservancy	**File No.**	C11211806MEM002.docx

1. Introduction

This technical memorandum has been prepared to present the results of a parking demand analysis performed by GHD for the Torrey Pines State Beach North Parking Lot located within the Los Penasquitos Lagoon in the City of San Diego, California. The California State Parks currently operate both the North Parking Lot and South Parking Lot at the base on Torrey Pines State Natural Reserve. The North Lot is bounded by Carmel Valley Road to the east and Torrey Pines Road to the west. The term "project" refers to the North Parking Lot (NPL) that gains direct vehicle access from McGonigle Road via Carmel Valley Road (see Figure 1—Project Site Vicinity).

Based on historical parking data gathered for the NPL between the years 2015 and 2020, the highest use months for the project typically occur during July and August with the peak use days occurring on a weekend (Saturday or Sunday).[1] In addition to surveying the NPL for peak parking demand characteristics, adjacent arterial, residential, and commercial streets were surveyed immediately east of the NPL for parking demand characteristics. Discussions with project stakeholders indicate that patrons wishing to access the Los Penasquitos Lagoon and/or Torrey Pines State Beach will often seek out adjacent (free) street parking rather than park in the State-controlled, LAZ (vendor) operated NPL for an established daily fee of $20 or through purchase of an annual pass.

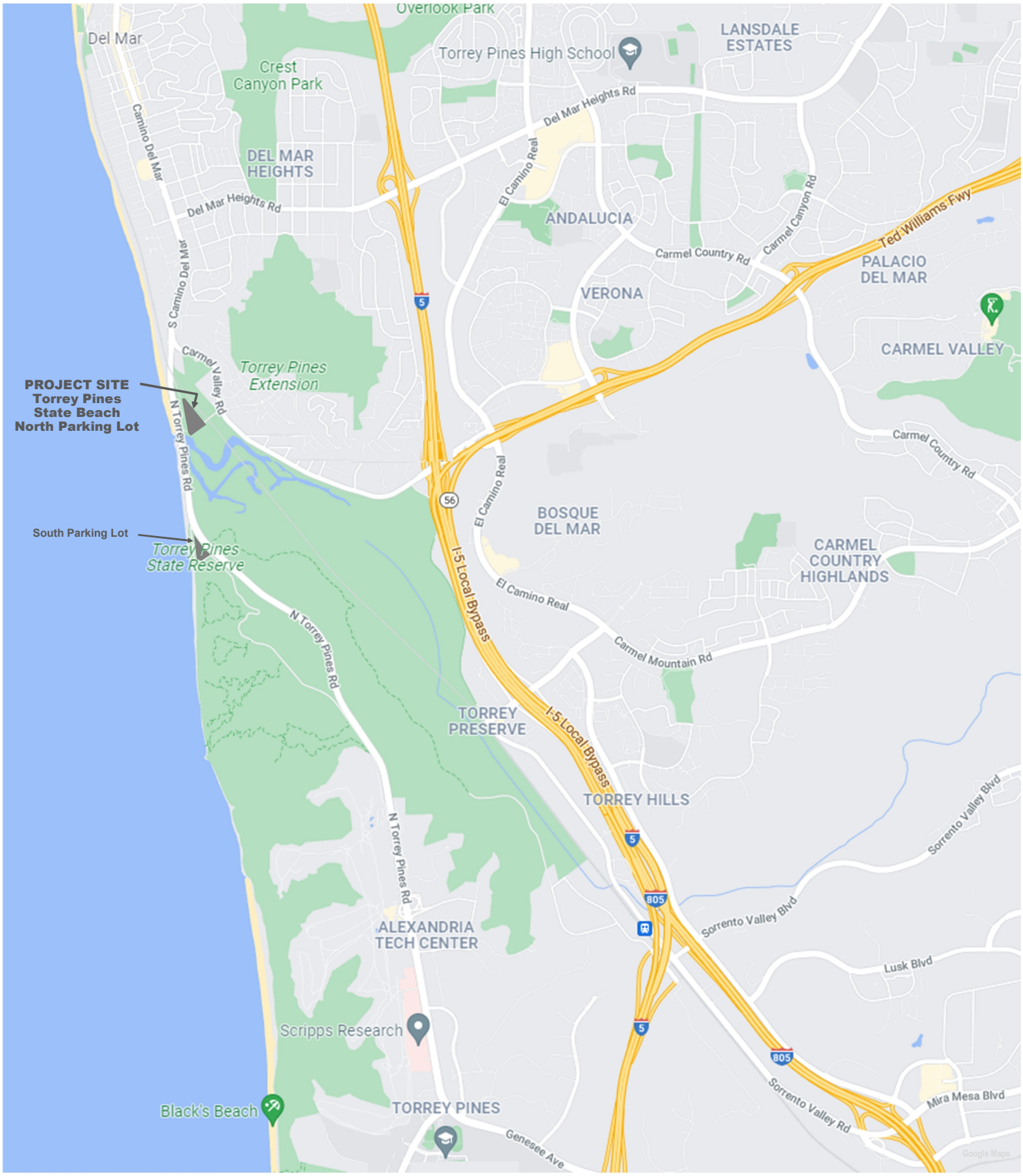
To determine peak parking demand for the NPL and adjacent street network, the following three summer survey dates were chosen during both holiday and non-holiday weekends:

1. July 4th, 2021 (Sunday-Holiday)
2. August 28, 2021 (Saturday-Non-Holiday)
3. September 4th (Saturday-Holiday)

The primary focus of the parking demand analysis was twofold:

1. Calculate the peak parking demand for the NPL and adjacent City streets during high activity weekends to determine current use characteristics, supply, and occupancy rates;

[1] LAZ (North Parking Lot Vendor), Daily, weekly, and monthly parking use data, CA Parks, North Torrey Pines, 2015-2020.



GHD

Project Site Vicinity

FIGURE 1

N

2. Based on the calculated peak demand of the NPL and adjacent streets, determine how many parking spaces (if any) could be removed from the NPL without impacting minimum occupancy ratios in the NPL and on the adjacent street network.

The following sections outline the parking demand analysis including previous parking studies, project study areas, street network, existing facility operations, parking survey methodology, calculated peak parking demand, and amount of parking spaces (if any) that could be removed from the NPL without significantly affecting the surrounding on-street residential, commercial, and parking areas.

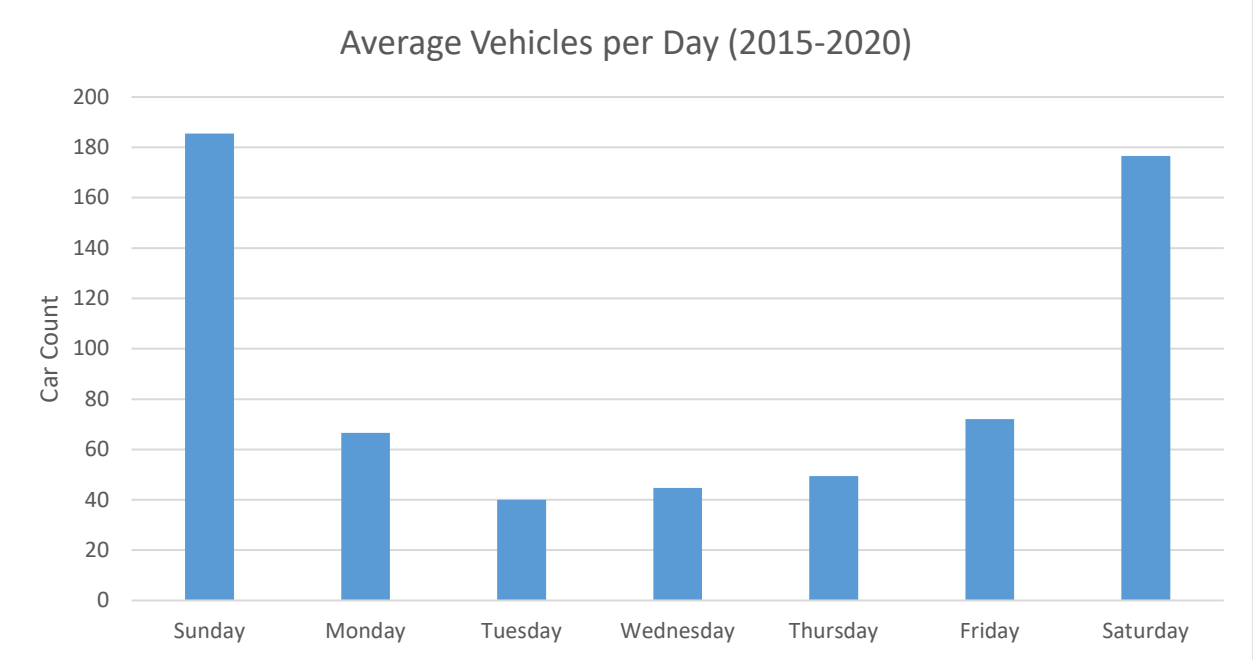
2. Background Conditions/Prior Studies

The NPL has been surveyed for overall parking demand on a daily basis by California State Parks through their vendor LAZ Parking from January 2015 through December 2020.[2] The parking surveys identified the average number of vehicles using the NPL on a daily, monthly, and yearly basis. (Please note, the LAZ parking data for the NPL identified the total number of vehicles using the lot on a daily basis. However, the parking data collected by LAZ does not identify peak parking demand for the NPL which is the goal of this parking demand analysis).

Based on the parking survey data collected by LAZ Parking for the five-year period, the parking data for the NPL has been summarized in the following categories:

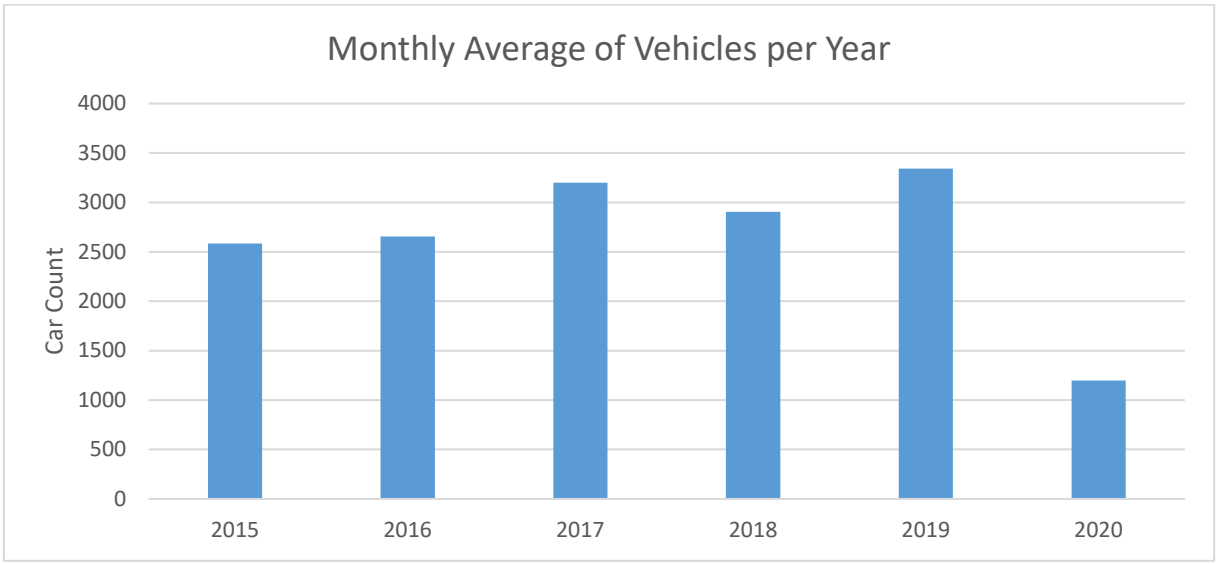
- Average Vehicles Per Day
- Monthly Average of Vehicles Per Year
- Average Number of Vehicles Per Month
- Monthly Total of Vehicles Per Year

The associated data graphs are shown as follows:

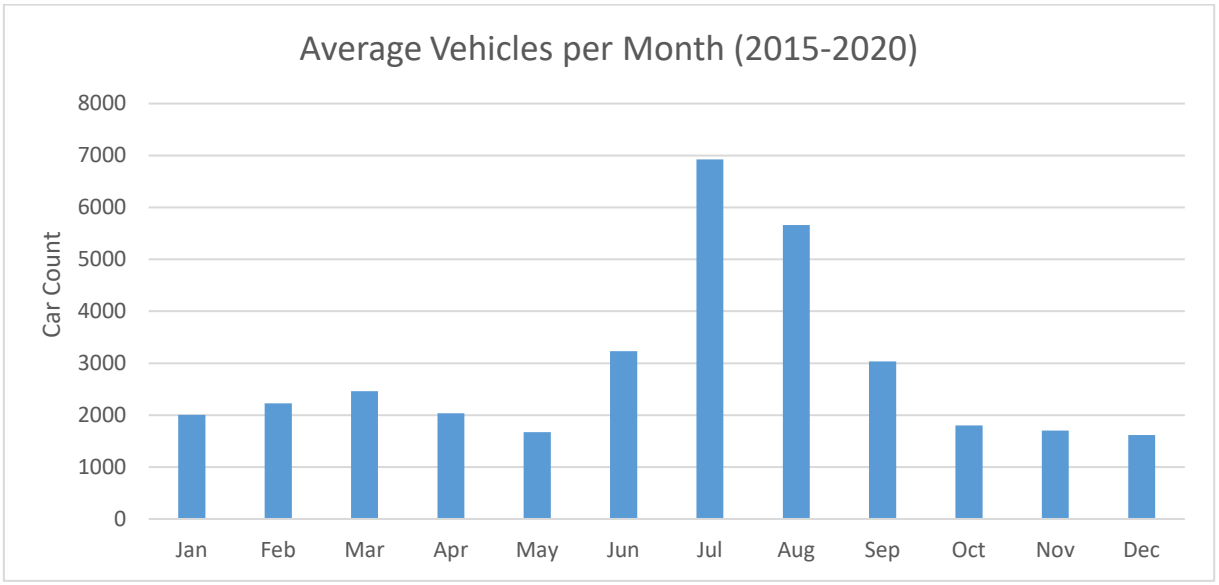


Source: LAZ Parking, CA Parks, North Torrey Pines Parking Lot, 2015-2020.

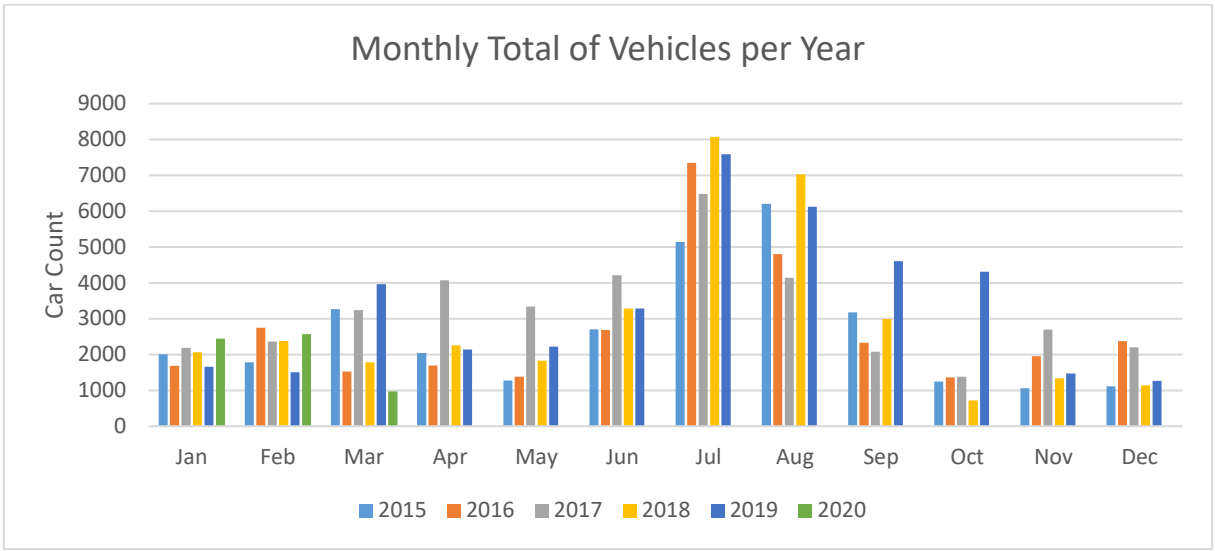
[2] LAZ Parking, Daily, monthly, and yearly parking surveys for the Los Penasquitos Lagoon North Parking Lot, 2015-2020.



Source: LAZ Parking, CA Parks, North Torrey Pines Parking Lot, 2015-2020.



Source: LAZ Parking, CA Parks, North Torrey Pines Parking Lot, 2015-2020.



Source: LAZ Parking, CA Parks, North Torrey Pines Parking Lot, 2015-2020.

Based on LAZ historical parking surveys for the NPL, Saturdays and Sundays are the peak use days during the week averaging approximately 181 vehicles per day. The peak use months occur in July and August. On a yearly basis, the NPL averaged approximately 2,585 vehicles per month starting in 2015 increasing to a high of 3,343 vehicles per month in 2019. (Please note year 2020 was significantly lower – likely due to Covid-19 pandemic restrictions).

Discussions with project stakeholders indicate that several factors can typically lead to July and August being the most active months for the NPL including favourable weather and ocean conditions and being coincident with summer school breaks and the tourism peak in San Diego.

3. Project Study Area

The Torrey Pines State Beach and Los Penasquitos Lagoon area are served by two parking lots controlled by California State Parks and surface street parking in the City of San Diego (off of Torrey Pines Road) and City of Del Mar (off of Carmel Valley Road and residential streets). The South Parking Lot (SPL) primarily serves the Torrey Pines State Natural Reserve and beach areas and is located off North Torrey Pines Road. The North Parking Lot (NPL) serves the Los Penasquitos Lagoon as well as the State Beach areas south of the lagoon mouth and is accessed from McGonigle Road via Carmel Valley Road and is the focus of this study. Adjacent commercial and residential streets in the City of Del Mar include Carmel Valley Road, Del Mar Scenic Parkway, Via Aprilia, Via Borgia, Via Cortina, and Via Donada (see Figure 2—Project Street Network). Please note, specific parking supply and restrictions have been discussed in detail in Section 4 (Project Survey Areas). However, a brief description of each roadway and their on-street parking characteristics follows:

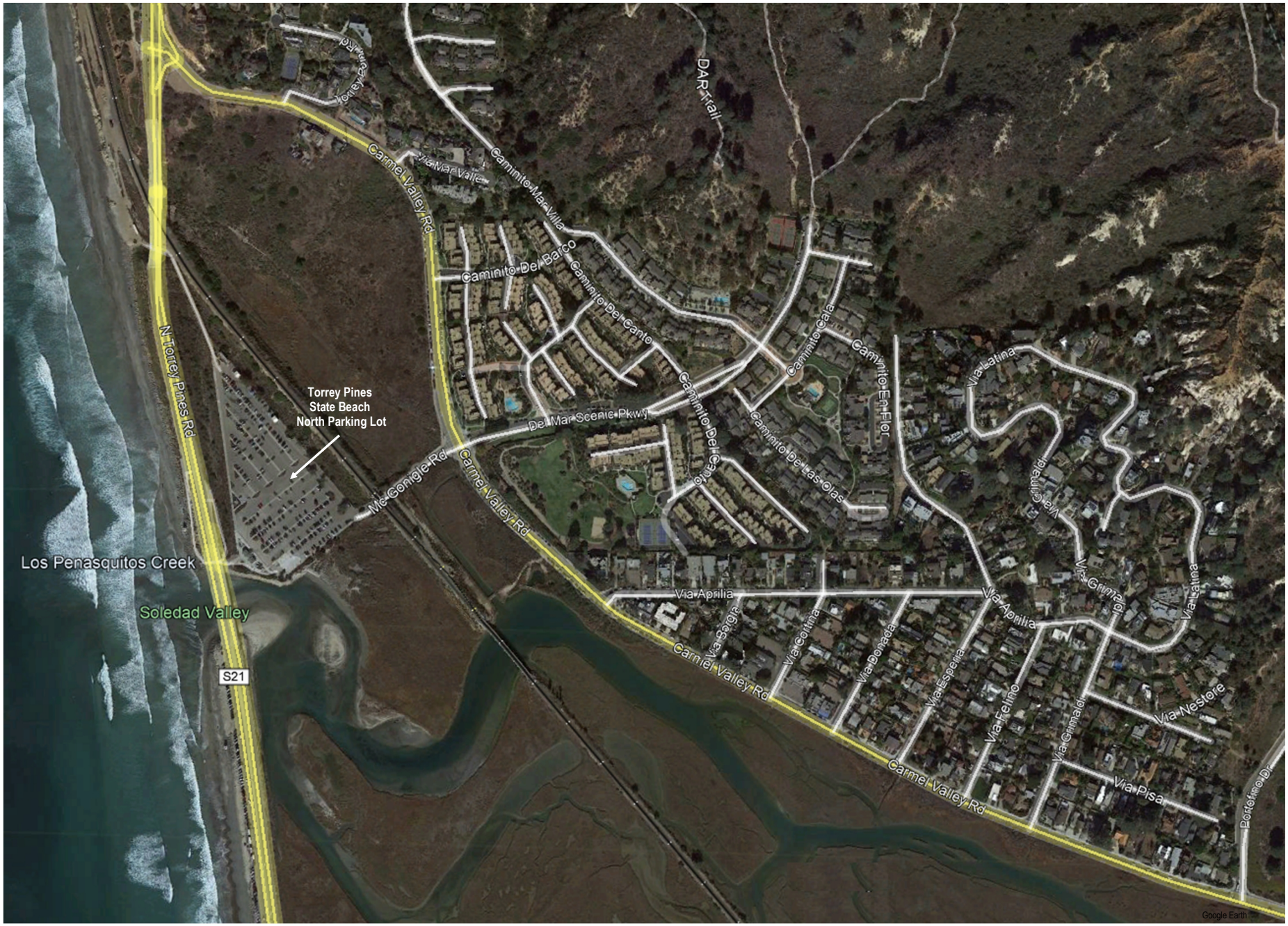
North Torrey Pines Road extends in a north-south direction in the project area from Carmel Valley Road to the Torrey Pines State Natural Reserve. This segment of North Torrey Pines Road has two travel lanes, a raised median, and Class II bicycle lanes on each side of the street. As the roadway continues south, it widens to four travel lane approaching the South Parking Lot. Diagonal vehicle parking is allowed along the west side of the roadway extending for approximately 1,600 feet along the beachfront between the lagoon mouth and the South Parking Lot. Parking is only prohibited in this segment between 2:00-4:00 a.m.

Carmel Valley Road extends generally in an east-west direction between North Torrey Pines Road and Interstate 5. A two-lane roadway with Class II bicycle lanes, Carmel Valley Road divides the residential and commercial areas in the City of Del Mar from the State Park recreational areas to the south. Parallel on-street vehicle parking is allowed in selected areas along the roadway extending from Via Mar Valle in the west to Via Esperia to the east. Various parking restrictions (or not) apply within certain segments of the roadway as follows:

- Via Mar Valle to Via Donada: “No Parking All City Streets Oversized Vehicles, Non-Motorized Vehicles, Recreational Vehicles 2:00-6:00 a.m., Except City Permit/No Parking within 50-feet of any intersection on alley (restrictions enforced for 1,600 feet of parking area—80 spaces).
- Via Donada to Via Del Mar: No Restrictions (1,606 feet of parking area—80 spaces). 1-Hour Parking 7:00 a.m.-5:00 p.m. (162 feet of parking area—8 spaces).

Del Mar Scenic Parkway extends due east from Carmel Valley Road providing access to residential areas directly opposite McGonigle Road. A wide two-lane roadway, on-street parallel parking is allowed on both sides of the street. Between Carmel Valley Road and Camino Del Canto there are approximately 60 on-street parking spaces including one (1) ADA space.

Via Aprilia is located southeast of McGonigle Road and extends east from Carmel Valley Road to Via Grimaldi. Via Aprilia provides access to primarily to residential areas and has on-street parallel parking on both sides of the street. Except for one loading zone parking space (adjacent to small commercial area near Carmel Valley Road), there are approximately 69 parking spaces between Carmel Valley Road and Via Donada.



Project Street Network

FIGURE 2

Via Borgia is a short, two-lane residential street that extends north-south between Carmel Valley Road and Via Aprilia. There are approximately 11 on-street parking spaces on the roadway.

Via Cortina also extends between Carmel Valley Road and Via Aprilia and provides access to both commercial and residential areas. This two-lane roadway has approximately 20 on-street parking spaces with no restrictions.

Via Donada is eastern-most street in the parking survey area extending between Carmel Valley Road and Via Aprilia. Like Via Cortina, Via Donada provides access to a combination of residential and commercial areas. The two-lane has approximately 32 on-street parking spaces with no restrictions.

4. Parking Survey Areas

On-Street Areas:

Residential and commercial streets surveyed for existing peak parking demand include the roadways located immediately east of the North Parking Lot. Specific streets were selected in coordination with the project team. Criteria for selection included available on-street parking, limited or no parking restrictions, relative proximity to the North Parking Lot (less than one-half mile), anecdotal observations of usage patterns and convenient walking/biking access to the NPL. Consideration was given to adjacent facilities where on-street parking is essentially "free" and unrestricted for the majority of hours throughout the day. It is noted that available (free) parking along North Torrey Pines Road between the North Parking Lot and the South Parking Lot was not surveyed as part of this analysis. Since parking along in this roadway segment is free, it was assumed that parking spaces would be occupied at a +90% capacity rate and would be a first choice for patrons visiting the Torrey Pines Beach and recreational areas. Surveyed street segments in the study area have been shown in Figure 3.

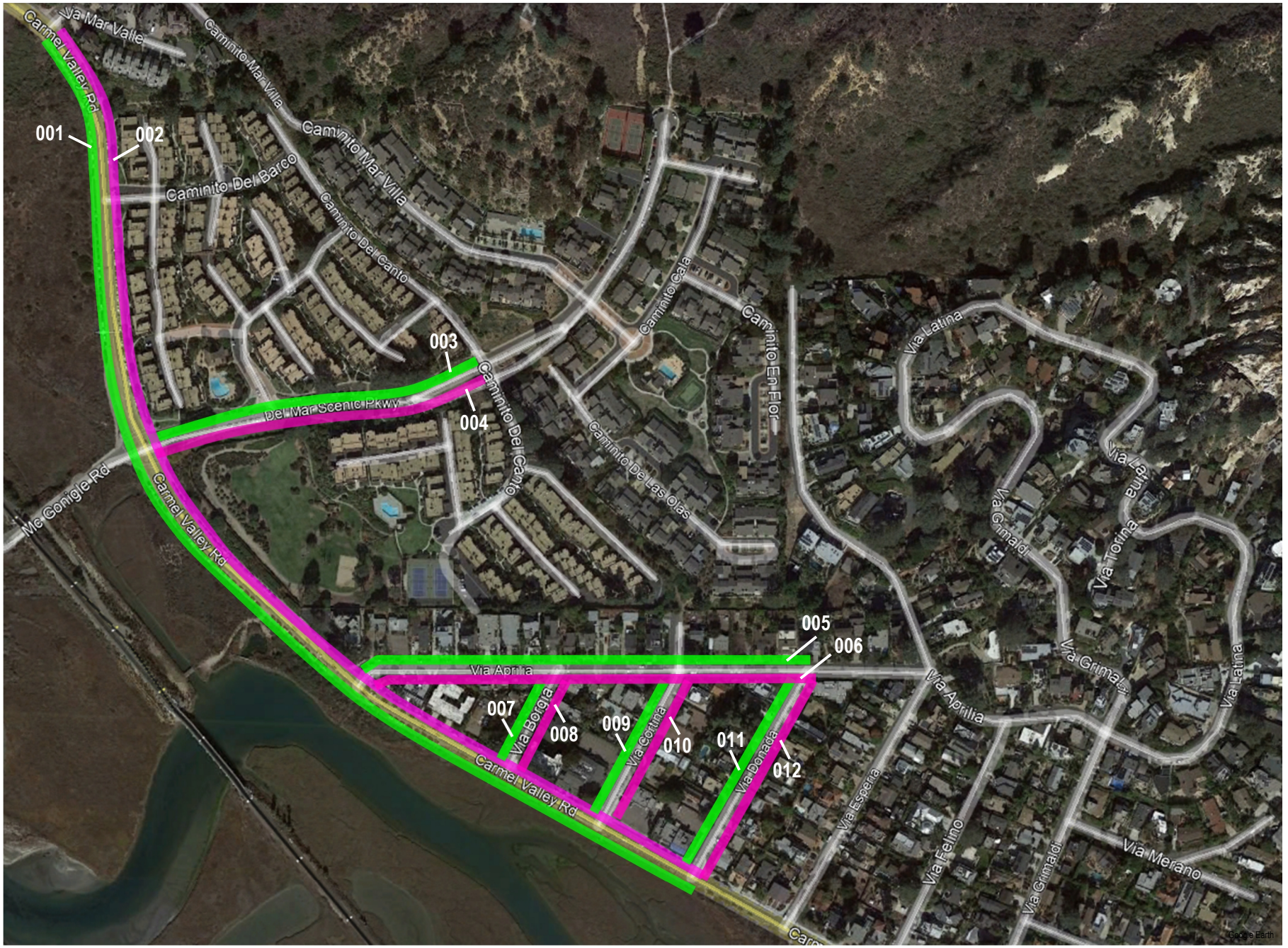
An inventory of the surveyed off-street parking space and approximate supply has been shown Table 1.

Table 1: On-Street Parking Inventory, Restrictions, and Supply

Segment	Street	From	To	Restriction	Measurement (ft.)	Approximate Space *(Measurement divided by 20')*
1	Carmel Valley Rd	Via Mar Valle	Via Donada	No Parking All City Streets Oversized vehicles, None motorized vehicles, Recreational vehicles 2am-6am	1600'	80
2	Carmel Valley Rd	Via Donada	Via Mar Valle	No Restriction	1606'	80
2	Carmel Valley Rd	Via Donada	Via Mar Valle	1 Hr Parking 7am-5pm	162'	8
3	Del Mar Scenic Pkwy	Caminito Del Canto	Carmel Valley Rd	Handicap Parking Only	18'	1
3	Del Mar Scenic Pkwy	Caminito Del Canto	Carmel Valley Rd	No Restriction	523'	26
4	Del Mar Scenic Pkwy	Carmel Valley Rd	Caminito Del Canto	No Restriction	663'	33
5	Via Aprilia	Via Donada	Carmel Valley Rd	No Restriction	725'	36
6	Via Aprilia	Carmel Valley Rd	Via Donada	15 Min parking 9am-10pm Daily	17'	1
6	Via Aprilia	Carmel Valley Rd	Via Donada	No Restriction	664'	33
7	Via Borgia	Via Aprilia	Carmel Valley Rd	No Restriction	124'	6
8	Via Borgia	Carmel Valley Rd	Via Aprilia	No Restriction	116'	5
9	Via Cortina	Via Aprilia	Carmel Valley Rd	No Restriction	181'	9
10	Via Cortina	Carmel Valley Rd	Via Aprilia	No Restriction	232'	11
11	Via Donada	Via Aprilia	Carmel Valley Rd	No Restriction	326'	16
12	Via Donada	Carmel Valley Rd	Via Aprilia	No Restriction	320'	16
Total						361

Source: National Data Systems (NDS), On-Street Parking Occupancy Survey, Los Penasquitos North Parking Lot, July 4, 2021.

Based on the inventory of on-street parking in the specific geographic areas immediately east of the North Parking Lot, there are 361 available parking spaces as shown in Table 1. As noted, the majority of these on-street parking spaces have little to no restrictions which makes them a viable alternative to off-street (pay) parking at the NPL during the daytime hours.



GHD

On-Street Parking Survey Areas

FIGURE 3

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Off-Street Area- North Parking Lot:

The parking inventory for the North Parking Lot was divided into geographic Zone 1A and Zone 1B. Zone 1A consists of the ingress/egress driveway/kiosk, parking ticket machines, and parking aisles/fields that extend in an east-west direction on the southern half of the NPL. Zone 1B is located on the northern half the NPL and has parking aisles that extend in a north-south direction. Parking spaces contained within Zone 1A include standard, ADA, employee only, clean-air/EV vehicle, and motorhome/large vehicle parking spaces. Zone 1B contains standard, ADA, and motorhome/large vehicle parking spaces. The NPL survey areas area shown in Figure 4.

Based on discussions with California State Parks staff, the current rate for parking in the NPL is $20 per day (there are no hourly rates). Based on the State Park's website, day use fees may be paid through automated pay machines installed within the NPL or at the entrance station (when staffed). In addition, park patrons may also purchase a California Explorer Vehicle Day Use Annual Pass that allows them to park in the NPL (and other State Park lots) year-around. The NPL's hours of operation are between sunrise and sunset adjusted for time of year. As shown in Table 2, the NPL has a current supply of 500 parking spaces. Please note, due to existing temporary "obstructions" within the NPL not all useful parking spaces were available for recreational patrons during survey periods (9 spaces). However, since these obstructions are temporary and will be removed, total parking supply has not been reduced for occupancy purposes.

Table 2: Los Penasquitos Lagoon North Parking Lot; Off-Street Parking Supply

Lot	Zone 1A					Zone 1B			
Restriction	Regular	Handicap	Employee Only	Clean Air/ EV Vehicle	Motor Home & Large Vehicle Parking Only	Regular	Handicap	Motor Home & Large Vehicle Parking Only	Total
Spaces	225	12	2	8	6	245	2	2	500

Source: National Data Systems (NDS), On-Street Parking Occupancy Survey, Los Penasquitos North Parking Lot, July 4, 2021.

5. Parking Demand Surveys

Methodology

In effort to capture peak parking demand activity periods for both on and off-street uses, parking surveys were conducted during holiday weekend periods as well as non-holiday weekends over the year 2021 summer period. The goal of the parking surveys is to ensure that recreational activities (and parking demand) would be near or at their highest use relative to the Los Penasquitos Lagoon and Torrey Pines State Park beach areas. Other variable factors affecting use intensities include tourist activity, weather, and return to school (August). As noted, parking demand surveys were conducted over the course of summer 2021 at the following periods based on historical peak use periods:[3] [4]

- July 4, 2021 (Sunday: holiday weekend—July 4th);
- August 28, 2021 (Saturday: non-holiday weekend)
- September 4, 2021 (Saturday: holiday weekend—Labor Day)

Parking demand data was surveyed for both on and off-street locations between 7:00 a.m. and 7:00 p.m. on an hourly basis. For off-site (on-street) parking surveys, surveys were categorized by roadway segment, available parking spaces, time of day (hour), and parking demand for each roadway segment. For off-street (North Parking Lot), surveys were categorized by type of space, time of day (hour), and zone 1A or zone 1B (see parking demand survey data/graphics on and off-street locations-attached).

[3] National Data and Surveying Services, Inc, Parking demand surveys conducted for on-street (Del Mar segments) and off-street (Los Penasquitos Lagoon North Parking Lot, Parking demand surveys, 7:00 a.m.- 7:00 p.m., July 4, August 28, September 6, 2021.
[4] LAZ Parking, Daily, monthly, and yearly parking surveys for the Los Penasquitos Lagoon North Parking Lot, 2015-2020.

GHD

Off-Street Los Penasquitos North Parking Lot Survey Areas

FIGURE 4

N

Existing Parking Demand

July 4, 2021 (Sunday—Holiday Weekend):

On-Street Parking

Peak parking demand and occupancy for off-site (on-street) segments are shown in Table 3. Based on the hourly breakdown of overall parking demand, peak demand occurred between 9:00 a.m. and noon when approximately 72-73% of available on-street spaces were occupied. As shown, study roadway segments located closer to the NPL and beach areas experience higher occupancy rates than roadway segments located further from these recreation areas. Specifically, the street segments of Carmel Valley Road, Del Mar Scenic Parkway, and Via Aprilia tend to experience higher occupancy rates (80-100%) than Via Cortina and Via Donada (40-60%) that are located further east of the recreational facilities. This on-street parking trend (parking closer to recreational facilities) carries through for all three of the peak days surveyed. In addition, it was observed that on-street parking with no restrictions tended to fill up quicker.

Table 3 On-Street Parking Demand for Study Street Segments (July 4, 2021)

Segment	Street	From	To	Restriction	Measurement (ft.)	Approximate Space (Measurement divided by 20')	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
1	Carmel Valley Rd	Via Mar Valle	Via Donada	No Parking All City Streets Oversized vehicles, None motorized vehicles, Recreational vehicles 2am-6am	1600'	80	37	72	71	69	72	74	69	65	64	63	52	36
2	Carmel Valley Rd	Via Donada	Via Mar Valle	No Restriction	1606'	80	36	70	71	70	69	67	68	66	55	49	46	29
2	Carmel Valley Rd	Via Donada	Via Mar Valle	1 Hr Parking 7am-5pm	162'	8	2	2	7	7	5	6	6	5	4	3	2	2
3	Del Mar Scenic Pkwy	Caminito Del Canto	Carmel Valley Rd	Handicap Parking Only	18'	1	0	0	0	0	0	0	0	0	0	0	0	0
3	Del Mar Scenic Pkwy	Caminito Del Canto	Carmel Valley Rd	No Restriction	523'	26	13	23	25	25	25	25	23	20	18	16	15	15
4	Del Mar Scenic Pkwy	Carmel Valley Rd	Caminito Del Canto	No Restriction	663'	33	24	27	26	28	28	27	26	25	22	20	24	24
5	Via Aprilia	Via Donada	Carmel Valley Rd	No Restriction	725'	36	15	19	19	18	17	20	17	17	14	14	14	10
6	Via Aprilia	Carmel Valley Rd	Via Donada	15 Min parking 9am-10pm Daily	17'	1	0	0	0	1	0	0	0	1	0	0	0	0
6	Via Aprilia	Carmel Valley Rd	Via Donada	No Restriction	664'	33	12	17	16	15	15	16	16	14	14	13	11	9
7	Via Borgia	Via Aprilia	Carmel Valley Rd	No Restriction	124'	6	0	2	4	4	4	5	4	4	2	1	2	2
8	Via Borgia	Carmel Valley Rd	Via Aprilia	No Restriction	116'	5	0	3	3	3	3	3	1	1	1	1	1	1
9	Via Cortina	Via Aprilia	Carmel Valley Rd	No Restriction	181'	9	4	4	4	4	5	5	3	4	3	3	2	1
10	Via Cortina	Carmel Valley Rd	Via Aprilia	No Restriction	232'	11	3	4	4	4	4	4	3	4	3	3	4	5
11	Via Donada	Via Aprilia	Carmel Valley Rd	No Restriction	326'	16	2	3	3	3	5	7	5	5	2	2	1	0
12	Via Donada	Carmel Valley Rd	Via Aprilia	No Restriction	320'	16	7	8	8	9	8	7	7	8	7	7	5	5
Total						361	155	254	261	260	260	266	248	239	209	195	179	139
Total Occupancy Rate							42.94%	70.36%	72.30%	72.02%	72.02%	73.68%	68.70%	66.20%	57.89%	54.02%	49.58%	38.50%

Off-Street Parking

Peak parking demand for the off-street (on-site) NPL has been shown in Table 4. Peak parking demand occurred during the 1:00-2:00 p.m. hour when approximately 65% of the on-site parking spaces were occupied. None of the various parking types (regular, ADA, etc.) experienced significant parking demand (in excess of 80% occupancy) with the exception of clean air parking spaces. Field observations indicated that the NPL typically had ample parking capacity throughout the day with a total of 316 of the 500 standard and "other" spaces occupied.

Table 4 Off-Street Parking Demand Los Penasquitos North Parking Lot (July 4, 2021)

Lot	Total Occupancy Zones 1A & 1B						Occupancy Rate					
Restriction	Total	Total # Regular Spaces	Total # Handicap Spaces	Clean Air	Motor Home	*Other	All Space Types	Regular Spaces	Handicap Spaces	Clean Air	Motor Home	*Other
Spaces	500	470	14	8	8	30						
7:00 AM	6	6	0	0	0	0	1.20%	1.28%	0.00%	0.00%	0.00%	0.00%
8:00 AM	46	45	0	0	1	1	9.20%	9.57%	0.00%	0.00%	12.50%	3.33%
9:00 AM	103	101	0	0	2	2	20.60%	21.49%	0.00%	0.00%	25.00%	6.67%
10:00 AM	149	140	5	3	1	9	29.80%	29.79%	35.71%	37.50%	12.50%	30.00%
11:00 AM	218	210	3	4	1	8	43.60%	44.68%	21.43%	50.00%	12.50%	26.67%
12:00 PM	294	282	4	7	1	12	58.80%	60.00%	28.57%	87.50%	12.50%	40.00%
1:00 PM	316	303	5	3	5	13	63.20%	64.47%	35.71%	37.50%	62.50%	43.33%
2:00 PM	290	277	4	4	5	13	58.00%	58.94%	28.57%	50.00%	62.50%	43.33%
3:00 PM	282	273	3	3	3	9	56.40%	58.09%	21.43%	37.50%	37.50%	30.00%
4:00 PM	203	192	3	4	4	11	40.60%	40.85%	21.43%	50.00%	50.00%	36.67%
5:00 PM	114	108	1	2	3	6	22.80%	22.98%	7.14%	25.00%	37.50%	20.00%
6:00 PM	71	68	0	1	2	3	14.20%	14.47%	0.00%	12.50%	25.00%	10.00%

**Other = ADA (Handicapped), Clean Air, Motor Home*

August 28, 2021 (Saturday—Non-Holiday Weekend):

On-Street Parking

Peak parking demand and occupancy for off-site (on-street) segments are shown in Table 5. Based on the hourly breakdown of overall parking demand, peak demand occurred between 11:00 a.m. and 2:00 p.m. when approximately 84-86% of available on-street spaces were occupied. Surveyed parking occupancies for on-street demand for this Saturday on a non-holiday weekend was higher than occupancies recorded for the July 4th holiday weekend. In addition, all surveyed street segments experienced occupancy rates between 85-100% with the exception of Via Donada located in the far eastern portion of the study area. Survey results appear to indicate that off-site (on-street) parking areas remain popular throughout the weekend primarily as a "first choice" for patrons using the Los Penasquitos Lagoon and beach recreational areas. These recreational patrons would either prefer not to be charged for parking or do not need the convenience of the NPL.

Table 5 On-Street Parking Demand for Study Street Segments (August 28, 2021)

Segment	Street	From	To	Restriction	Measurement (ft.)	Approximate Space (Measurement divided by 20')	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
1	Carmel Valley Rd	Via Mar Valle	Via Donada	No Parking All City Streets Oversized vehicles, None motorized vehicles, Recreational vehicles 2am-6am Except City Permit / No Parking within 50ft of any intersection on alley	1600'	80	54	70	71	70	71	73	73	67	72	70	63	58
2	Carmel Valley Rd	Via Donada	Via Mar Valle	No Restriction	1606'	80	57	64	70	74	74	74	73	64	63	62	58	42
2	Carmel Valley Rd	Via Donada	Via Mar Valle	1 Hr Parking 7am-5pm	162'	8	6	6	7	7	6	7	6	6	6	4	3	2
3	Del Mar Scenic Pkwy	Caminito Del Canto	Carmel Valley Rd	Handicap Parking Only	18'	1	0	0	0	0	0	0	0	0	0	1	1	0
3	Del Mar Scenic Pkwy	Caminito Del Canto	Carmel Valley Rd	No Restriction	523'	26	20	23	22	22	23	23	23	21	22	22	21	17
4	Del Mar Scenic Pkwy	Carmel Valley Rd	Caminito Del Canto	No Restriction	663'	33	24	31	31	29	30	31	29	25	27	27	29	26
5	Via Aprilia	Via Donada	Carmel Valley Rd	No Restriction	725'	36	16	26	27	28	28	31	23	18	20	19	19	16
6	Via Aprilia	Carmel Valley Rd	Via Donada	15 Min parking 9am-10pm Daily	17'	1	1	0	1	1	0	1	0	0	1	0	1	0
6	Via Aprilia	Carmel Valley Rd	Via Donada	No Restriction	664'	33	18	23	23	26	28	28	25	22	20	17	15	15
7	Via Borgia	Via Aprilia	Carmel Valley Rd	No Restriction	124'	6	1	4	6	4	3	3	3	2	2	2	2	2
8	Via Borgia	Carmel Valley Rd	Via Aprilia	No Restriction	116'	5	3	3	5	5	5	5	2	0	0	0	1	1
9	Via Cortina	Via Aprilia	Carmel Valley Rd	No Restriction	181'	9	9	9	9	10	9	10	9	7	6	6	7	6
10	Via Cortina	Carmel Valley Rd	Via Aprilia	No Restriction	232'	11	7	7	7	8	9	10	10	9	10	11	10	10
11	Via Donada	Via Aprilia	Carmel Valley Rd	No Restriction	326'	16	1	1	1	3	6	6	4	3	3	3	7	7
12	Via Donada	Carmel Valley Rd	Via Aprilia	No Restriction	320'	16	7	7	7	8	10	8	9	9	9	9	6	6
Total						361	224	274	287	295	302	310	289	253	261	253	243	208
Total Occupancy Rate							62.05%	75.90%	79.50%	81.72%	83.66%	85.87%	80.06%	70.08%	72.30%	70.08%	67.31%	57.62%

Off-Street Parking

Peak parking demand for the off-street (on-site) NPL has been shown in Table 4. Peak parking demand occurred during the 1:00-2:00 p.m. hour when approximately 46% of the on-site parking spaces were occupied. Again, none of the various parking types (regular, ADA, etc.) experienced significant parking demand (in excess of 80% occupancy) with the exception of clean air parking spaces. Field observations indicated that the NPL typically had ample parking capacity throughout the day with a total of 234 of the 500 standard and "other" spaces occupied.

Table 6 Off-Street Parking Demand Los Penasquitos North Parking Lot (August 28, 2021)

Lot	Total Occupancy Zones 1A & 1B						Occupancy Rates					
Restriction	Total	Total # of Regular Space	Total # of Handicapped Space	Clean Air	Motor Home	*Other	All Space Types	Regular Spaces	Handicapped	Clean Air	Moter Home	*Other
Spaces	500	470	14	8	8	30						
7:00 AM	2	2	0	0	0	0	0.40%	0.43%	0.00%	0.00%	0.00%	0.00%
8:00 AM	45	43	0	2	0	2	9.00%	9.15%	0.00%	25.00%	0.00%	6.67%
9:00 AM	103	98	1	4	0	5	20.60%	20.85%	7.14%	50.00%	0.00%	16.67%
10:00 AM	149	142	3	4	0	7	29.80%	30.21%	21.43%	50.00%	0.00%	23.33%
11:00 AM	172	168	1	3	0	4	34.40%	35.74%	7.14%	37.50%	0.00%	13.33%
12:00 PM	203	197	1	5	0	6	40.60%	41.91%	7.14%	62.50%	0.00%	20.00%
1:00 PM	234	229	3	1	1	5	46.80%	48.72%	21.43%	12.50%	12.50%	16.67%
2:00 PM	229	224	3	1	1	5	45.80%	47.66%	21.43%	12.50%	12.50%	16.67%
3:00 PM	256	253	3	0	0	3	51.20%	53.83%	21.43%	0.00%	0.00%	10.00%
4:00 PM	227	223	4	0	0	4	45.40%	47.45%	28.57%	0.00%	0.00%	13.33%
5:00 PM	171	169	2	0	0	2	34.20%	35.96%	14.29%	0.00%	0.00%	6.67%
6:00 PM	160	156	4	0	0	4	32.00%	33.19%	28.57%	0.00%	0.00%	13.33%

**Other = ADA (Handicapped), Clean Air, Motor Home*

September 4, 2021 (Saturday—Holiday Weekend):

On-Street Parking

Peak parking demand and occupancy for off-site (on-street) segments are shown in Table 7. Based on the hourly breakdown of overall parking demand, peak demand occurred between 10:00-11:00 a.m. when approximately 83% of available on-street spaces were occupied. Surveyed parking occupancies for on-street demand for this Saturday holiday weekend averaged between 76-83% between the hours of 9:00 a.m. and 2:00 p.m. In addition, all surveyed street segments experienced occupancy rates between 72-100% with the exception of Via Donada located in the far eastern portion of the study area. As with all three survey dates, on-street parking areas remain popular throughout the weekend primarily as a "first choice" for patrons using the Los Penasquitos Lagoon and beach recreational areas.

Table 7 On-Street Parking Demand for Study Street Segments (September 4, 2021)

Segment	Street	From	To	Restriction	Measurement (ft.)	Approximate Space (Measurement divided by 20')	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
1	Carmel Valley Rd	Via Mar Valle	Via Donada	No Parking All City Streets Oversized vehicles, None motorized vehicles, Recreational vehicles 2am-6am Except City Permit / No Parking within	1600'	80	67	72	73	77	76	73	67	76	67	66	60	57
2	Carmel Valley Rd	Via Donada	Via Mar Valle	No Restriction	1606'	80	62	67	71	70	73	67	73	68	61	59	58	54
2	Carmel Valley Rd	Via Donada	Via Mar Valle	1 Hr Parking 7am-5pm	162'	8	3	4	6	7	7	5	7	6	6	5	7	7
3	Del Mar Scenic Pkwy	Caminito Del Canto	Carmel Valley Rd	Handicap Parking Only	18'	1	0	0	0	0	0	0	0	0	0	0	0	0
3	Del Mar Scenic Pkwy	Caminito Del Canto	Carmel Valley Rd	No Restriction	523'	26	17	21	23	22	22	22	22	22	22	22	21	21
4	Del Mar Scenic Pkwy	Carmel Valley Rd	Caminito Del Canto	No Restriction	663'	33	20	22	30	32	32	30	32	32	31	31	30	29
5	Via Aprilia	Via Donada	Carmel Valley Rd	No Restriction	725'	36	19	22	24	26	26	20	19	17	14	15	17	16
6	Via Aprilia	Carmel Valley Rd	Via Donada	15 Min parking 9am-10pm Daily	17'	1	0	0	0	1	1	1	0	0	1	1	0	0
6	Via Aprilia	Carmel Valley Rd	Via Donada	No Restriction	664'	33	11	13	17	19	23	22	21	21	16	16	16	17
7	Via Borgia	Via Aprilia	Carmel Valley Rd	No Restriction	124'	6	2	2	6	6	6	5	5	5	4	4	3	2
8	Via Borgia	Carmel Valley Rd	Via Aprilia	No Restriction	116'	5	1	2	3	4	3	3	3	3	4	3	2	1
9	Via Cortina	Via Aprilia	Carmel Valley Rd	No Restriction	181'	9	3	4	5	5	4	6	6	5	3	3	2	3
10	Via Cortina	Carmel Valley Rd	Via Aprilia	No Restriction	232'	11	5	7	8	10	9	9	5	5	6	6	6	4
11	Via Donada	Via Aprilia	Carmel Valley Rd	No Restriction	326'	16	4	4	5	5	7	7	7	7	5	5	5	5
12	Via Donada	Carmel Valley Rd	Via Aprilia	No Restriction	320'	16	4	5	7	9	9	9	8	8	7	6	6	6
Total						361	218	245	278	293	298	279	275	275	247	242	233	222
Total Occupancy Rate							60.39%	67.87%	77.01%	81.16%	82.55%	77.29%	76.18%	76.18%	68.42%	67.04%	64.54%	61.50%

Off-Street Parking

Peak parking demand for the off-street (on-site) NPL are shown in Table 8. Peak parking demand occurred during the 2:00-3:00 p.m. hour when approximately 58-59% of the on-site parking spaces were occupied. Again, none of the various parking types (regular, ADA, etc.) experienced significant parking demand (in excess of 80% occupancy) with the exception of clean air parking spaces. Field observations indicated that the NPL typically had ample parking capacity throughout the day with a total of 297 of the 500 standard and "other" spaces occupied.

Table 8 Off-Street Parking Demand Los Penasquitos North Parking Lot (September 4, 2021)

Lot	Total Occupancy						Occupancy Rate					
Restriction	Total	Total # Regular Spaces	Total # Handicap Spaces	Clean Air	Motor Home	*Other	All Space Types	Regular Spaces	Handicap Spaces	Clean Air	Motor Home	*Other
Spaces	500	470	14	8	8	30						
7:00 AM	7	7	0	0	0	0	1.40%	1.49%	0.00%	0.00%	0.00%	0.00%
8:00 AM	38	38	0	0	0	0	7.60%	8.09%	0.00%	0.00%	0.00%	0.00%
9:00 AM	63	62	1	0	0	1	12.60%	13.19%	7.14%	0.00%	0.00%	3.33%
10:00 AM	140	135	3	1	1	5	28.00%	28.72%	21.43%	12.50%	12.50%	16.67%
11:00 AM	171	165	2	4	0	6	34.20%	35.11%	14.29%	50.00%	0.00%	20.00%
12:00 PM	201	191	4	5	0	9	40.20%	40.64%	28.57%	62.50%	0.00%	30.00%
1:00 PM	265	258	5	2	0	7	53.00%	54.89%	35.71%	25.00%	0.00%	23.33%
2:00 PM	293	285	7	1	0	8	58.60%	60.64%	50.00%	12.50%	0.00%	26.67%
3:00 PM	297	287	9	1	0	10	59.40%	61.06%	64.29%	12.50%	0.00%	33.33%
4:00 PM	247	239	8	0	0	8	49.40%	50.85%	57.14%	0.00%	0.00%	26.67%
5:00 PM	190	183	7	0	0	7	38.00%	38.94%	50.00%	0.00%	0.00%	23.33%
6:00 PM	119	117	1	1	0	2	23.80%	24.89%	7.14%	12.50%	0.00%	6.67%

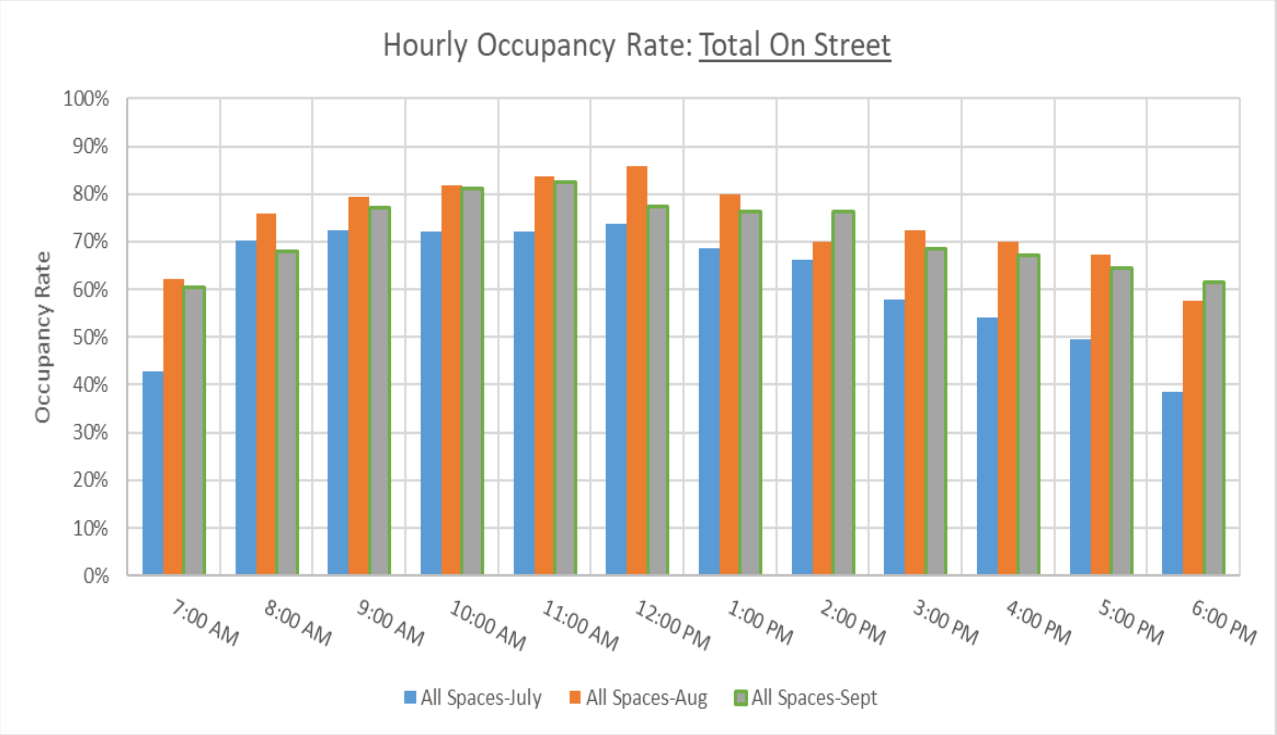
**Other = ADA (Handicapped), Clean Air, Motor Home*

6. Summary of Existing Parking Demand

On-Street Parking Demand:

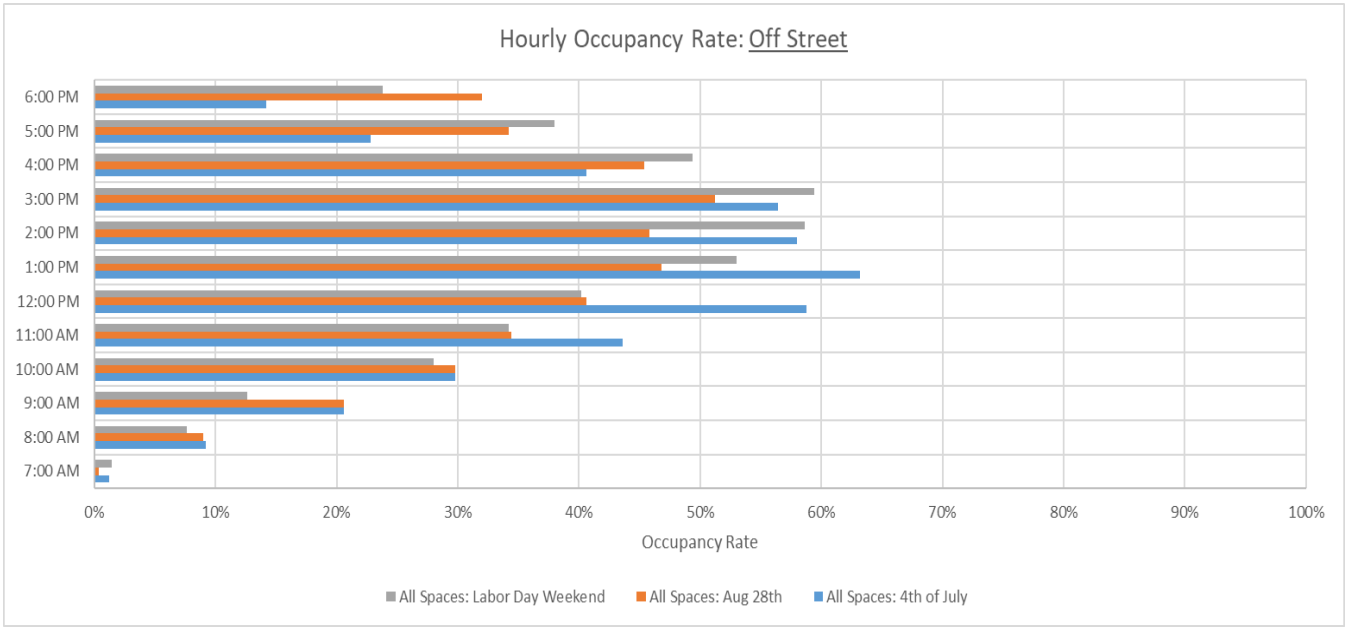
Peak parking demand for on-street (off-site) segments has been summarized graphically for the three survey periods conducted in the months July, August, and September 2021. As shown below (Hourly Occupancy Rate: Total On Street); the July 4th Holiday weekend had the lowest on-street demand while the month of August trended toward the highest occupancy rates. Peak daily demand periods typically occurred between 9:00 a.m. and 2:00 p.m. with occupancy rates ranging between 70-85%. The highest demand period(s) occurred between 11:00 a.m. – 1:00 p.m. with occupancies ranging from approximately 78-85% for the survey periods of August and September (please refer to graphic summaries of specific on-street segments-attached).

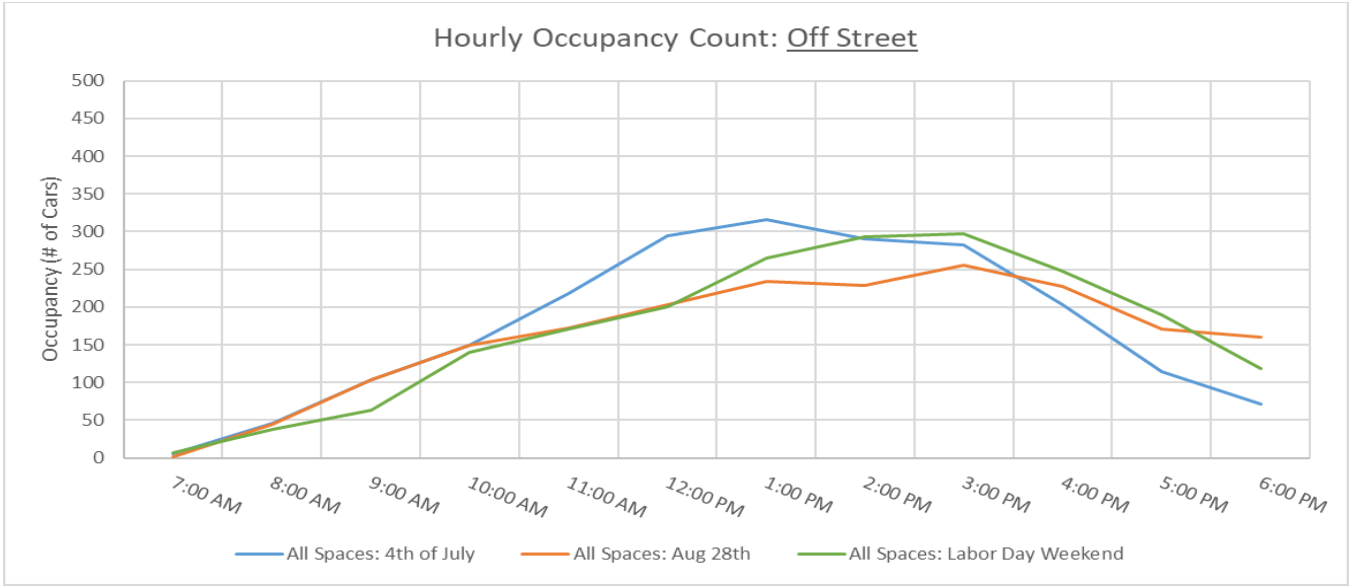
On-street parking occupancy surveys for the Del Mar street segments immediately adjacent to the Los Penasquitos Lagoon and beach recreation areas indicate strong parking demand (70—85%) during the morning and midday hours. In particular, parking demand along Carmel Valley Road, Del Mar Scenic Parkway, and the Via Aprilia and Via Borgia segments tends to remain strong due to the lack of restrictions (i.e., time and no fees) and convenience to the recreational areas. Assuming there would be no changes to the current parking structure fees (or lack thereof) and restrictions for both on-street and adjacent off-street parking facilities; daily parking demand in these on-street segments would continue to remain constant during peak weekend (Saturday or Sunday) demand periods.



Off-Street Parking Demand

Peak off-street parking demand for the NPL has been summarized graphically for all three survey periods conducted in the months of July, August, and September 2021. As shown graphically below (Hourly Occupancy Rate/Count: Total Off Street), the July 4th Holiday weekend had the lowest off-street demand while the month of August trended toward the highest occupancy rates. However, peak daily demand periods occurred somewhat later in the morning than on-street parking characteristics starting at 11:00 a.m. and extending through 4:00 p.m. During these time periods, occupancy rates ranged from 45-63%. The highest demand period(s) occurred between 12 Noon – 3:00 p.m. with occupancies ranging from approximately 58-63% for the survey period of August (please refer to graphic summaries of specific on-street NPL parking demand-attached).





Reviewing each survey period separately, off-street parking occupancy for the North Parking Lot and beach recreation areas indicate the highest demand for all spaces occurred over the July 4th (Saturday) weekend at 63% or 316 parking spaces during the midday hour. Subsequent parking demand surveys conducted over the summer on August 28, 2021 (Saturday) and September 4, 2021 (Saturday) indicated slightly lower occupancy rates. Specifically, a peak occupancy rate of 51% (256 spaces) was recorded for the August

survey and 59% (297 spaces) during the September survey. Please note—these surveys refer to all parking spaces within the NPL (standard, ADA, clean air/EV, and motor home). Focusing on just the standard parking spaces, parking demand mimicked overall occupancy rates for total spaces but was slightly higher during the surveyed time periods. Peak occupancy rates for standard spaces were recorded at 65%, 54%, and 61% during the July, August, and September surveys.

Overall, peak parking demand surveys for the NPL indicate that parking demand is relatively moderate for the three survey periods averaging approximately 58% for all parking spaces and 60% for standard parking spaces. As noted in the summary on adjacent on-street (off-site) segments, patrons wishing to access the Los Penasquitos Lagoon and beach recreation areas would seem to prefer off-site parking areas as their primary choice due to lack of restrictions and parking fees. These off-site parking factors tend to keep current parking demand at the NPL moderate during peak summer demand periods.

7. Considerations for the Reduction of Parking Spaces from North Parking Lot

Methodology

Based on peak parking demand surveys conducted over the summer holiday and non-holiday periods at the North Parking Lot; there is an opportunity to reduce the number of existing parking spaces in the NPL while still maintaining a balanced parking supply for adjacent recreational uses. Based on surveyed parking demand in the NPL for the three summer survey periods, the overall average parking demand for the NPL was 58% for all parking spaces (293 spaces). However, for the purpose of this study the focus will be on the number of *standard parking spaces* that could be reduced in the NPL. The reason for using standard parking spaces is that other uses provided within the NPL such as ADA access, clean air/EV, and motor homes will continue to be promoted and encouraged. In addition, the analysis will focus on the most conservative parking survey (July 4th weekend) rather than an average of all three summer parking surveys to provide the most conservative analysis.

To calculate the number of standard parking spaces that could be reduced in the NPL, assumptions regarding four parking components associated with both off-street and on-street parking demand are summarized below:

- **On-Site Parking Supply**: Based on the existing parking survey conducted by NDS for the NPL, the total supply of standard parking spaces is **470** (out of a total parking supply of 500 spaces);

- **On-Site Parking Demand Surveys.** Based on parking demand surveys conducted by NDS for the NPL, a peak occupancy rate of **65%** (**or 303 standard spaces**) was recorded on July 4, 2021. The NPL occupancy rate of 65% was the highest recorded parking demand for the three holiday and non-holiday periods and is being used as a conservative “baseline” condition to determine future parking demand;

- **North Parking Lot Daily Fee Cost**: A daily parking fee of $20 is currently being assessed by California State Parks for the NPL. The parking fee of $20 will be assumed for this analysis. It is noted that any change in the daily parking fee at the NPL (up or down) would affect future parking demand calculations;

- **Del-Mar Street Segment Parking Restrictions**: For the surveyed street segments of Carmel Valley Road, Del Mar Scenic Parkway, Via Aprilia, Via Borgia, Via Cortina, and Via Donada; all parking restrictions (or lack thereof) will be assumed for this analysis.

From the four parking components (above), the two most critical factors in assessing whether parking spaces could be reduced in the NPL are the daily parking fee and the Del Mar street segment parking restrictions. Should any of those two components change in the future, then parking demand at the NPL

would likely change (up or down). New parking demand surveys would have to be conducted at the NPL to assess the resulting parking occupancies.

Parking Design Factors

When determining parking demand for each facility, care must be taken in providing a sufficient number of parking spaces for the specific use(s) so as not to create excess demand or a "spill-over" effect into adjacent neighborhoods or commercial districts during peak demand periods. Typically, County or City agencies will establish the minimum number of parking spaces required by a unit of measurement. These units could be per room, per seat, per student, per 1,000 square feet of gross leasable area (GLA), etc. Based on parking research and data gathered over many years and studies, minimum parking rates have been established for commercial, retail, and residential uses (among others). However, when a unique land use is being evaluated such as the North Parking Lot, established parking demand rates are not readily available or reliable due to lack of research or uniqueness of the project. Therefore, established parking guidelines recommend surveying the actual land use to gain parking demand information and minimum design standards. In the case of the North Parking Lot, the three parking surveys conducted on both summer holiday and non-holiday weekends recorded a peak parking demand of 65% (303 spaces) for standard parking spaces. Clearly, 303 standard parking spaces would be the minimum number of spaces required to maintain an adequate parking supply within the NPL for current uses. Nonetheless, additional design factors must be considered when configuring parking facilities to meet the minimum parking demand requirements.

There has been little research conducted on reducing the size of established parking lots (other than to maintain the minimum number of parking spaces required by code for the specific land use(s)). Recently, jurisdictions and agencies have been crediting development projects (primarily multi-family residential) based on their proximity to transit services. Typically, if these residential developments are within close proximately to transit (one-half mile or less), than the development can provide less parking spaces than the minimum code requirement. These parking credits usually range between 5-25%.

Regarding the North Parking Lot, the absolute minimum number of spaces required would be the highest parking demand recorded plus recommended design factors to allow for an adequate supply buffer and utilization. Based on an overall parking supply of 470 standard spaces and peak demand of 303 spaces, there are theoretically 167 parking spaces that could be adjusted to reduce the overall parking supply within the NPL. However, the Urban Land Institute (ULI) and ENO Foundation have evaluated minimum design requirements for parking facilities that must be considered when evaluating overall parking requirements[5,6] There are two factors when evaluating design and circulation requirements for a parking facility as follows:

> **Design:** The concept of parking lot design is typically based on parking rates/ratios that provide an 85% confidence level that the supply will not be exceeded. This is commonly referred to as "design-level parking demand" and that the parking supply would only be exceeded 15% of the time. Since parking surveys conducted for the NPL were conducted during the theoretically highest peak use weekends of the summer, the need for a design level buffer would be reduced. However, 100% utilization of a parking facility is never recommended for design purposes and all parking facilities are considered at maximum utilization when they reach 90% occupancy. The design recommendations go on to state "Because it is not practical to have every space occupied during peak demand periods, the number of parking spaces that should be provided should exceed peak demands." Consequently, a suggested 5-10% parking design buffer is suggested above the recorded peak demand.
>
> **Parking Facility Circulation**: As noted above, parking facilities are usually considered at capacity when 90% occupancy is reached. The design recommendations indicate "Some reserve capacity is needed to allow for cruising vehicles in search of a space, vehicles 'unparking,' and for peak surges. Thus, a design safety factor should be applied to account for these conditions. A design

[5] ENO Foundation, Parking, Robert E. Weant and Herbert S. Levinson, Chapter 3 (Zoning Requirements), Chapter 6 (Parking Demands and Characteristics), 1990.
[6] Urban Land Institute (ULI), The Dimensions of Parking, 4th Edition, Chapter 3 (Parking Demand), 2000.

safety factor of 10% is suggested for most land uses. For example, if a parking analysis shows a peak demand of 500 spaces, the overall design should provide another 50 spaces to allow for reserve capacity."

Estimated Parking Space Reduction for the Los Penasquitos North Parking Lot

Based on a reasonable parking facility utilization factor of 5% plus a parking design safety factor of 10% (15% combined), the number of parking spaces that could be reduced in the Los Penasquitos NPL has been estimated. Using the peak recorded parking demand for standard parking spaces of 65% (or 303 spaces), the estimated number of spaces that would provide adequate reserve parking capacity in the Los Penasquitos NPL has been calculated as follows:

Utilization and Design Factor Adjustments:

- 303-space peak demand x 15% (utilization & design factors) = +46 spaces

Adjusted Peak Parking Demand w/ Utilization & Design Buffer:

- 303 space peak demand + 46 spaces = 349 spaces:

Estimated Reduction in Parking Spaces:

- 470 standard space supply – 349 space peak demand = -121 spaces

Estimated Reduction: Adjusted Total Parking Space Supply (Standard & "Other" Spaces):

- **500 spaces – 121 spaces = 379 spaces**

As shown in the above calculations, 46 parking spaces would have to be added to the peak recorded parking demand of 303 spaces to allow for an adequate utilization and design buffer. The adjusted peak parking demand would then increase to 349 spaces. Based on a total supply of 470 standard parking spaces, the estimated number of parking spaces that could be reduced in the Los Penasquitos NPL would be 121 standard spaces. The adjusted total parking supply of standard and "other" spaces for the Los Penasquitos NPL would be 379 spaces. As noted, "other" parking in the NPL includes a combined 30 ADA, Clean Air/EV Vehicles, Motor Home/Large Vehicle Parking, and Employee Only spaces.

The adjusted total parking supply of 379 spaces represents the minimum number of spaces for the Los Penasquitos North Parking Lot that would allow for adequate capacity without compromising off-site parking demand in the adjacent Del Mar street segments.

Attachment 2

Tidal Hydraulics Modeling

Technical Memorandum

October 14, 2022

To	Los Peñasquitos Lagoon Foundation .		
Copy to	Mike Hastings, Executive Director		
From	Brett Vivian, PE Brian Leslie	**Project No.**	11211806
Project Name	Preserving Public Access to Torrey Pines State Natural Reserve		
Subject	Hydraulic Analysis of McGonigle Road Crossing		

1. Hydraulic Analysis of McGonigle Road Crossing

1.1 Background

McGonigle Road provides access to the North Beach parking lot from Carmel Valley Road (Figure 1). The roadway was elevated in the late 1960s by an earthen fill prism and bisects a tidal channel and marsh plain (ESA, 2016). The tidal channel and marsh plain, referred to herein as the northern marsh, are isolated from the rest of the lagoon by the roadway prism to the south and railroad prism to the west. The culvert within the McGonigle Road fill prism conveys tidal waters and upslope stormwater runoff from the northern marsh to the tidal channel parallel to the railroad that flows to the main channel of Los Peñasquitos lagoon. Structural failure of the culvert began in 2008, creating a sinkhole in the roadway that has been bridged with steel plates to maintain vehicle access and prevent further settlement of the roadway (ESA, 2016).

Figure 1. McGonigle Road fill prism intersects the northern historical marsh plain and tidal channel of Los Pensasquitos Lagoon.

High tides, stormwater runoff, and high flows due to winter floods flow into the northern marsh and as water levels recede south of the crossing, areas of impounded water persist in the northern marsh and immediately south of the crossing. The Los Peñasquitos Lagoon Enhancement Plan identified that water impounded in the northern marsh creates ideal habitat for mosquito breeding, resulting in this location being a potential area of concern for the County's Department of Environmental Health (ESA, 2016).

The hydraulic analysis of the northern marsh and existing culvert under McGonigle Road is intended to develop baseline conditions and set initial parameters for an optimization study that will assist in determining a feasible approach to improve tidal circulation to the northern marsh.

1.2 Water Level Monitoring

Water level monitoring takes place at select sites throughout the lagoon, including the northern marsh, that is identified as water level site NW in Figure 2. Water level monitoring conducted by Tijuana River National Estuarine Research Reserve (TRNERR) from June 2014 shows that high tides within the northern marsh are similar to other locations within the lagoon system and open ocean as measured at the La Jolla tide gauge (Figure 3). However, low tides are limited to between 4.5 and 5 feet (NAVD88), while the lagoon water levels drop to between 2 and 3 feet (NAVD88) (TRNERR, 2014).

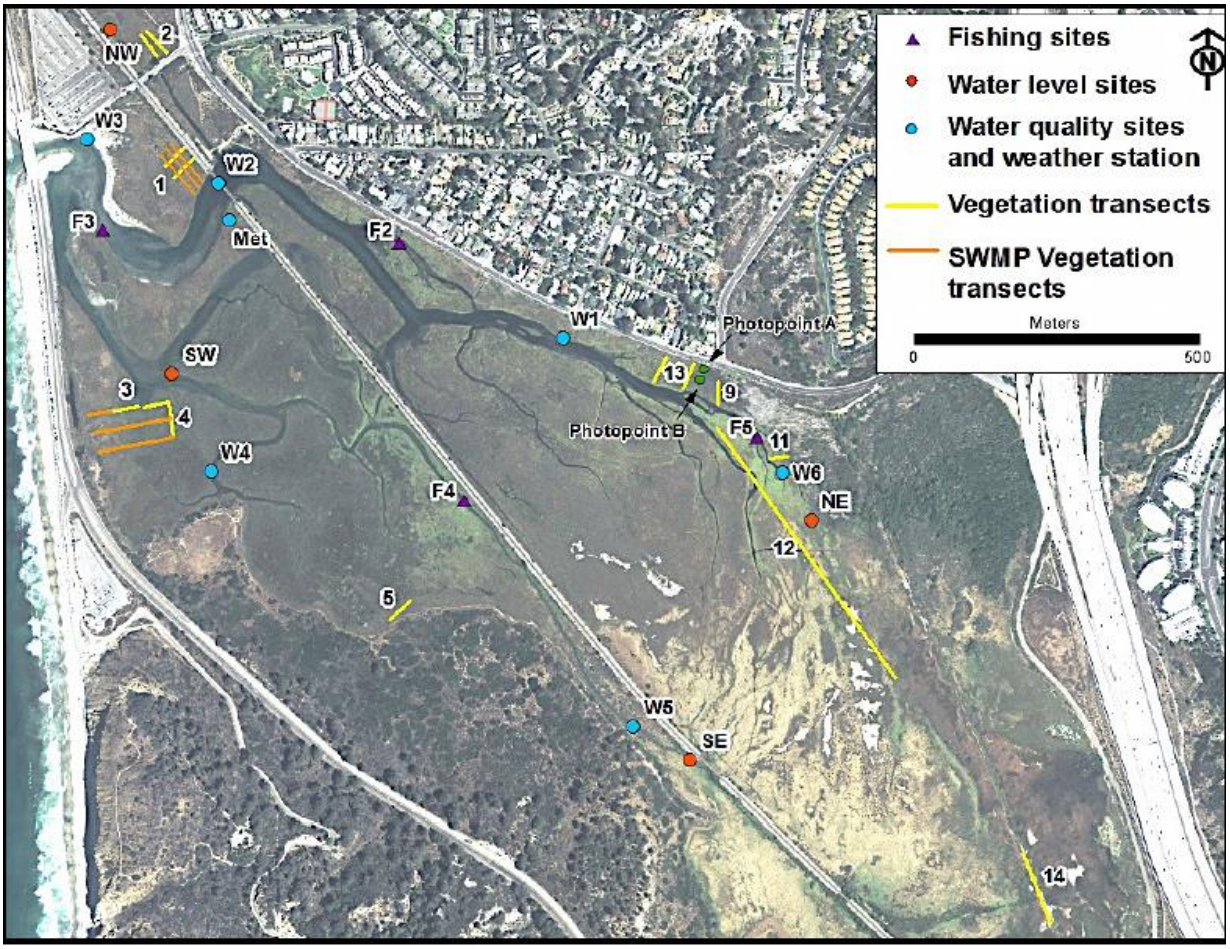


Figure 2. Water Level and Quality Monitoring sites throughout Los Peñasquitos Lagoon (TRNERR & SIO, 2017)

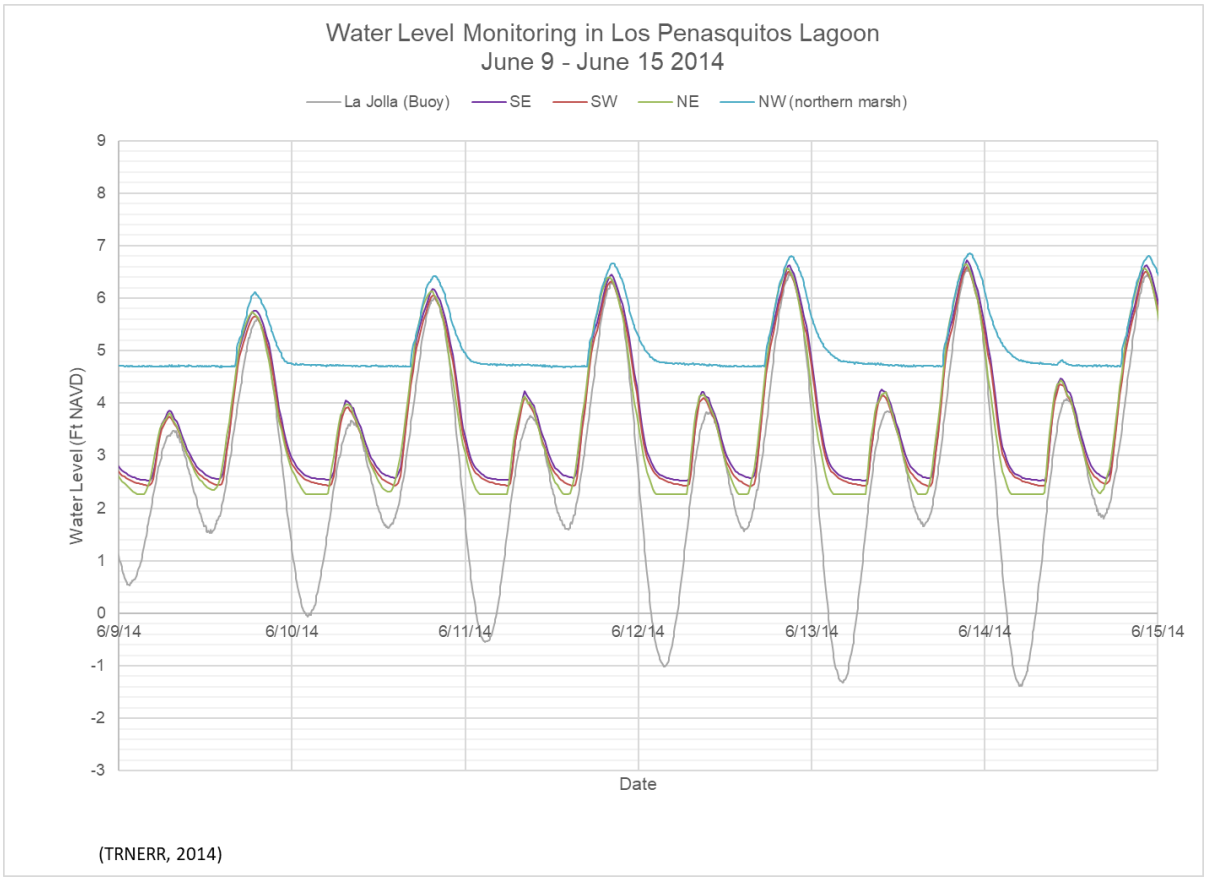


Figure 3. Water level monitoring in Los Penasquitos Lagoon showing restricted low tide water levels in the Northern Marsh tidal channel.

As shown in Figure 3, flood tide water levels above 4.8 feet in the Northern Marsh rise at a similar rate as water levels at other monitoring locations and fall with the ebb tide at a slightly lower rate, suggesting that a potential impediment to flow may be present south of the monitoring location. When water levels drop to 4.8 feet, the water level remains constant until tides flood tides higher than 4.8 feet return, suggesting that the low tide may be limited by topographic features.

1.3 Topographic Characteristics and Hydraulic Geometry

Based on a review of historical aerial imagery, photographs and anecdotal observations, pools of tidal and stormwater runoff persist throughout the year immediately upstream and downstream the McGonigle Road culvert. The Los Penasquitos Lagoon Foundation has reported that the culvert is approximately 24-inch diameter and is always submerged, even at the lowest tides. As-built information regarding the culvert crossing is not available at this time and the submerged culvert poses difficulties to access, measure, and confirm dimensions.

The 2016 USGS West Coast El-Nino Lidar (WA, OR, CA) provides topographic detail of the marsh plain and surrounding areas. This dataset was used to assess topographic features that may contribute to the restriction of low tide water levels (Figure 4).

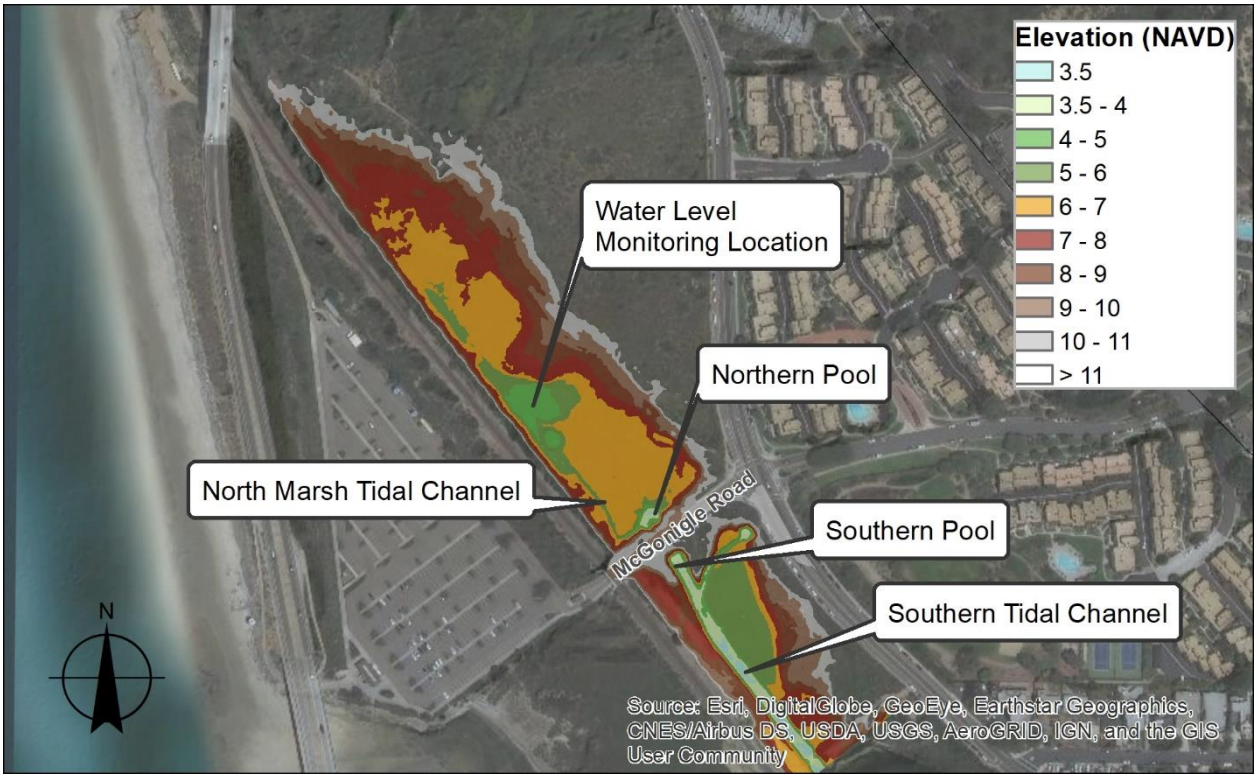


Figure 4. 2016 USGS West Coast El-Nino Lidar (WA, OR, CA) was combined with slough channel topographic information in the 2014 USACE NCMP Topobathy Lidar DEM: California.

The location of water level monitoring in the northern marsh shows a minimum elevation of approximately 4.5 feet (Figure 5). Based on aerial imagery during low tides, this area is largely a dry salt pan with small, isolated areas of ponded water in narrow channels. Topography in these channel locations show elevations around 5.0 feet and appear to be the result of hydroflattening in the LiDAR data set, water surfaces that define the topography instead of the ground bathymetry. Channel geometry that exhibits a flat bottom is typically indicative of hydroflattenting, while a more v-shaped bottom is indicative of actual bathymetry. The metadata for the LiDAR dataset only removed large areas of water surface, such as in the main channel of the lagoon, and these smaller channels were not removed. Isolated areas of ponded water within channel reaches, where hydroflattening occurs, reduces storage within the channel, but does not affect hydraulic conveyance when channel bathymetry upstream and downstream is greater than or equal to the ponded water surface. In locations upstream and downstream of these ponded areas, where cross section geometry is indicative of ground bathymetry, the v-shaped bottom elevation is approximately 5.5 feet. Lower elevations of 3.5 to 4 feet are present in the northern and southern pools on either side of McGonigle Road. Based on field measurements and observations at low tide, the LiDAR data has hydroflattened the topography, resulting in the water surface and not the true channel bottom being shown. Considering the field measurements described above the pool bottom elevations areas were measured to be approximately elevation 0 feet. The southern tidal channel, south of McGonigle Road, shows elevations ranging from 3.5 to 4 feet. Based on aerial imagery during multiple low tide events, narrow channels of water exist within the channel, but the channel is largely dry at low tide, and the thalweg (flow line) elevation is likely varies between elevation 3 and 4 feet.

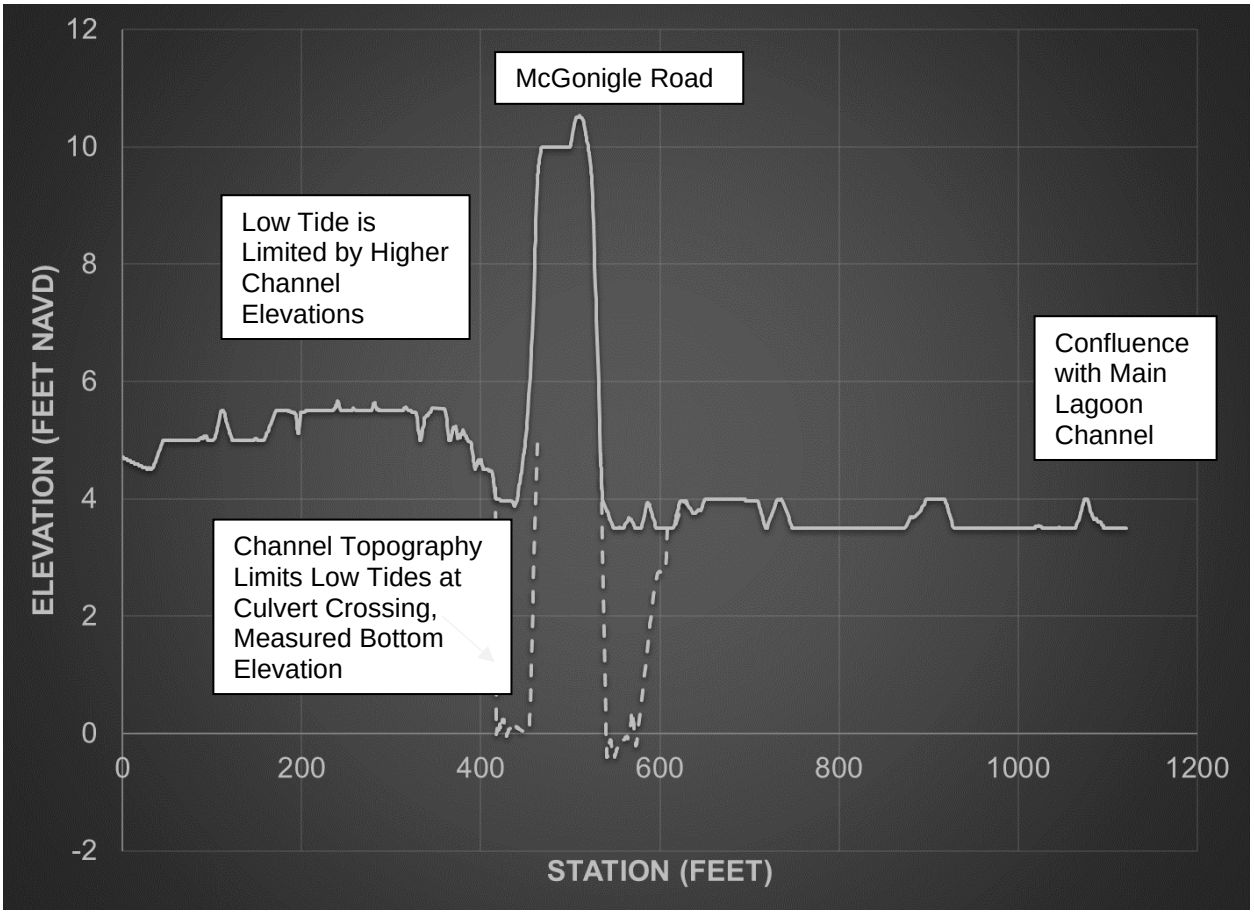


Figure 5. The northern marsh tidal channel shows that topography will result in areas of ponding due to higher elevations downstream (south).

Hydraulic geometry, consisting of depth, width and cross section area, of mature tidal channels are a function of contributing marsh area and tidal prism (Williams, Orr, & Garrity, 2002). Tidal prism is the volume of water between mean high water (MHW) and mean low water (MLW), or the volume of water between these datums leaving on an ebb tide. Based on water level monitoring in the lagoon from June 2013 to August 2014, MHW in the lagoon is between 4.67 to 4.69 feet and MLW is 0.91 to 2.53 feet (ESA, 2016). MLW exhibits a larger range due to the highly seasonal variability and management of the lagoon mouth. With topographic features limiting the low tide elevation in the northern marsh to approximately 4.75 feet, tidal prism is severely limited, resulting in severely reduced channel forming processes and the accumulation of sediment and ponding within the tidal reach. An indication of the effects due to the limited tidal prism can be illustrated in the difference between the tidal channels north and south of McGonigle Road (Figure 6). The tidal prism contributing to the southern tidal channel is approximately 1.1 acre-feet with a bottom elevation of approximately 3.5 feet and significantly larger cross sectional area.

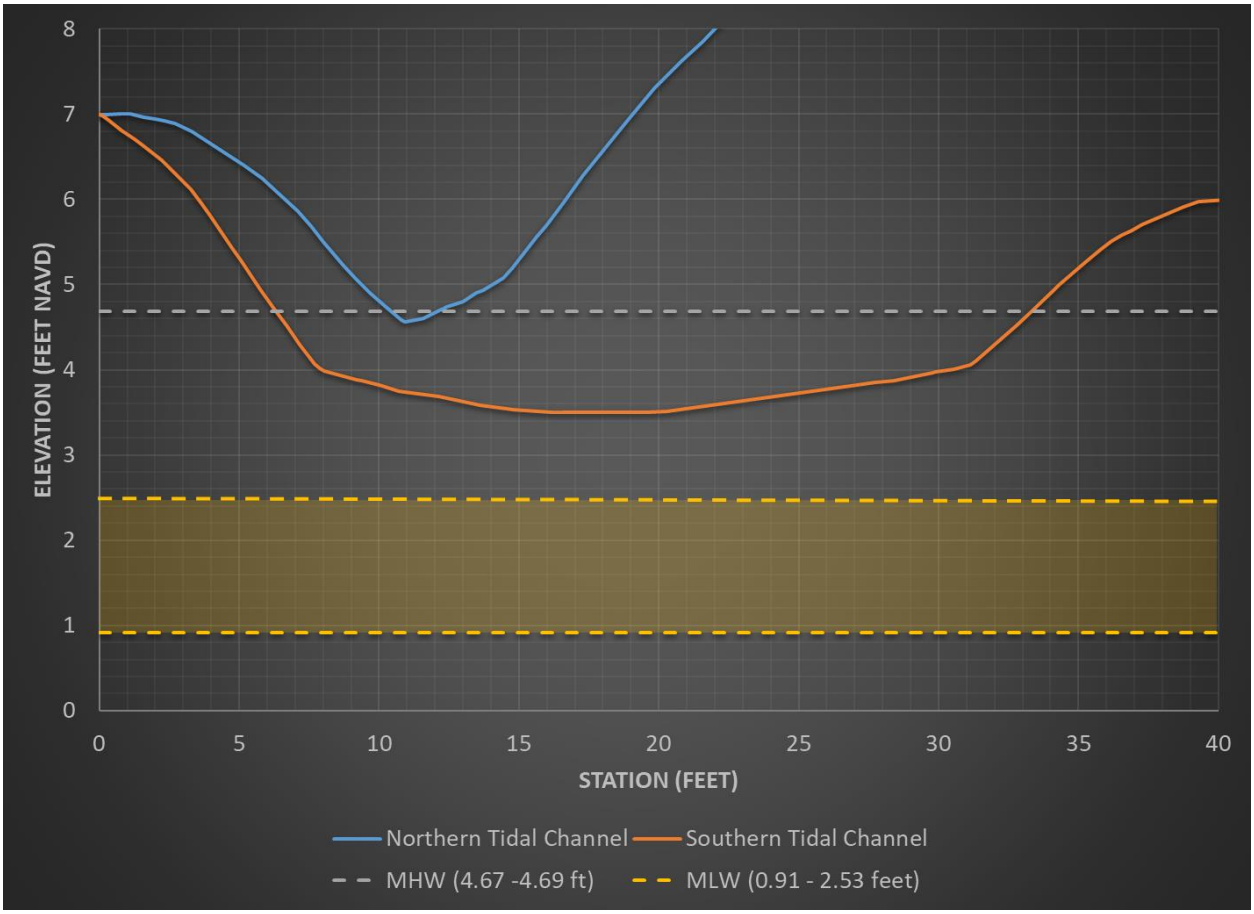


Figure 6. Northern tidal channel compared to the southern tidal channel.

Empirical equations have been developed to relate depth, width and cross section area of mature tidal channels (Williams, Orr, & Garrity, 2002). Depth, width and cross section area are calculated relative to Mean Higher High Water (MHHW). MHHW in the lagoon is between 5.39 and 5.27 feet (ESA, 2016). Applying these equations to the southern tidal channel shows that 1.1 acre-feet of tidal prism typically form narrower, deeper channels (Table 1). A depth of 4.5 feet below MHHW results in an expected bottom elevation of approximately 0.9 to 1 feet, suggesting that the channel may be in a state of aggradation, with channel elevations now higher than historical elevations. This theory is further supported by the observation that the culvert invert elevation to the north is currently lower than the channel elevation.

Table 1. Empirical equations for hydraulic geometry based on tidal prism compared to existing conditions in the southern tidal channel.

	Depth below MHHW (ft)	Channel Top Width (ft)	Cross Section Area (ft^2)	Tidal Prism (acre-feet)
Existing	1.77	30	41	1.1
Empirical	4.5	13.5	10.1	

Additional detail regarding the channel hydraulics, McGonigle Road culvert, and circulation can be assessed using a hydraulic model. The following sections provides an analysis of the modeled culvert crossing and tidal channel.

2. Hydraulic Model

The project site is a tidal channel extending north from the Los Penasquitos Lagoon channel. The objective of the hydraulic analysis is to assess the water levels and velocities within the tidal channels, marsh and McGonigle Road culvert to identify feasible alternatives to improve circulation and reduce ponding. A 2-dimensional hydraulic model was developed using the Hydraulic Engineering Center River Analysis System (HEC-RAS) version 5.0.7. Typical spring tides were modeled to assess hydraulic conditions.

2.1 Model Development

2.1.1 Boundary Conditions

Boundary conditions define how water enters and exits the model. The upstream boundary condition is defined using a flow rate and the downstream boundary condition by tidal conditions. A summer baseflow of 10 cubic feet per second (cfs) was established, based on typical gage data flows during the month of June for Los Penasquitos Creek (Station 11023340), Carmel Creek (Station 11023450) and Carroll Creek (Station 11023400), then scaled to account for the total watershed area contributing to the upstream boundary condition location.

A tidal downstream boundary condition was used that corresponded to available water level monitoring data for the northern marsh. Tidal water levels at the La Jolla buoy, from June 4th to June 15th 2014 define the downstream boundary water levels. The tidal levels represent typical spring tides and model results could be compared to water level monitoring for model calibration and validation.

The downstream boundary was located approximately 1200 feet downstream of the project site, where the Los Penasquitos Lagoon discharges into the Pacific Ocean (Figure 8). The upstream boundary was located approximately 3,500 feet upstream, at the eastern extent of slough channels, near the intersection of Carmel Valley Road and Interstate 5. The model domain includes Carmel Valley Road to the east and the Pacific Ocean to the west. The following sections outline the model components and parameters.

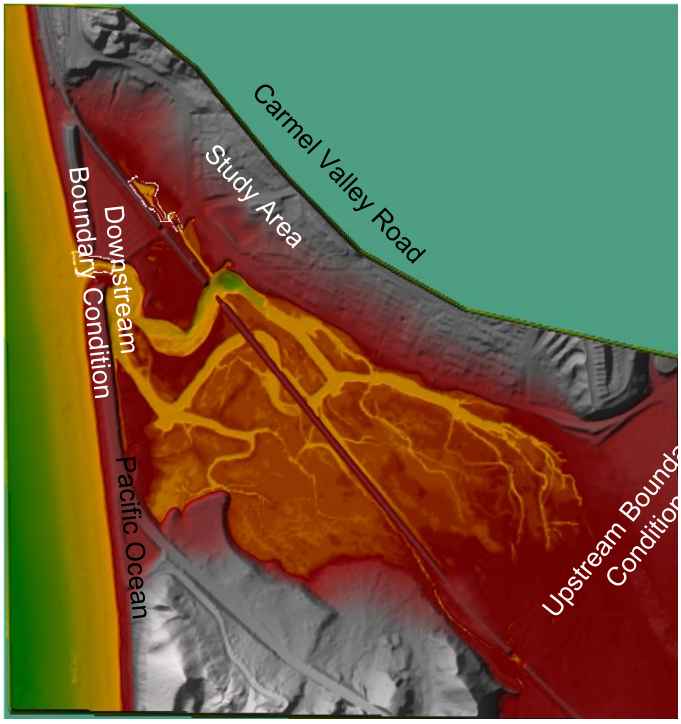


Figure 7. Model domain of Los Penasquitos Lagoon.

2.1.2 Elevation Data

The 2016 USGS West Coast El-Nino Lidar (WA, OR, CA) was used to define topography. The 2014 USACE NCMP Topobathy Lidar DEM: California was used to supplement channel topography by providing additional resolution within the main lagoon channel and was obtained during the same year as the available water level monitoring data. The bathymetry of immediately upstream and downstream of the McGonigle Road crossing was adjusted to achieve a bottom pool elevation of 0 ft, consistent with field measurements. Elevations exceeding 4.75 feet in portions of the northern marsh tidal channel were flattened as these higher areas are likely due to vegetation obstructions, and water levels were shown to drop to 4.75 feet, consistent with the water level monitoring. Higher elevations within the channel are likely the result of vegetative interference with the LiDAR survey. The elevation of the lagoon mouth at the confluence with the Pacific Ocean was lowered from to elevation 2.5 feet allow the lagoon to drain to an elevation more similar to that of the monitored water levels, which show a minimum lagoon water level of 2.5 feet.

2.1.3 Structures

The culvert crossing at McGonigle Road was modeled based on the limited, anecdotal information received from the LPLF. The culvert was modeled as a 24-inch diameter, corrugated metal pipe (manning's n = 0.013), with invert elevation upstream and downstream of 0 feet.

2.1.4 Model Parameters

Additional parameters include model duration and time step, and Manning's n. The model duration was set to correspond to the tidal water levels at the La Jolla buoy, from June 4th to June 15th 2014 and the time step utilized was 10 seconds. Manning's n quantifies the roughness and friction of the channel bed. Typical values for Manning's n are shown in Table 2. The slough channels are earthen, windy, and fairly uniform. A uniform Manning's n of 0.025 was used to represent the slough channels.

Table 2. Manning's n values for indicated channel types.

Channel Type	Manning's n
Lined Channels	
Asphalt	0.013 - 0.017
Brick	0.012 - 0.018
Concrete	0.011 - 0.020
Rubble or riprap	0.020 - 0.035
Vegetal	0.030 - 0.40
Excavated or dredged	
Earth, straight and uniform	0.020 - 0.030
Earth, windy, fairly uniform	0.025 - 0.040
Rock	0.030 - 0.045
Unmaintained	0.050 - 0.140
Natural channels (minor streams, top width at flood stage < 100 ft)	
Fairly regular section	0.030 - 0.070
Irregular section with pools	0.040 - 0.100

Source: ASCE (1982), Gravity Sanitary Sewer Design and Construction, ASCE Manual of Practice No. 60, New York, NY.

2.2 Existing Conditions Results

The following sections present assessments and results of the hydraulic model. The project area was modeled with the existing channel geometry and structures and then with proposed project conditions, based on the existing conditions findings, discussed in the following sections. Results of the existing conditions analysis show that the McGonigle Road culvert crossing constricts flow, resulting in increased channel velocities, but does not have a significant effect on water levels in the northern marsh.

2.2.1 Calibration

Modeled water levels were compared to water level monitoring levels to assess and validate the model. As shown in Figure 8, modeled and measured water levels follow similar trends and elevations. The modeled water levels in the northern marsh are typically within approximately 0.5 feet of the peak measured water levels during high tide and very similar to the lowest elevations measured. Modeled and measured water levels at the SW location are also within 0.5 feet of each other on the peak tide. Differences in low tide elevation as the SW location are likely a result of differences in the geometry of the lagoon mouth to the Pacific Ocean. The mouth is highly dynamic and regularly dredged, which in turn has an effect on the minimum and maximum water levels in the lagoon. This analysis is focused on the hydraulics of the McGonigle Road culvert crossing and northern marsh tidal channel. As discussed in topographic characteristics, the tidal channel immediately downstream (south) of the culvert crossing is elevation 4 feet; therefore, water levels below elevation 4 feet would not have an effect on water levels upstream (north), due to the topographic barrier at elevation 4 feet.

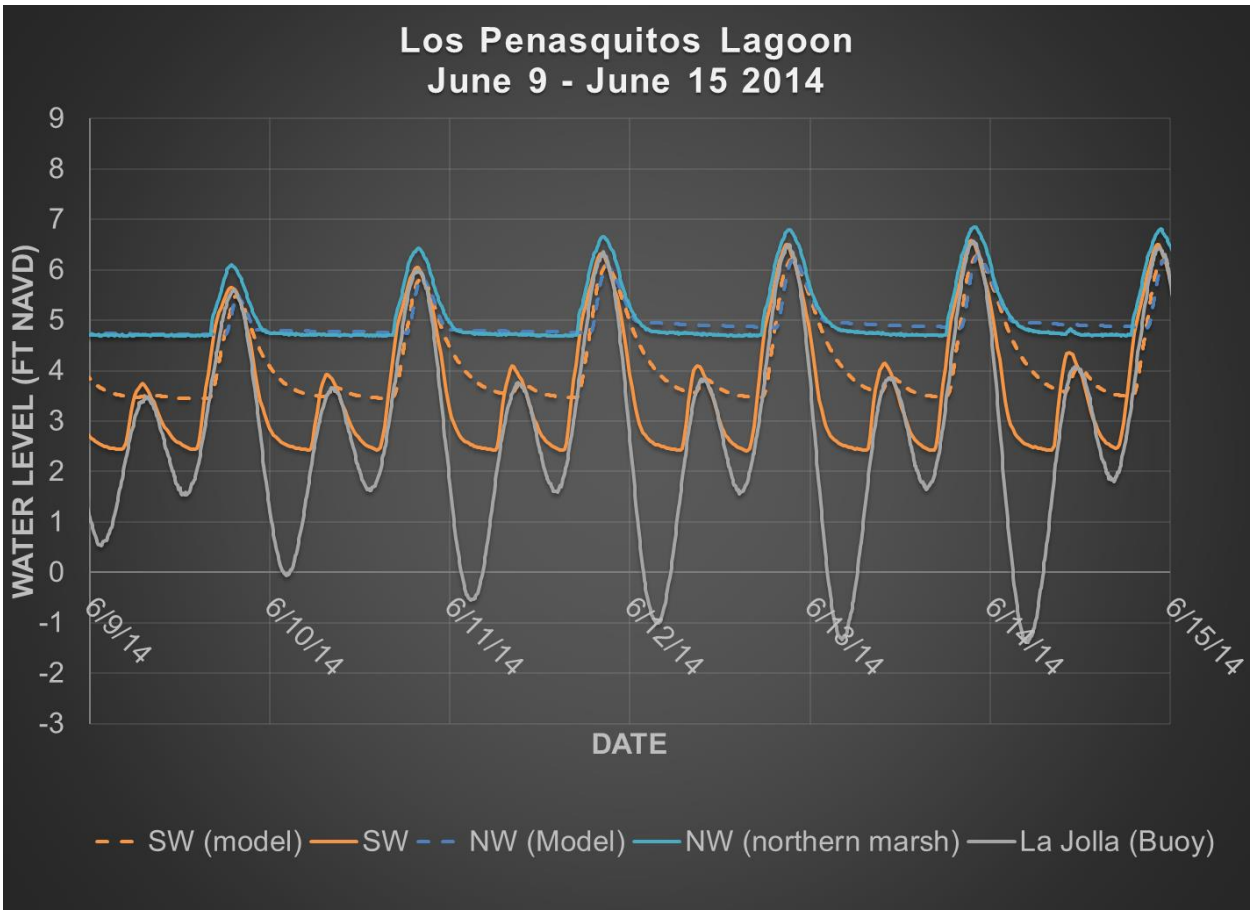


Figure 8. Model calibration comparison between modeled and measured water levels.

2.2.2 Water Surface Elevation and Velocity

As described above, topography appears to limit the elevation of the low tides in the tidal channel extending from the northern marsh to the confluence with the main lagoon channel. However, constrictions, such as culverts, within the channel can also affect water levels. Water level time series throughout the tidal channel show that water levels are similar upstream and downstream of the culvert crossing. While little information is available regarding the culvert dimensions and elevations, the culvert does not affect water levels, as the rates of change are nearly identical (Figure 9).

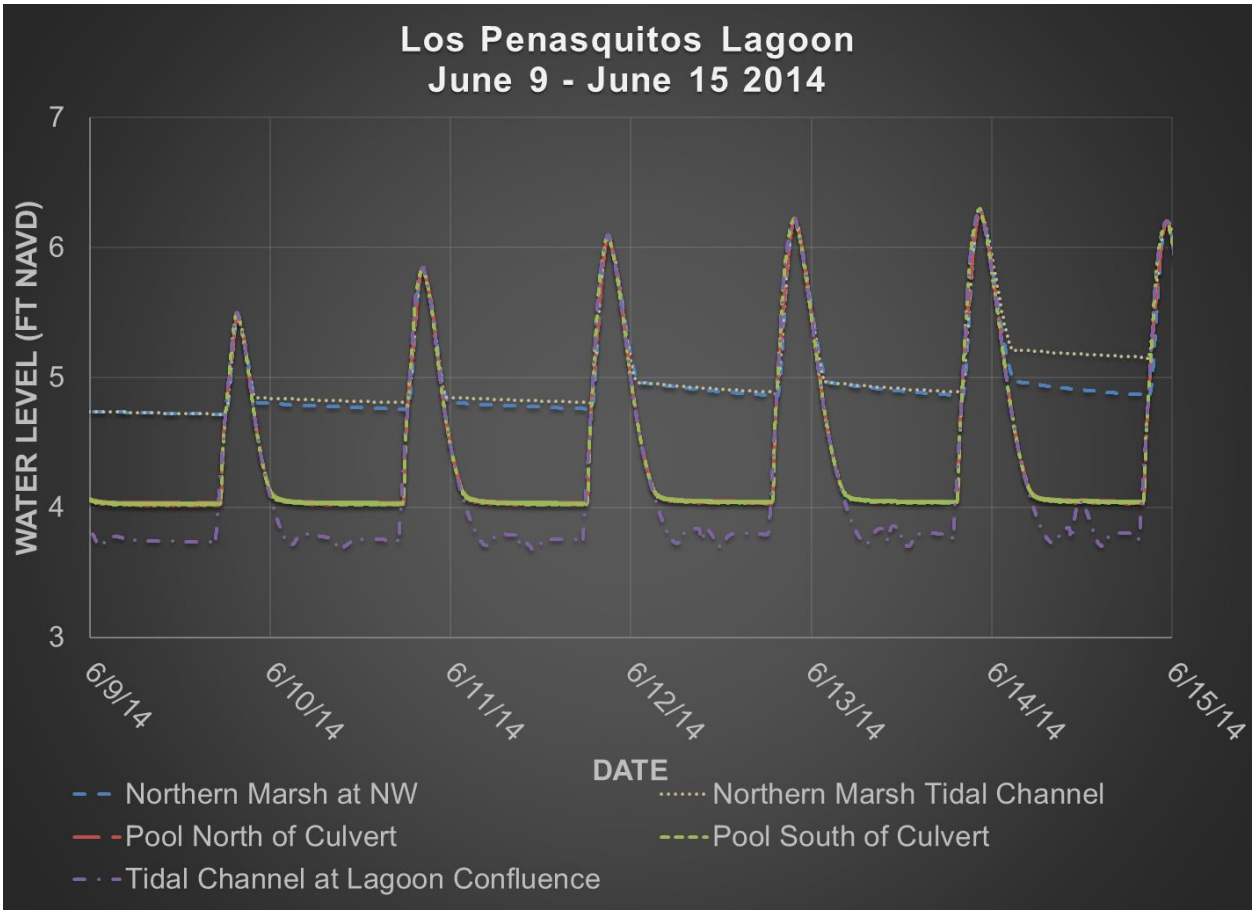


Figure 9. Modeled water levels within the tidal channel show nearly identical rates of change north and south of the culvert crossing, indicating that water levels are not affected by the culvert.

Based on observations, the culvert flow line is below the natural tidal channel grade. Water levels presented above show that the submerged culvert does not affect water levels, but Figure 10 shows that the estimated 24-inch diameter culvert results in a constriction to flow through the culvert, with increased velocities, compared to other locations in the tidal channel. A similar effect would be expected with other culvert dimensions that do not meet or exceed the cross sectional area of the tidal channel. Velocities within the open tidal channel range from 0 to 0.5 ft/sec, while velocities within the culvert reach more than 2 ft/sec. Based on historical aerial imagery, the tidal channel location and top width appears stable. The increased velocities within the culvert combined with the invert elevation below the tidal channel thalweg likely contribute to scouring of sediment and persistence of the pools north and south of the culvert. The sediment that is scoured out of the culvert or pools may then suspend and be carried to other areas of the tidal channel, where it is deposited. Accumulated sediment within the tidal channel may then contribute to the topographic restrictions to low tide.

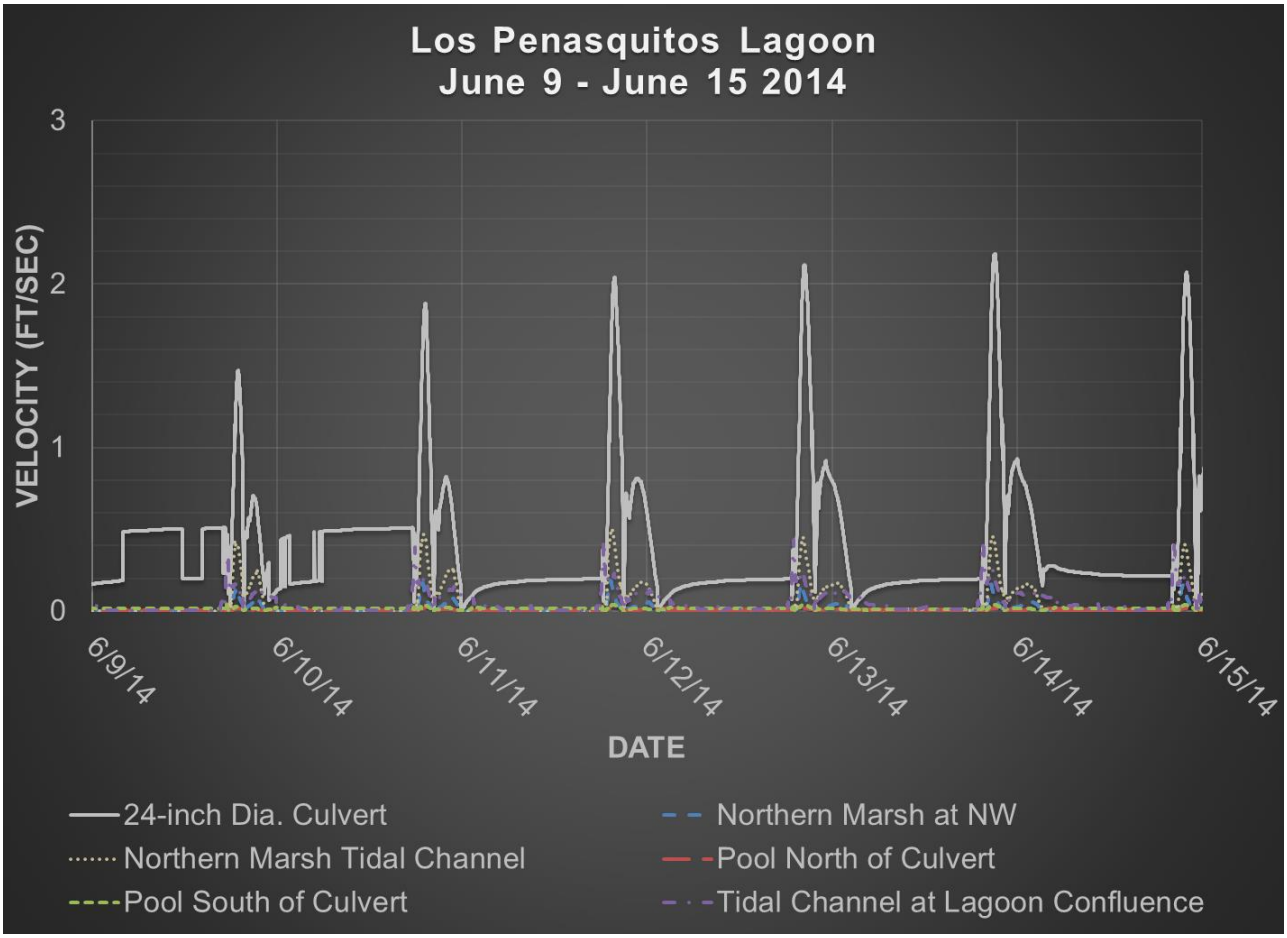


Figure 10. Modeled velocities within the culvert crossing and significantly higher than velocities within the rest of the tidal channel.

2.3 Conceptual Tidal Channel and Culvert Improvements

The hydraulic analysis of the northern marsh and existing culvert under McGonigle Road presented above shows that topographic features within the tidal channel and immediately upstream and downstream of the culvert result in significant limitations to tidal range and prism that result in poor tidal circulation. Restoration of tidal range by excavating a dendritic tidal channel in the northern marsh and replacement of the culvert crossing to accommodate the restored tidal channel dimensions will increase the tidal prism and restore channel forming processes. The southern tidal channel is anticipated to adjust to the increased tidal prism or could alternatively be excavated to restore mature tidal channel geometry and elevations, subject to further geotechnical and hydraulic analyses. Conceptual designs of tidal channel restoration in the northern marsh is presented in Figure 11. The bottom elevation and geometry of the proposed tidal channel may be optimized using the empirical equations described above, habitat goals, McGonigle Road crossing design constraints, and geotechnical considerations.

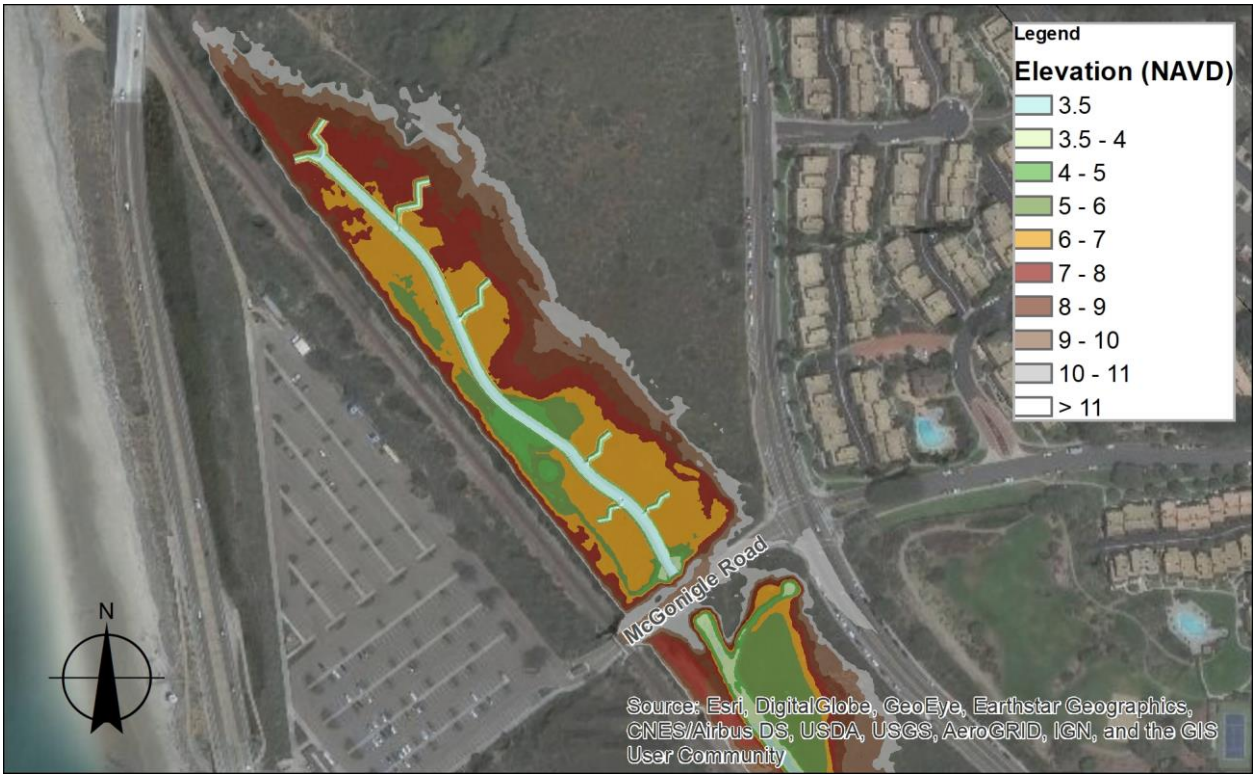


Figure 11. Conceptual tidal channel restoration in the northern marsh.

2.4 Rainfall Runoff

The United States Geological Survey's Stream Stats was used to assess the contributing rain runoff to the McGonigle Road crossing. The contributing drainage area consists of 0.1 square miles, extending from the McGonigle Road crossing upslope to the northeast, encompassing Carmel Valley Road and the community along Caminito Mar Villa. The resulting peak-flows by recurrence are presented in Table 3.

Table 3. Peak flow by recurrence at McGonigle Road crossing.

Recurrence	Peak-Flow (cfs)
2-yr	4.69
5-yr	11.1
10-yr	14.2
25-yr	16.6
50-yr	18.1
100-yr	19.4

Manning's equation for open channel flow can be used to determine the flow depth associated with the 100-yr recurrence flow. Assuming a trapezoidal channel of slope 0.1% and side slopes of 2H:1V, flow depth is typically less than 1 foot (Table 4). The increased flow due to restored tidal prism will likely dictate the hydraulic geometry of the restored tidal channel. Geotechnical considerations will be evaluated to identify the size and type of crossing.

Table 4. 100-yr recurrence flow depth for varying tidal channel bottom width at McGonigle Road.

Channel Bottom Width (ft)	100-yr Recurrence Flow Depth (ft)
2	1.1
4	0.8
6	0.7
8	0.6

10	0.5

The FEMA Flood Insurance Rate Map (FIRM) was reviewed to assess water levels associated with the 100-yr flow in Los Penasquitos Lagoon. The FIRM base flood elevation (BFE) for the 100-yr recurrence at McGonigle Road is between 13 and 14 feet (NAVD), which results in overtopping of McGonigle Road (approx. elevation 10 feet). Continuous BFE elevations at FEMA-modeled cross sections B, C, and D upstream of McGonigle Road suggest a backwater effect due to the flow constriction at the North Torrey Pines Road crossing. Excavation within a backwater area would not be anticipated to increase the BFE.

2.5 Geotechnical Considerations

Tidal Channel

A minimum of two hand corings to elevation 1 foot in southern part of channel is recommended to determine the sediment cohesive/noncohesive characteristics. The results of this analysis will inform design of the restored tidal channel and extent of grading required in the restored tidal channel and erodability of the tidal reach between McGonigle Road and the confluence with the main channel of the lagoon.

McGonigle Road Crossing

A geotechnical investigation to evaluate the subsurface conditions and provide criteria for design of a new structure foundation is recommended. Potential structures include a bridge crossing, arch culvert, and box culvert. The geotechnical investigation should include at least two test borings – one at each abutment – extended to depths approximately 50 feet below channel bottom. The structure borings shall be supplemented by two shallow (5-10 ft deep) borings at the approach sections for roadway design. Laboratory tests on soil samples recovered from the test borings should include moisture content, unit weight, direct shear or unconfined compressive strength, sieve analysis, plasticity index, soil corrosion, and R-value for pavement design.

The geotechnical investigation should include a summary of the subsurface exploration; field and laboratory soils testing; "Log of Test Borings" drawing; seismic design criteria; liquefaction evaluation; corrosion evaluation; foundation recommendations (including pile alternatives) per current Caltrans procedures; approach earthwork recommendations with pavement sections; and construction considerations (including but not limited to maximum permanent and temporary cut slopes).

The report should also include, as-built drawings, published geologic mapping and seismicity data, aerial photographs, preliminary project data, anticipated earth materials and conditions based on data and site exposures; provide seismic input parameters consistent with current Caltrans practice; recommendations of roadway approaches and pavement options; and recommend foundation types, channel scour, and liquefaction potential.

2.6 Sea Level Rise Considerations

Water level monitoring in the lagoon shows that peak tide water levels, as measured at the La Jolla buoy, propagate throughout the lagoon. Given this relationship, increased water levels due to sea level rise are expected to be additive, shifting tidal datum in the lagoon equal to the amount of sea level rise. Hydraulic geometry of tidal channels will adjust accordingly, based on changes to tidal prism. Marsh habitat elevation will also adjust, shifting vegetative communities upslope as the duration of the tidal inundation of existing elevations increases. Habitat design parameters should use tidal datum with sea level rise projections added.

The FEMA BFEs for riverine and coastal analyses are based on independent events. FEMA BFEs due to riverine flood sources at McGonigle Road are shown in Table 5. The BFE due to coastal flood sources at the mouth of the lagoon is also shown and supplemented with NOAA exceedance probability levels.

Table 5. FEMA recurrence and base flood elevations in study area.

Source	Return Period	Rate of Occurrence	BFE/Water Levels (ft)
Riverine	10-yr	0.1	8.7
	50-yr	0.02	11.9
	100-yr	0.01	13.9
	500-yr	0.002	19.8
Coastal	1.1-yr*	0.99	6.5
	2-yr*	0.5	6.9
	10-yr*	0.1	7.2
	100-yr	0.01	8.0
* (NOAA, 2020)			

The transition area between coastal and riverine floodplains can be analyzed for the effects of the combined rate of occurrence for coastal and riverine flooding (FEMA, 2015). The analysis assumes independence and non-concurrence, where storms that produce extreme rainfall and runoff are not the same as the storms that produce the greatest storm surge. The analysis selects a flood level within the elevation range of interest. The rates of occurrence of rainfall runoff and storm surge exceeding the selected flood level elevation due to rainfall runoff and storm surge are summed to calculate the combined rate of occurrence. The values presented in Table 5 and increases in sea level rise of 1 foot increments were used to develop power equations for calculating rate of occurrence based on elevation. Figure 12 shows the calculated combined rates of occurrence, as well as existing, separate rates of occurrence. The relationship between the combined rates of occurrence and elevation can be used for design water levels.

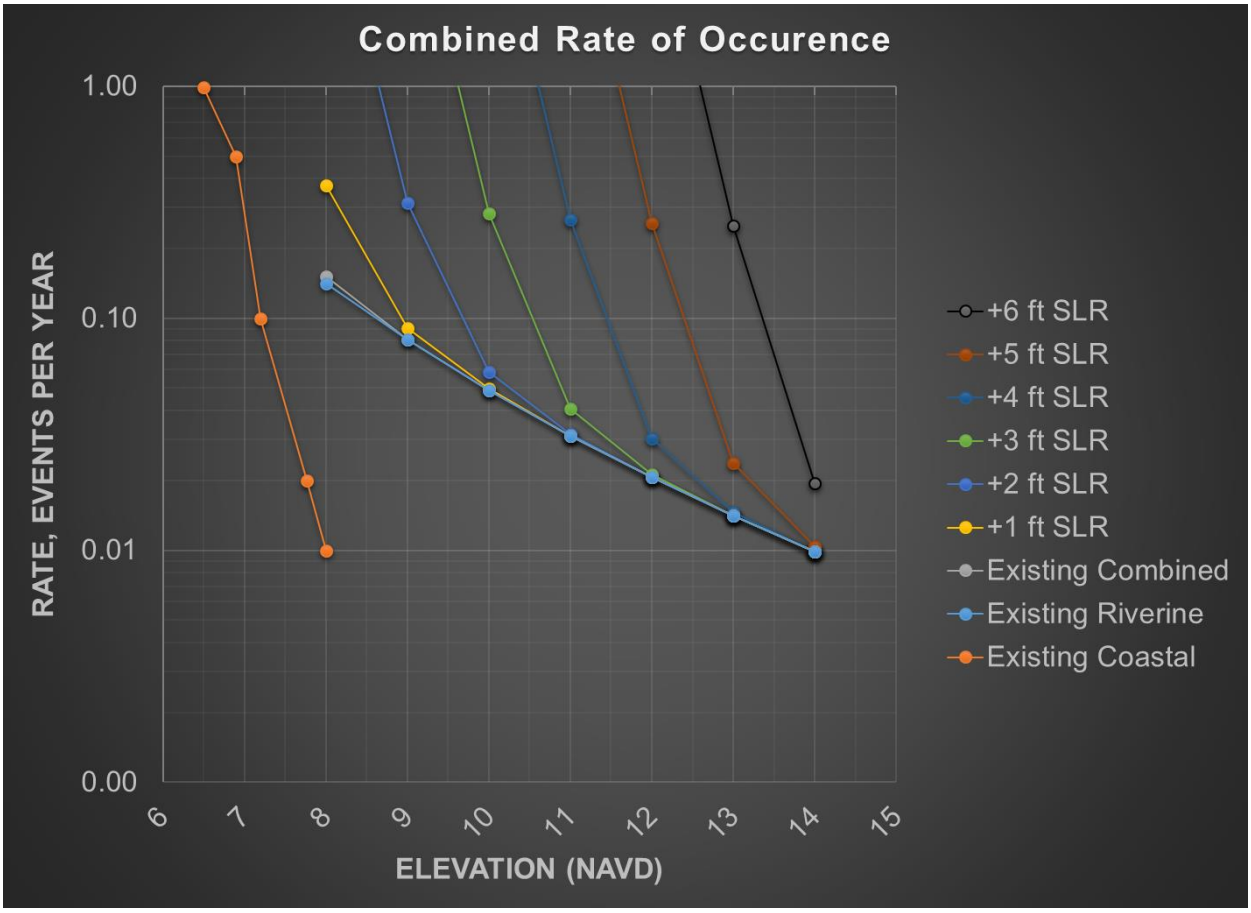


Figure 12. Combined coastal and riverine rate of occurrence for Los Penasquitos Lagoon.

References

ESA. (2016). *Los Penasquitos Lagoon Enhancement Plan.* ESA.

FEMA. (2015). *Guidance for Flood Risk Analysis and Mapping: Coastal Flood Frequency and Extreme Value Analysis.* FEMA.

NOAA. (2020, October 13). *Exceedance Probability Levels and Tidal Datums, 9410230 La Jolla, CA*. Retrieved from NOAA Tides and Currents: https://tidesandcurrents.noaa.gov/est/stickdiagram.shtml?stnid=9410230

NOAA Tides & Currents. (2020, October 10). *Datums for 9410230, La Jolla CA*. Retrieved from NOAA Tides & Currents: https://tidesandcurrents.noaa.gov/datums.html?id=9410230

TRNERR. (2014). *LPL Water Level Monitoring.*

Williams, P. B., Orr, M. K., & Garrity, N. J. (2002). *Hydraculic Geometry: A Geomorphic Design Tool for Tidal Marsh Channel Evolution in Weland Restoration Projects.* Society for Ecological Restoration.

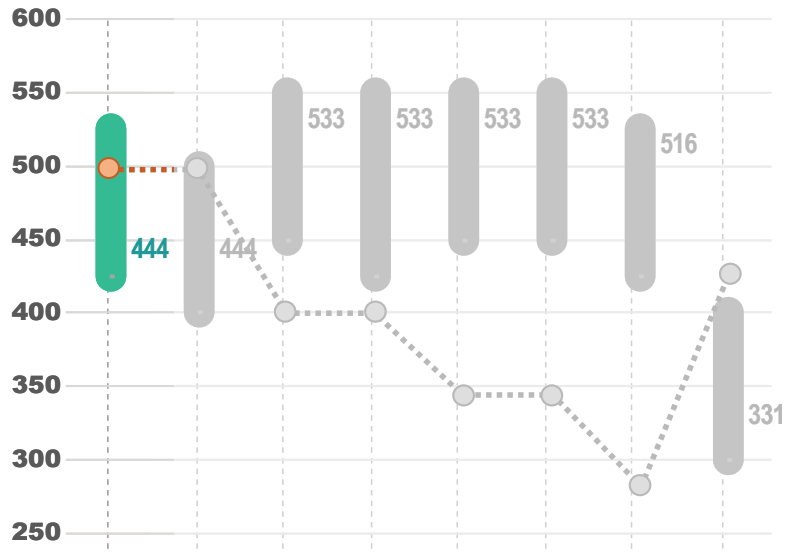
Attachment 3

Adaptation Strategy Concepts

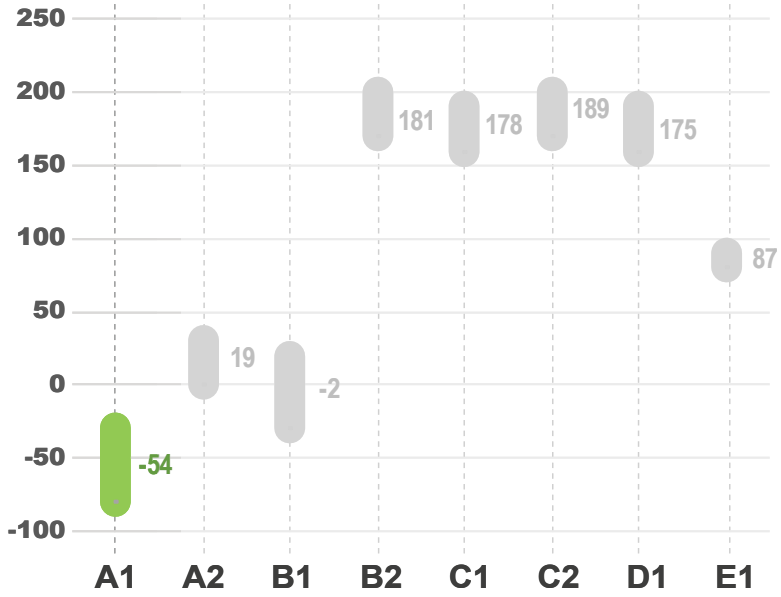
STRATEGIC ALTERNATIVES | A1: Frontage Lot + Dropoff Lot

0' 20' 60' 200' 500'

Net Potential Parking [spaces, sf/space]



Net Potential Habitat Area Change [1000 sf]



Key Disadvantages

- Inefficient parking density
- Long drainage slope
- Long "hunting" distance

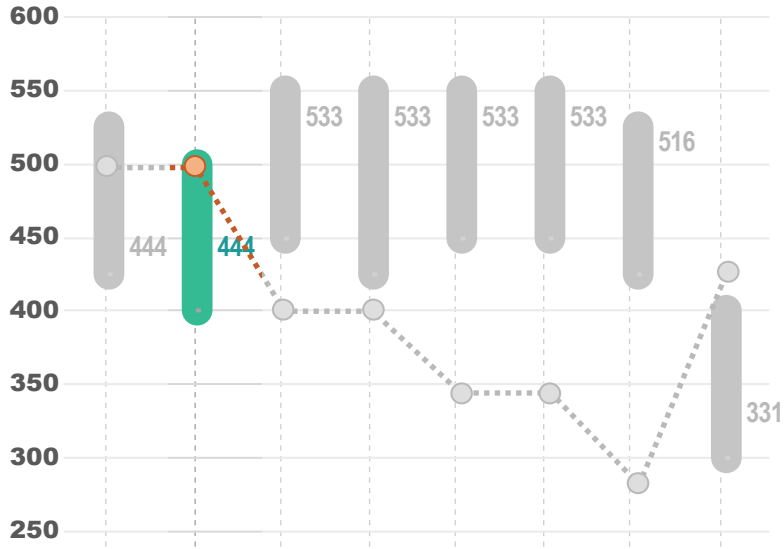
Key Advantages

- Dispersed visual impact
- Reduced grading need
- Effective visual screening

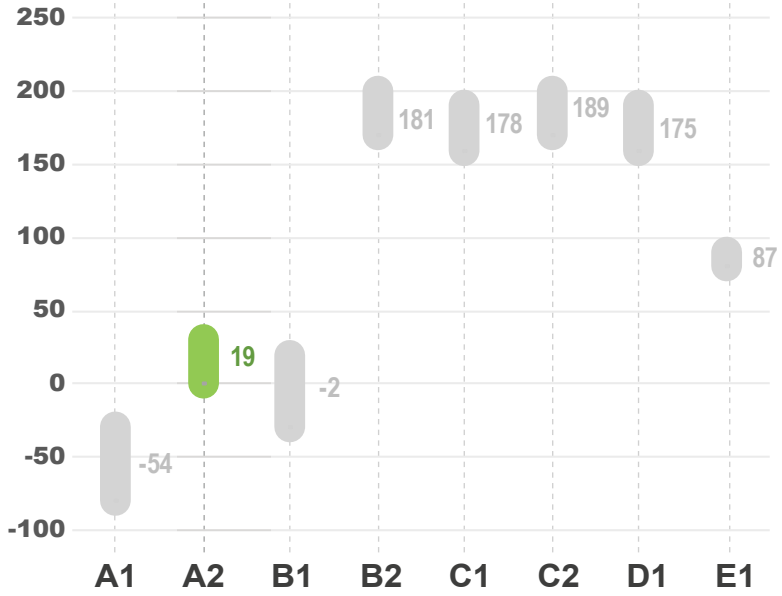
STRATEGIC ALTERNATIVES | A2: Frontage Lot + Capped Dropoff Lot

0' 20' 60' 200' 500'

Net Potential Parking [spaces, sf/space]



Net Potential Habitat Area Change [1000 sf]



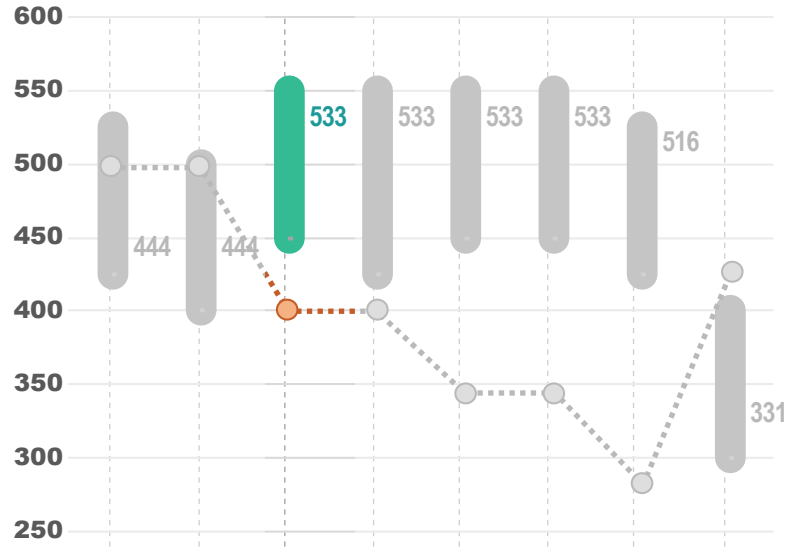
Key Disadvantages

- Inefficient parking density
- Long drainage slope
- Long "hunting" distance

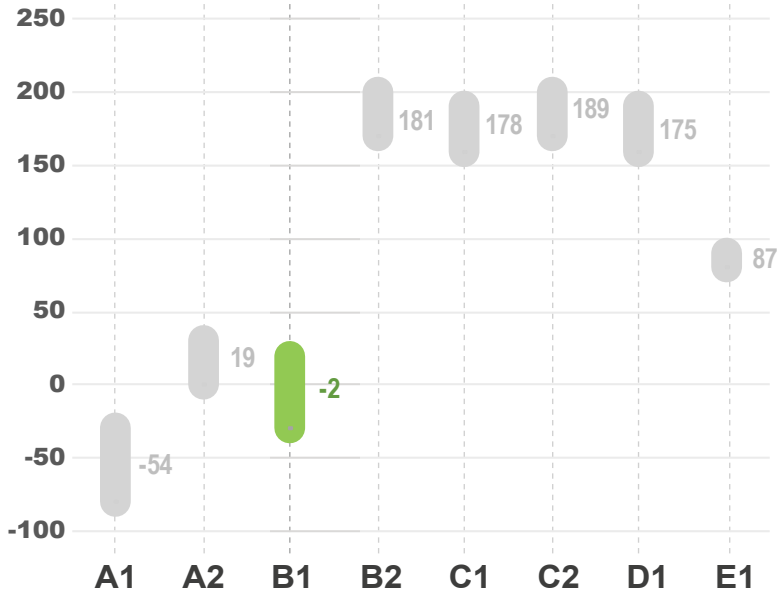
Key Advantages

- Shaded dropoff
- Low-cost habitat cap
- Inaccessible to coyotes

Net Potential Parking [spaces, sf/space]



Net Potential Habitat Area Change [1000 sf]



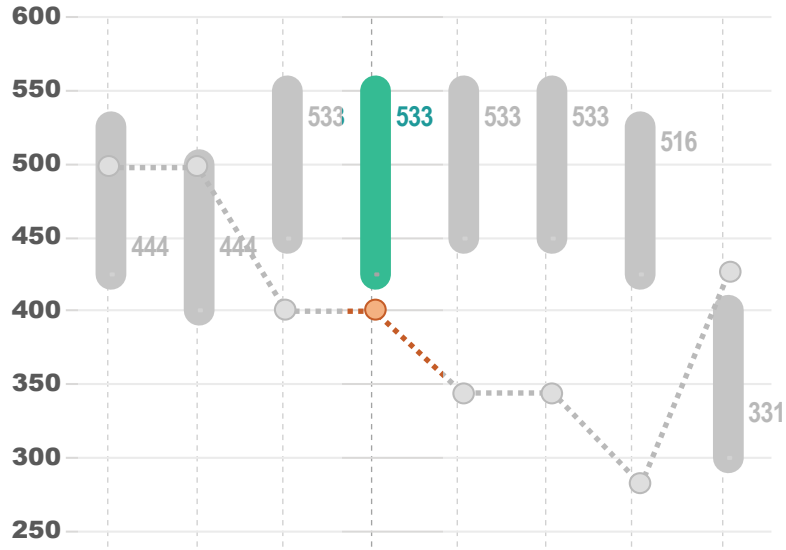
Key Disadvantages
- Large lot nearer homes
- Visual impact to outparcel
- Significant grading needed

Key Advantages
- Efficient “hunting” pattern
- Runoff BMP precedent
- Priotitizes coastal strand

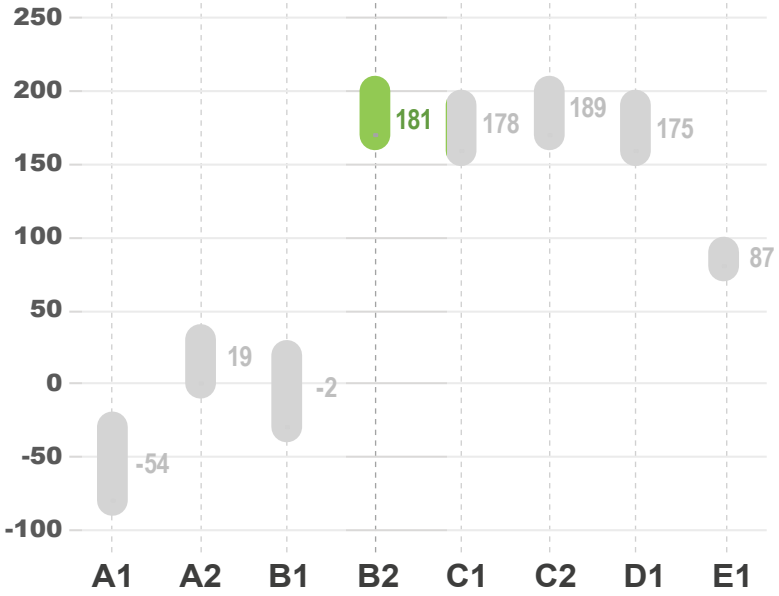
STRATEGIC ALTERNATIVES | B1: Large North Lot

0' 20' 60' 200' 500'

Net Potential Parking [spaces, sf devel-



Net Potential Habitat Area Change [1000 sf]



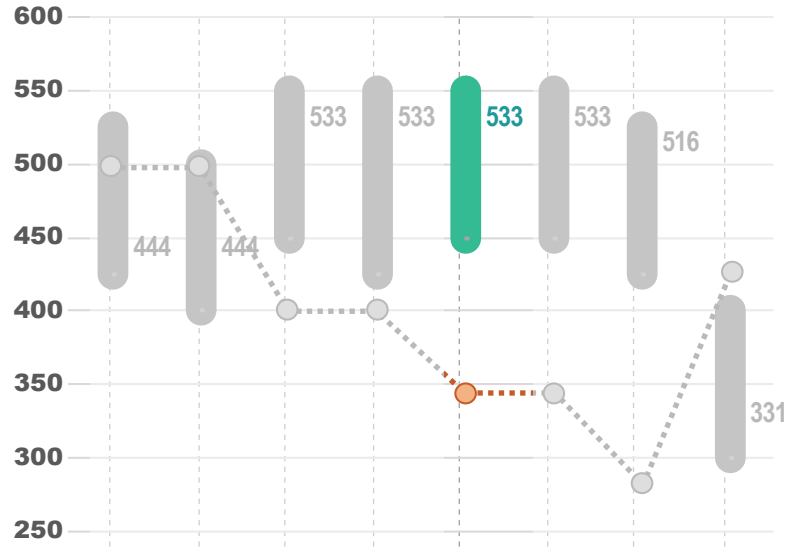
Key Disadvantages
- Significant grading needed
- Cost-inefficient habitat cap
- Distance to beach access

Key Advantages
- High habitat recovery
- Good deck access
- Effective visual solution

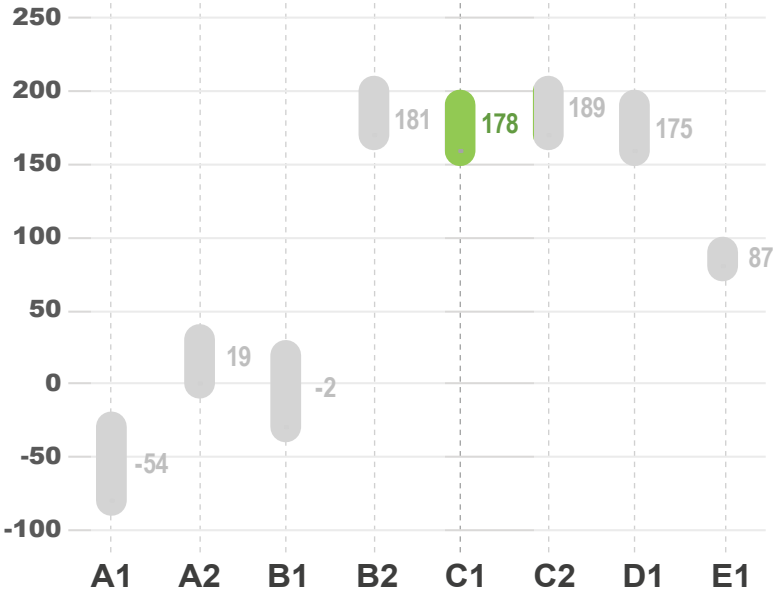
STRATEGIC ALTERNATIVES | B2: Large North Lot with Cap

0' 20' 60' 200' 500'

Net Potential Parking [spaces, sf/space]



Net Potential Habitat Area Change [1000 sf]



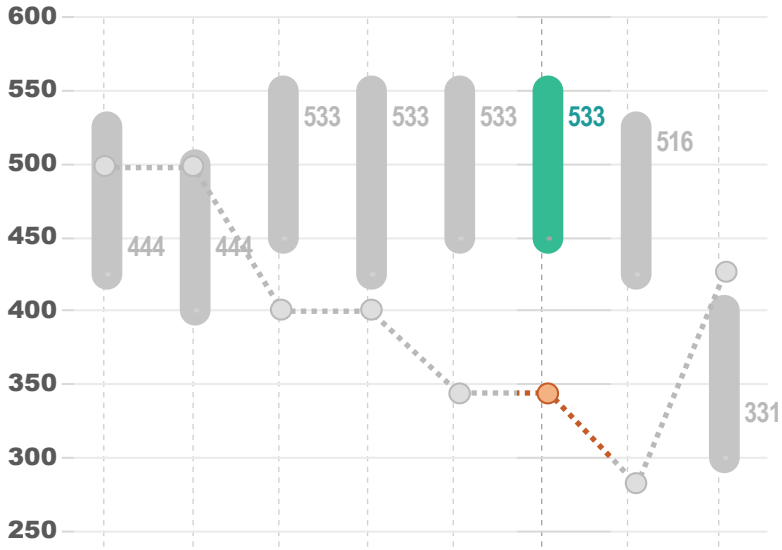
Key Disadvantages
- Unconventional SLR solution
- Long term SLR risk
- Costly cap solution

Key Advantages
- Minimal new disturbance
- Good parking efficiency
- Good beach access

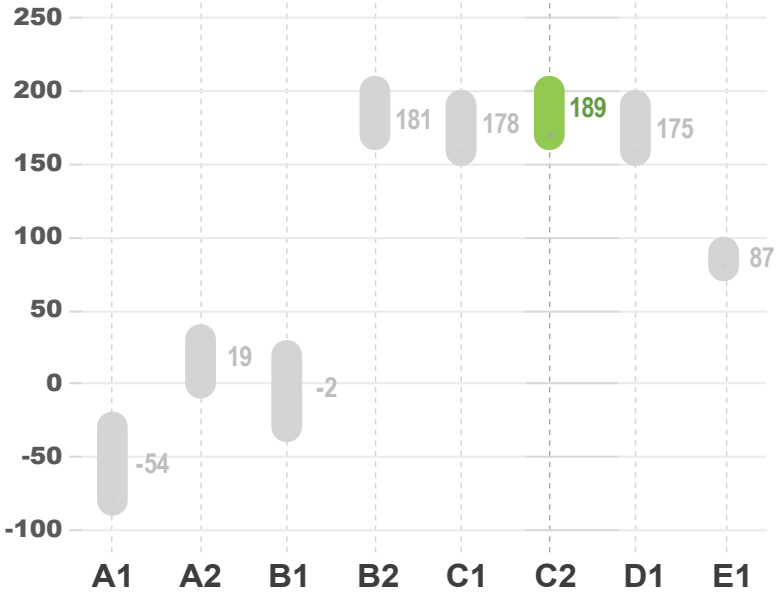
STRATEGIC ALTERNATIVES | C1: Reduced Lot with Coastal Strand Cap

0' 20' 60' 200' 500'

Net Potential Parking [spaces, sf/space]



Net Potential Habitat Area Change [1000 sf]



Key Disadvantages
- Unconventional SLR solution
- Long term SLR risk
- Possibly most costly option

Key Advantages
- Best habitat recovery
- Good parking efficiency
- Maximum visual screen

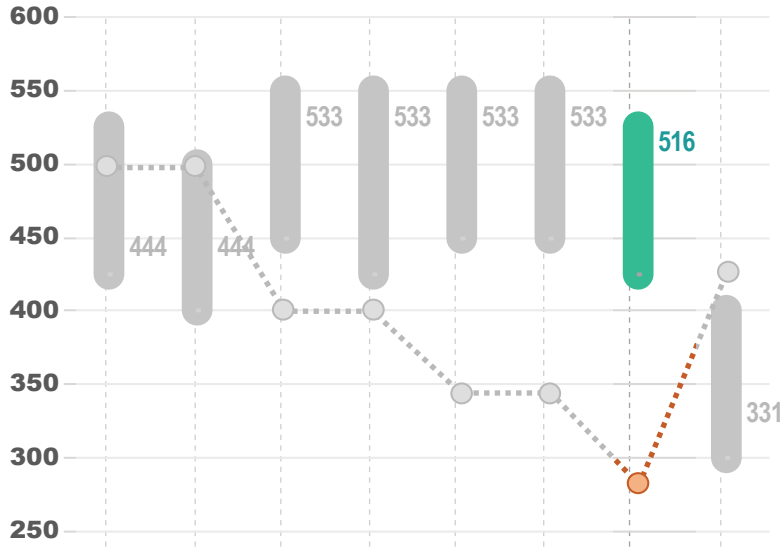
STRATEGIC ALTERNATIVES | C2: Parked Coastal Strand Dune

0' 20' 60' 200' 500'

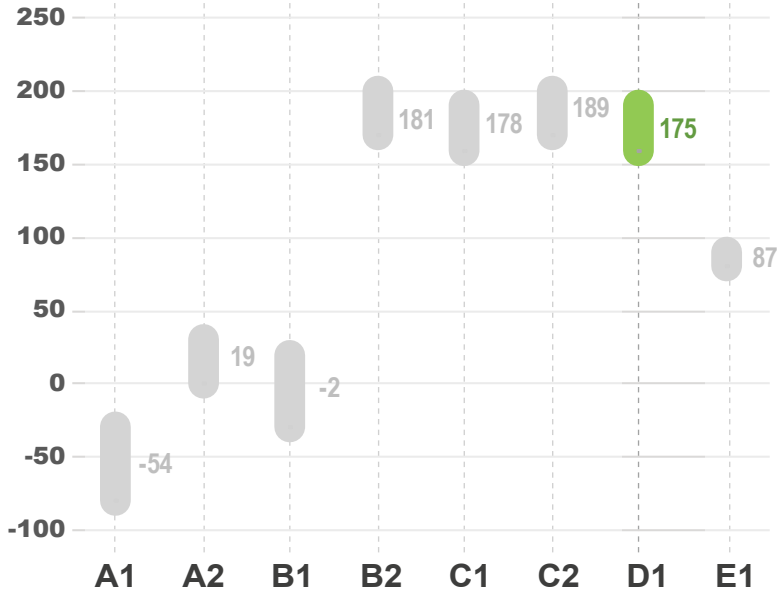
STRATEGIC ALTERNATIVES | D1: North Structure with Cap

0' 20' 60' 200' 500'

Net Potential Parking [spaces, sf/space]



Net Potential Habitat Area Change [1000 sf]



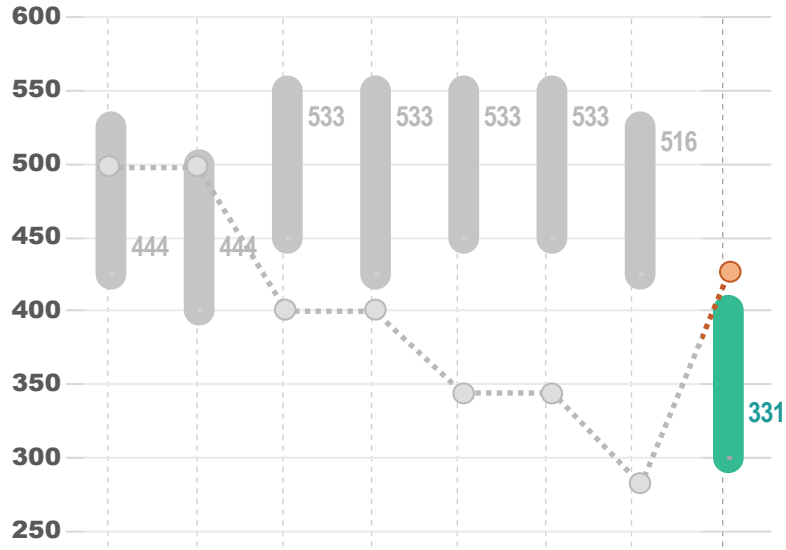
Key Disadvantages

- Possibly most costly option
- Large grading and surcharge
- Distance to beach access

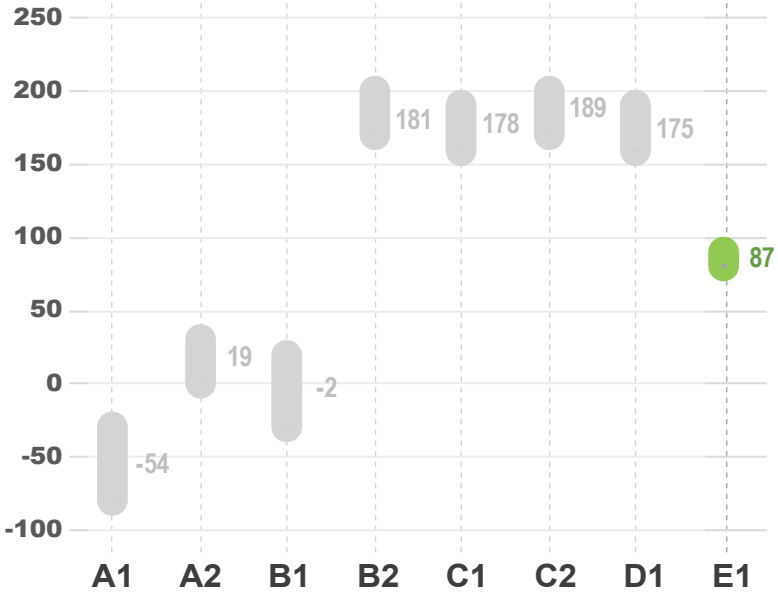
Key Advantages

- Most efficient parking
- High habitat recovery
- Hidden below slope

Net Potential Parking [spaces, sf/space]



Net Potential Habitat Area Change [1000 sf]



Key Disadvantages
- Lowest net parking spaces
- SLR access vulnerability
- Lowest habitat recovery

Key Advantages
- Lowest cost option
- Reduced grading need
- Minimal new disturbance

STRATEGIC ALTERNATIVES | E1: Reduced Lot

0' 20' 60' 200' 500'

STRATEGIC ALTERNATIVES | Renaturalization + Green Infrastructure Potential

0' 20' 60' 200' 500'

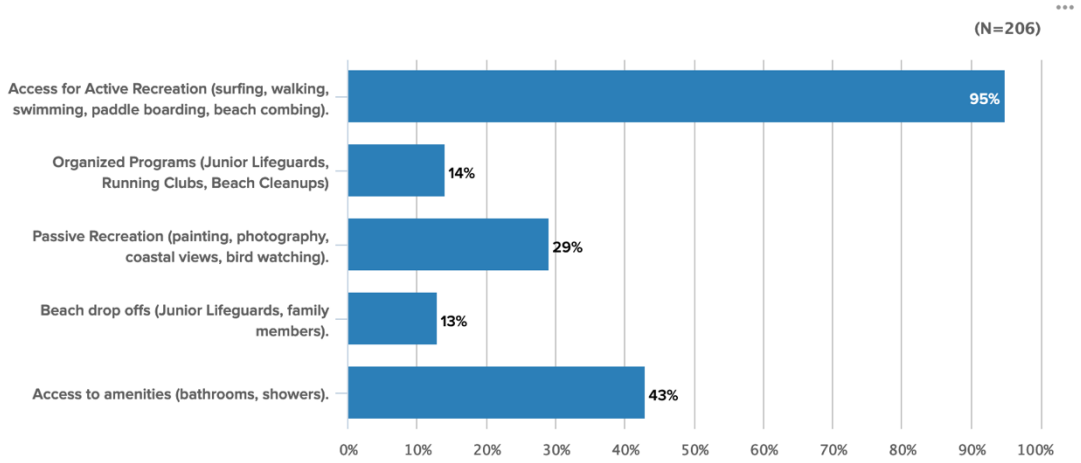
Attachment 4

Public Outreach Survey and Poll Results

Agenda Item 6c. Managed Retreat of North Beach Parking Lot

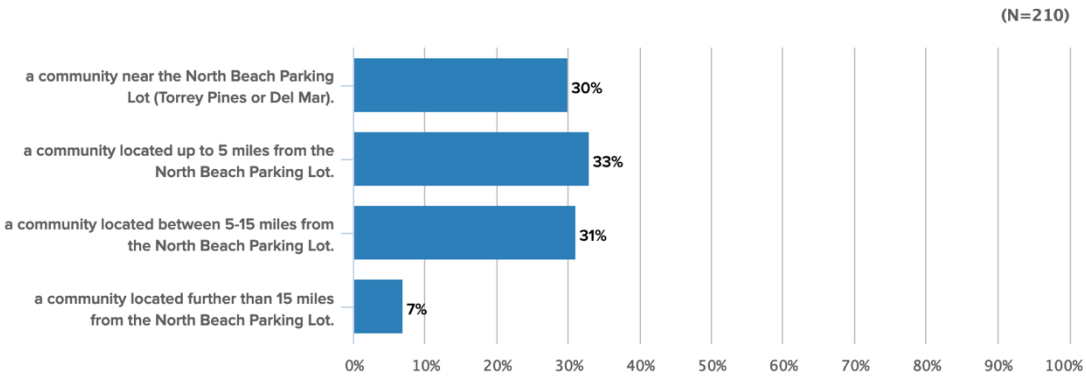
Public Survey 1: User Group Background & Preferences Results (194 - 210 responses)

2. Which of the following best describes how you most frequently enjoy/utilize the North Beach Parking Lot and beach? (Choose up to 3)



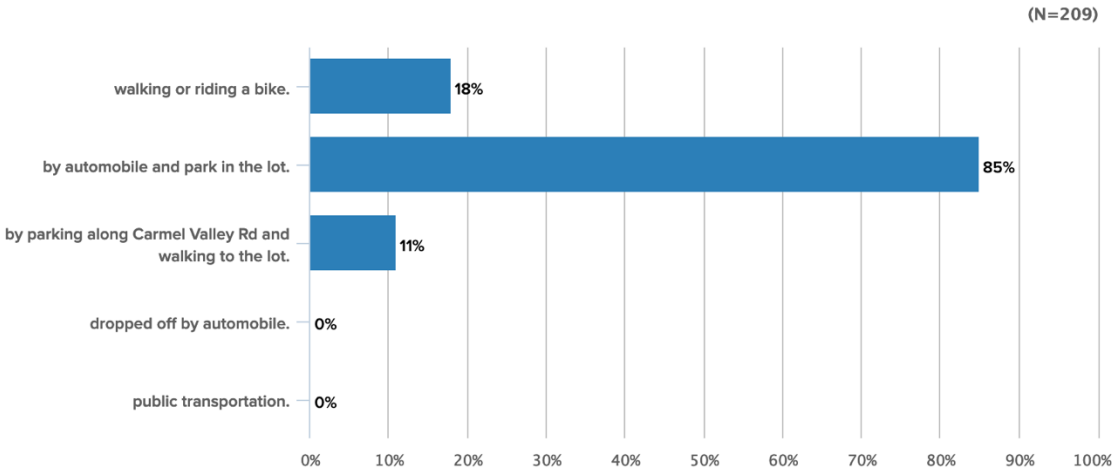
Because multiple answers per participant are possible, the total percentage may exceed 100%.

3. I am a resident of.....



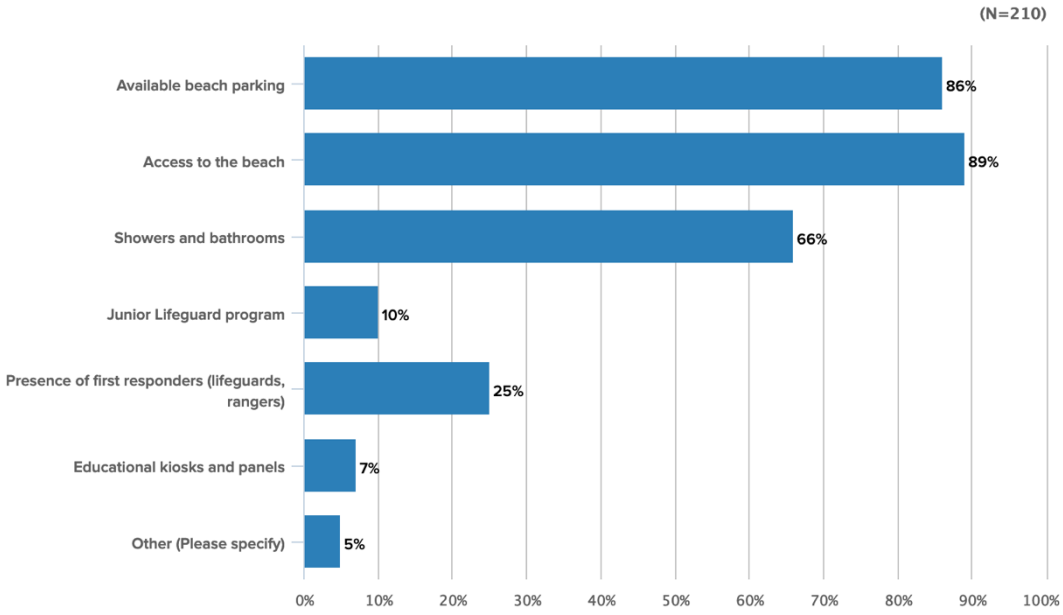
Because multiple answers per participant are possible, the total percentage may exceed 100%.

4. I typically get to the North Beach Parking Lot by...



Because multiple answers per participant are possible, the total percentage may exceed 100%.

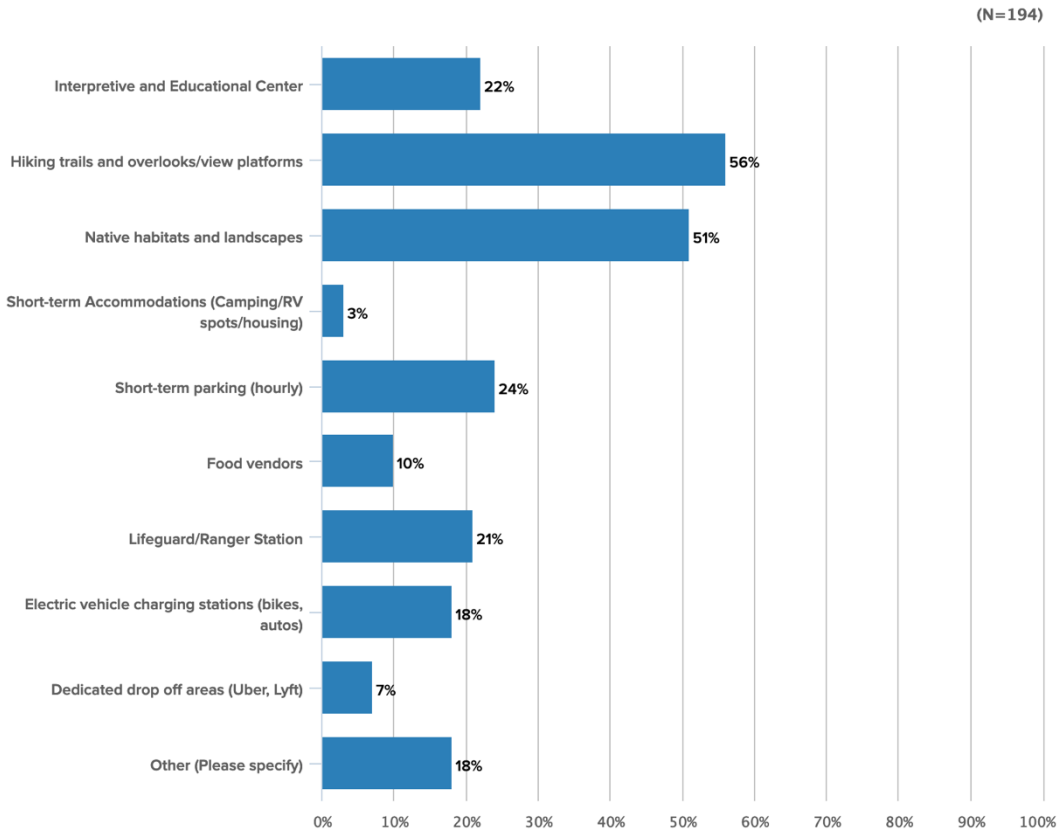
5. Which of the following features provided by the North Beach Parking Lot are the most valuable to you? (choose up to 3)



Examples from "Other"

- View of Torrey Headland
- Safety and cleanliness
- Birds

6. What additional features would you like to see in the North Beach Parking Lot? (choose up to 3)



Because multiple answers per participant are possible, the total percentage may exceed 100%.

Examples from "Other"

- Improve access ramp under bridge
- Bathrooms/amenities near north beach access
- Drinking fountain, water bottle refill station
- Sell parking permits at North Lot
- Leave as is (no reduction in parking)

Public Survey 2: Ranking Design Concepts/Approaches Results (122 responses)

1st Place

3

Please score the following design option for reducing the footprint of the Torrey Pines North Beach Parking Lot
(1 Star = poor, 10 Stars = strong) *

POTENTIAL OPTIONS – REDUCED FOOTPRINT

Maintain Northern Section of the Lot and Restore Habitat to the South

KEY ADVANTAGES

- Lowest cost option.
- Minimal new disturbance.
- Restoration/expansion of coastal habitats adjacent to the inlet area and lagoon.
- Potential for trails in areas of restored coastal habitats.
- Better protected from SLR than Option 1A due to lot location.
- Beach access similar to existing.

KEY DISADVANTAGES

- Loss of parking spaces.
- Long-term SLR resilience.
- Lower potential for habitat recovery.
- Vulnerability to erosion with removal of revetment at inlet.

OPTION 1B. REDUCED PARKING LOT

2nd Place

1

Please score the following design option for reducing the footprint of the Torrey Pines North Beach Parking Lot
(1 Star = poor, 10 Stars = strong)
*

POTENTIAL OPTIONS – REDUCED FOOTPRINT

Maintain Southern Section of the Lot and Restore Habitat to the North

KEY ADVANTAGES

- Lowest cost option.
- Minimal new disturbance.
- Restoration of coastal strand habitat.
- Potential for trails in areas of restored coastal strand habitat.
- Beach access similar to existing conditions.

KEY DISADVANTAGES

- Loss of parking spaces.
- Long-term SLR resilience.
- Lowest potential for habitat recovery.

OPTION 1A. REDUCED PARKING LOT

3rd Place

5

Please score the following design option for reducing the footprint of the Torrey Pines North Beach Parking Lot
(1 Star = poor, 10 Stars = strong) *

POTENTIAL OPTIONS – REDUCED FOOTPRINT

Maintain Southern Section of the Lot and Restore Habitat with Green Roof

KEY ADVANTAGES

- Balances parking spaces with habitat expansion.
- Minimal new disturbance.
- Beach access similar to existing.
- Green roof improves visual corridors.

KEY DISADVANTAGES

- Loss of parking spaces.
- Long-term SLR resilience
- Higher cost than Option 1A and Option 1B.

OPTION 2A. PARKING LOT WITH GREEN ROOF

Attachment 5

Construction Cost Estimates

Torrey Pines State Beach North Lot Resiliency Project

Opinion of Probable Construction Cost

Date: 6/23/2022

Item	Description	Option 1 Cost ($M)	Option 2 Cost ($M)	Option 3 Cost ($M)
1	Mob/Demob	$ 0.7	$ 0.7	$ 0.7
2	Demolition	$ 0.1	$ 0.5	$ 0.6
3	Earthworks	$ 0.4	$ 1.1	$ 1.2
4	Parking lot	$ 0.3	$ 1.5	$ 1.5
5	Buildings	$ 2.0	$ 3.0	$ 3.0
6	Site improvements	$ 0.7	$ 2.0	$ 6.2
7	Planting	$ 0.4	$ 0.4	$ 0.4
8	Closeout and Demobilization	$ 0.3	$ 0.3	$ 0.3
Construction Sub Total		$ 4.9	$ 9.5	$ 13.8
9	Fees (other construction costs)	$ 1.3	$ 2.6	$ 3.0
Non-Construction Sub Total		$ 1.3	$ 2.6	$ 3.0
Construction & Non-Construction Total		$ 6.3	$ 12.1	$ 16.9
Contingency (30%)		$ 1.9	$ 3.6	$ 5.1
Total Including 30% Contingency		**$ 8.2**	**$ 15.7**	**$ 21.9**

Torrey Pines State Beach North Lot Resiliency Project

Opinion of Probable Construction Cost

Date: 6/23/2022

Item	Description	Quantity	Unit	Unit Cost Incl. O&P	Option 1 Total Cost	Quantity	Unit	Unit Cost Incl. O&P	Option 2 Total Cost	Quantity	Unit	Unit Cost Incl. O&P	Option 3 Total Cost
1	**Mob/Demob**				**$ 700,000.00**				**$ 700,000.00**				**$ 700,000.00**
1.1	Mod/Demob	1	LS	$ 150,000.00	$ 150,000.00	1	LS	$ 150,000.00	$ 150,000.00	1	LS	$ 150,000.00	$ 150,000.00
1.2	Project Preparation	1	LS	$ 50,000.00	$ 50,000.00	1	LS	$ 50,000.00	$ 50,000.00	1	LS	$ 50,000.00	$ 50,000.00
1.3	Project Engineer/Management	10	MONTH	$ 20,000.00	$ 200,000.00	10	MONTH	$ 20,000.00	$ 200,000.00	10	MONTH	$ 20,000.00	$ 200,000.00
1.4	Site Facilities	10	MONTH	$ 5,000.00	$ 50,000.00	10	MONTH	$ 5,000.00	$ 50,000.00	10	MONTH	$ 5,000.00	$ 50,000.00
1.5	BMPs/SWPPP measures	1	LS	$ 100,000.00	$ 100,000.00	1	LS	$ 100,000.00	$ 100,000.00	1	LS	$ 100,000.00	$ 100,000.00
1.6	Site Security	10	MONTH	$ 5,000.00	$ 50,000.00	10	MONTH	$ 5,000.00	$ 50,000.00	10	MONTH	$ 5,000.00	$ 50,000.00
1.7	Traffic Control	1	LS	$ 100,000.00	$ 100,000.00	1	LS	$ 100,000.00	$ 100,000.00	1	LS	$ 100,000.00	$ 100,000.00
1.8				$ -	$ -		0	$ -	$ -		LS	$ -	$ -
2	**Demolition**				**$ 146,500.00**				**$ 527,500.00**				**$ 600,000.00**
2.1	Parking lot islands	9,000	SF	$ 3.50	$ 31,500.00	25,000	SF	$ 3.50	$ 87,500.00	25,000	SF	$ 3.50	$ 87,500.00
2.2	Parking lot pay stations	2	EA	$ 5,000.00	$ 10,000.00	10	EA	$ 5,000.00	$ 50,000.00	10	EA	$ 5,000.00	$ 50,000.00
2.3	Restroom buildings	-	EA	$ 50,000.00	$ -	2	EA	$ 50,000.00	$ 100,000.00	2	EA	$ 50,000.00	$ 100,000.00
2.4	Remove parking lot pavement	70,000	SF	$ 1.50	$ 105,000.00	230,000	SF	$ 1.00	$ 230,000.00	230,000	SF	$ 1.00	$ 230,000.00
2.5	Entrance roadway	-	SF	$ 1.50	$ -	-	SF	$ 1.50	$ -	20,000	SF	$ 1.50	$ 30,000.00
2.6	Entrance sidewalks	-	SF	$ 3.50	$ -	-	SF	$ 3.50	$ -	5,000	SF	$ 3.50	$ 17,500.00
2.7	Entrance shack	-	EA	$ 25,000.00	$ -	-	EA	$ 25,000.00	$ -	1	EA	$ 25,000.00	$ 25,000.00
2.8	Rock shore protection	-	SF	$ 2.50	$ -	12,000	SF	$ 5.00	$ 60,000.00	12,000	SF	$ 5.00	$ 60,000.00
2.9				$ -	$ -	-	0	$ -	$ -	-	0	$ -	$ -
3	**Earthworks**				**$ 375,000.00**				**$ 1,131,666.67**				**$ 1,167,666.67**
3.1	Clearing and Grubbing	-	SF	$ -	$ -	-	SF	$ -	$ -	-	SF	$ -	$ -
3.2	Rough grading	75,000	SF	$ 2.00	$ 150,000.00	150,000	SF	$ 2.00	$ 300,000.00	150,000	SF	$ 2.00	$ 300,000.00
3.3	Finish grading	75,000	SF	$ 3.00	$ 225,000.00	150,000	SF	$ 3.00	$ 450,000.00	150,000	SF	$ 3.00	$ 450,000.00
3.4	Remove, dispose of existing parking lot subgrade	-	CY	$ 15.00	$ -	4,259	CY	$ 15.00	$ 63,888.89	4,259	CY	$ 15.00	$ 63,888.89
3.5	New parking lot base	-	CY	$ 100.00	$ -	2,778	CY	$ 100.00	$ 277,777.78	2,778	CY	$ 100.00	$ 277,777.78
3.6	Stormwater pipe trenching	-	LF	$ 20.00	$ -	2,000	LF	$ 20.00	$ 40,000.00	2,000	LF	$ 20.00	$ 40,000.00
3.7	Dewatering	-	LS	$ -	$ -	-	LS	$ -	$ -	-	LS	$ -	$ -
3.8	McGonigle Rd. Grading?	-	SF	$ 3.00	$ -	-	SF	$ 3.00	$ -	12,000	SF	$ 3.00	$ 36,000.00
4	**Parking lot**				**$ 325,000.00**				**$ 1,505,000.00**				**$ 1,505,000.00**
4.1	New concrete curbs (for islands)		LF	$ 40.00	$ -	5,000	LF	$ 40.00	$ 200,000.00	5,000	LF	$ 40.00	$ 200,000.00
4.2	New asphalt paving		SF	$ 4.00	$ -	150,000	SF	$ 4.00	$ 600,000.00	150,000	SF	$ 4.00	$ 600,000.00
4.3	New sidewalks	12,000	SF	$ 20.00	$ 240,000.00	12,000	SF	$ 20.00	$ 240,000.00	12,000	SF	$ 20.00	$ 240,000.00
4.4	New parking lot pay stations		EA	$ 10,000.00	$ -	8	EA	$ 10,000.00	$ 80,000.00	8	EA	$ 10,000.00	$ 80,000.00
4.5	Signage	1	LS	$ 25,000.00	$ 25,000.00	1	LS	$ 25,000.00	$ 25,000.00	1	LS	$ 25,000.00	$ 25,000.00
4.6	Striping	1	LS	$ 60,000.00	$ 60,000.00	1	LS	$ 60,000.00	$ 60,000.00	1	LS	$ 60,000.00	$ 60,000.00
4.7	Wheel stops	-	EA	$ 250.00	$ -	200	EA	$ 250.00	$ 50,000.00	200	EA	$ 250.00	$ 50,000.00
4.8	Stormwater pipes	-	LF	$ -	$ -	-	LF	$ -	$ -	-	LF	$ -	$ -
4.9	Storm drain catch basins	-	EA	$ 10,000.00	$ -	10	EA	$ 10,000.00	$ 100,000.00	10	EA	$ 10,000.00	$ 100,000.00
4.10	EV charging spaces	-	EA	$ 15,000.00	$ -	10	EA	$ 15,000.00	$ 150,000.00	10	EA	$ 15,000.00	$ 150,000.00
4.11	Solar over parking spaces	-	LS	$ -	$ -	-	LS	$ -	$ -	-	LS	$ -	$ -
4.12				$ -	$ -		0	$ -	$ -		0	$ -	$ -
5	**Buildings**				**$ 2,000,000.00**				**$ 3,000,000.00**				**$ 3,000,000.00**
5.1	New lifeguard building	4,000	SF	$ 500.00	$ 2,000,000.00	4,000	SF	$ 500.00	$ 2,000,000.00	4,000	SF	$ 500.00	$ 2,000,000.00
5.2	New restrooms	-	EA	$ 150,000.00	$ -	1	EA	$ 1,000,000.00	$ 1,000,000.00	1	EA	$ 1,000,000.00	$ 1,000,000.00
5.3		-	EA	$ 50,000.00	$ -	-	EA	$ 50,000.00	$ -		EA	$ 50,000.00	$ -
5.4				$ -	$ -		0	$ -	$ -		0	$ -	$ -
6	**Site improvements**				**$ 715,000.00**				**$ 1,965,000.00**				**$ 6,169,000.00**

Torrey Pines State Beach North Lot Resiliency Project

Opinion of Probable Construction Cost

Date: 6/23/2022

Item	Description	Quantity	Unit	Unit Cost Incl. O&P	Option 1 Total Cost	Quantity	Unit	Unit Cost Incl. O&P	Option 2 Total Cost	Quantity	Unit	Unit Cost Incl. O&P	Option 3 Total Cost
6.1	Rock shore protection - scour protection	-	LF	$ 2,500.00	$ -	300	LF	$ 2,500.00	$ 750,000.00	300	LF	$ 2,500.00	$ 750,000.00
6.2	Bioretention basin	6,000	SF	$ 50.00	$ 300,000.00	6,000	SF	$ 50.00	$ 300,000.00	6,000	SF	$ 50.00	$ 300,000.00
6.3	Cobble berm	-	LF	$ 1,000.00	$ -	500	LF	$ 1,000.00	$ 500,000.00	500	LF	$ 1,000.00	$ 500,000.00
6.4	Elevated boardwalk	-	SF	$ 200.00	$ -	-	SF	$ 200.00	$ -	4,500	SF	$ 200.00	$ 900,000.00
6.5	Vehicle drop-off and turnaround @ Carmel Valley Rd.	-	LS	$ 500,000.00	$ -	-	LS	$ 500,000.00	$ -	1	LS	$ 350,000.00	$ 350,000.00
6.6	Interpretive signage	1	LS	$ 20,000.00	$ 20,000.00	1	LS	$ 20,000.00	$ 20,000.00	1	LS	$ 20,000.00	$ 20,000.00
6.7	Entrance gate	1	LS	$ 25,000.00	$ 25,000.00	1.0	LS	$ 25,000.00	$ 25,000.00	1	LS	$ 25,000.00	$ 25,000.00
6.8	Benches	20	EA	$ 5,000.00	$ 100,000.00	20	EA	$ 5,000.00	$ 100,000.00	20	EA	$ 5,000.00	$ 100,000.00
6.9	DG trails and base	-	SF	$ 30.00	$ -	-	SF	$ 30.00	$ -	4,800	SF	$ 30.00	$ 144,000.00
6.10	Post and rope fencing	400	LF	$ 50.00	$ 20,000.00	400	LF	$ 50.00	$ 20,000.00	1,600	LF	$ 50.00	$ 80,000.00
6.11	New culvert under McGonigle Rd	1	LS	$ 250,000.00	$ 250,000.00	1	LS	$ 250,000.00	$ 250,000.00		LS	$ 250,000.00	$ -
6.12	New traffic control @ N. Torrey Pines Rd.	-	EA	$ 3,000,000.00	$ -	-	EA	$ 3,000,000.00	$ -	1	EA	$ 3,000,000.00	$ 3,000,000.00
6.13			LS	$ -	$ -		LS	$ -	$ -		LS	$ -	$ -
6.14			LS	$ -	$ -		LS	$ -	$ -		LS	$ -	$ -
7	**Planting**				**$ 430,000.00**				**$ 430,000.00**				**$ 430,000.00**
7.1	Planting in habitat restoration area - ecotone seed mix	75,000	SF	$ 5.00	$ 375,000.00	75,000	SF	$ 5.00	$ 375,000.00	75,000	SF	$ 5.00	$ 375,000.00
7.2	Planting in bioretention swale/basin	6,000	SF	$ 5.00	$ 30,000.00	6,000	SF	$ 5.00	$ 30,000.00	6,000	SF	$ 5.00	$ 30,000.00
7.3	Parking lot islands	2,500	SF	$ 10.00	$ 25,000.00	2,500	SF	$ 10.00	$ 25,000.00	2,500	SF	$ 10.00	$ 25,000.00
7.4		-	LS	$ -	$ -	-	LS	$ -	$ -	-	LS	$ -	$ -
7.5		-	LS	$ -	$ -	-	LS	$ -	$ -	-	LS	$ -	$ -
7.6				$ -	$ -		0	$ -	$ -		0	$ -	$ -
8	**Closeout and Demobilization**				**$ 250,000.00**				**$ 250,000.00**				**$ 250,000.00**
8.1	Demobilization	1	LS	$ 250,000.00	$ 250,000.00	1	LS	$ 250,000.00	$ 250,000.00	1	LS	$ 250,000.00	$ 250,000.00
8.2				$ -	$ -		0	$ -	$ -		0	$ -	$ -
Construction Sub Total					$ 4,941,500				$ 9,509,167				$ 13,821,667
9	Fees (other construction costs)				$ 1,334,205				$ 2,567,475				$ 3,040,767
9.1	Construction Management	15%	LOT		$ 741,225	15%	LOT		$ 1,426,375	10%	LOT		$ 1,382,167
9.2	Escalation to 2024	12%	LOT		$ 592,980	12%	LOT		$ 1,141,100	12%	LOT		$ 1,658,600
9.3							0				0		
Non-Construction Sub Total					$ 1,334,205				$ 2,567,475				$ 3,040,767
Construction & Non-Construction Total					$ 6,275,705				$ 12,076,642				$ 16,862,433
Contingency		30%			$ 1,882,712	30%			$ 3,622,993	30%			$ 5,058,730
Total Including 30% Contingency					**$ 8,158,417**				**$ 15,699,634**				**$ 21,921,163**

Attachment 6

Multi-Criteria Analysis Scoring Matrix

Los Penasquitos Lagoon Foundation
Feasibility Analysis for Torrey Pines State Beach North Parking Lot Alternatives
Multi Criteria Analysis Weighted Scoring Matrix

Scoring	1	2	3	4	5
	Low		Average		High

Importance	Criteria	Basis of Evaluation	No Project		Alternative 1: Reduced Lot Footprint: Enhance Existing		Alternative 2: Reduced Lot Footprint: Replace and Reconfigure		Alternative 3: Reduced Lot Footprint: Replace and Reconfigure with New Access Point		Comments
			Score (out of 5)	Weighted Score	Score (out of 5)	Weighted Score	Score (out of 5)	Weighted Score	Score (out of 5)	Weighted Score	
25%	**Habitat Enhancement**										
20%	**Restoration**	Restoration of coastal areas (1 = little or no restoration, 5 = maximum restoration)	1	1%	3	3%	5	5%	5	5%	Alt 2&3 provide slightly larger restoration areas than Alt 1 and improve hydrology to larger wetland with modified revetment.
20%	**Marsh enhancement (McGonigle)**	Enhancement of McGonigle marsh areas (1 = little or no change, 5 = max enhancement) / invasive species control-remediation through SW improvements	1	1%	4	4%	4	4%	5	5%	Alt 1& 2 provide enhanced marsh with new culvert. Alt 3 provides largest enhancement area with the removal of McGonigle road embankment.
20%	**Sensitive Species**	Protection/expansion of habitat for sensitive species: Belding Savannah Sparrow & Gnatcatcher (1 = no protection/expansion of habitat, 5 = maximum expansion of habitat)	1	1%	3	3%	5	5%	3	3%	Alt 3 impacts TPR embankment (known nesting bird habitat). Alt 2 and 3 provide ecotone slope - habitat variety compared to Alt 1 which only provides coastal strand
20%	**Water Quality / Vector**	Parking lot drainage improved, LID features, SW treatment, etc.. / eliminate ponding to improve vector issues (1 = no change to drainage patterns, 5 = improved drainage with BMPs)	1	1%	3	3%	5	5%	5	5%	Assume Alt 1 has minor drainage & LID retrofits for WQ improvements. Assume Alt 2-3 have large scale drainage and LID improvements (e.g. demo and rework entire lot with pervious pavement).
20%	**Ecosystem Resilience (Sustainability)**	Ecosystem resilience with SLR within project area. Can project naturally adapt to SLR (1 = little ability to adapt, 5 = room to adapt to SLR)	1	1%	3	3%	4	4%	5	5%	Alts 2&3 provide more ecosystem resilience due to creation of transitional slope, as compared to Alt 1. Alt 3 removes the McGonigle Road fill prism, allowing for greater transitional habitat than Alts 1 and 2
100%		**SUBTOTAL out of 25%**		**5%**		**16%**		**23%**		**23%**	
25%	**Beach Access & Amenities**										
20%	**Pedestrian Access**	Coastal access, trail connectivity to neighborhood (1 = impact to access, 3 = no change, 5 = improvement)	3	3%	3	3%	3	3%	3	3%	No change to pedestrian access patterns across alternatives.
20%	**Vehicular Access**	Vehicular access to North Lot & circulation (within lot & adjacent streets) (1 = negatively impacted access & circulation patterns, 3 = no change, 5 = improved access & circulation)	3	3%	3	3%	3	3%	2	2%	No change for No Project, Alt 1 & 2. Alt 3 changes vehicle access patterns due to closure of McGonigle so scored slightly lower. Sharp right turn into North Lot off of McGonigle designed to accommodate construction vehicles.
20%	**State Park Facilities**	Lifeguard, restrooms, kiosks, building maintenance, etc.. (1 = impact to facilities, 3 = no change, 5 = improvements to facilities)	3	3%	5	5%	4	4%	4	4%	Alt 1 scored highest because restroom stays in current location, adds new facilities in new lot. Alt 2&3 scored higher than NP because of new facilities added to parking lot.
20%	**Aesthetics**	Visitor experience (1 = negative impact, 3 = no change, 5 = improved aesthetics) from viewshed and park user perspectives.	3	3%	3	3%	4	4%	5	5%	All alternatives would improve the aesthetics of the lot. Alt 1 would leave RSP in place - scored lower than Alt 2 and 3. Alts 2 and 3 would provide new lot w/permeable pavers. Alt 3 removal of McGonigle Road would improve aesthetics of marsh.
20%	**Temporary Access Impacts (Construction)**	Temporary Impacts during construction (1 = long duration/more disruptive, 5 = little or no disruptions)	5	5%	3	3%	2	2%	1	1%	Alt 1 would have sig. lower construction duration. Alt 3 would have longest construction duration.
100%		**SUBTOTAL out of 25%**		**17%**		**17%**		**16%**		**15%**	
30%	**Coastal Hazards**										
50%	**Flood Protection / SLR Resilience**	Does project reduce the risk of parking lot flooding or access to the lot during extreme events? Does the project accomodate SLR? (1 = no improvement in flood reduction & access, 3 = resilent to 3.5 ft SLR, 5 = resilient to 6 ft of SLR)	1	3%	3	9%	4	12%	5	15%	Alts 1 and 2 would have flooding on McGonigle during extreme events (low frequency & duration) that would impact access to the lot. Alt 2 parking lot could be elevated to reduce flood extents. Alt 3 would be resilient to 6' of SLR.
50%	**Inlet Stability / Hydraulics**	Would the project alter inlet dynamics potentially affecting the frequency or amount of dredging? (1 = increased dredging amount or frequency, 3 = no change, 5 = reduced)	3	9%	3	9%	4	12%	4	12%	The modification to the inlet & RSP configuration for Alts 2 and 3 have the potential to reduce the dredging amount & frequency, with more efficient hydraulics during ebb flows due to removal of existing revetment.
100%		**SUBTOTAL out of 30%**		**12%**		**18%**		**24%**		**27%**	
10%	**Regulatory**										
33%	**CEQA/NEPA Process**	Length and complexity of environmental process (e.g. EIR, MND, etc…) (1 = Lengthy EIR process, 3 = streamlined MND or tiered document from Programmatic EIR, 5 = categorical exemption / exculsion)	5	3%	5	3%	3	2%	1	1%	Alt 3 likely requires lengthy EIR & significant feedback from community & stakeholders due to new access from TPR
33%	**Permitting Process**	Length and complexity of permits (CCC, USACE, RWQCB) (1 = Lengthy process, 3 = standard process, 5 = No permit or or streamlined process - e.g. NWP)	5	3%	4	3%	3	2%	1	1%	Alt 3 scored lower because City of SD support/coordination likely probelmatic / difficult for new Torrey Pines Rd. access. Alts 2 and 3 scored lower than Alt 1 because CCC tradeoffs analysis required for revetment landward relocation.
33%	**Consistency with State Parks Plans & Policy**	Does the concept manage public access in a manner that is consistent with resource protection in a State Preserve and in compliance with the plans and policies of State Parks (i.e. SLR Adaptation Policy)? (1 = does not achieve compliance standards, 3 = meets compliance standards, 5 = exceeds compliance standards)	1	1%	3	2%	5	3%	5	3%	Alt 1 is less resilient to SLR & does not preserve & enhance natural resources to the same degree as Alts 2 and 3.
100%		**SUBTOTAL out of 10%**		**7%**		**8%**		**7%**		**5%**	
10%	**Financial**										
50%	**Construction Cost**	Initial cost of construction to implement each alternative (1 = high construction costs, 3 = moderate, 5 = low construction costs)	5	5%	3	3%	2	2%	1	1%	Scoring based on ROM costs for each alternative
50%	**Long-term Maintenance & Operation Costs**	Costs to maintain and adaptively manage the Project (1 = high maintenance and management costs, 3 = moderate, 5 = low maintenance and management costs)	5	5%	2	2%	3	3%	3	3%	Shoreline protection system for Alts 2 and 3 more dynamic than RSP so lowered score. Alt 1 likely requires more maintenance given condition & position of structure.
100%		**SUBTOTAL out of 10%**		**10%**		**5%**		**5%**		**4%**	
		TOTAL out of 100%		**51%**		**64%**		**75%**		**74%**	

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