Chapter 5.0 ALTERNATIVES

5.1 INTRODUCTION AND APPROACH

This chapter presents the alternatives analysis for the proposed Carmel Lagoon EPB, SRPS, and ISMP Project. This section sets forth the objectives of the proposed project, summarizes its significant impacts, discusses the alternatives considered but eliminated from further analysis, describes the range of alternatives considered, and compares the impacts of the alternatives evaluated to the impacts of the proposed project.

The State CEQA Guidelines, CCR Section 15126.6(a), states that an EIR must describe and evaluate a reasonable range of alternatives to the proposed project, or to the location of the project, that would feasibly attain most of the project's basic objectives, but that would avoid or substantially lessen any significant adverse effects of the project. An EIR is not required to consider every conceivable alternative to a proposed project. Rather, it must consider a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation. The CEQA Guidelines further state that the specific alternative of "no project" shall also be evaluated. The EIR must evaluate the comparative merits of the alternatives and include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the impacts of the proposed project.

5.1.1 Organization of this Chapter

This chapter is organized into the following sections:

Section 5.1, Introduction and Approach, provides an overview of CEQA requirements pertaining to the identification and analysis of alternatives, and the Chapter organization. This section also includes the objectives of the proposed project and a summary of significant impacts of the proposed project by topical area (**Table 5-1**). The section concludes with the identification of CEQA alternatives evaluated in this Chapter.

Section 5.2, Alternatives Considered but Eliminated*,* discusses the alternatives that were considered, but eliminated from further analysis in this EIR if the alternative failed to meet most of the project objectives, is determined infeasible, or is unable to avoid or lessen significant environmental impacts. This section is organized into two parts:

5.2.1 Alternative Components of the Proposed Project Considered but Eliminated

5.2.2 Alternative Projects of the Proposed Project Considered but Eliminated

Section 5.3, Alternatives Analysis*,* describes the alternatives to the proposed project, compares the impacts of the alternatives to the impacts of the proposed project, and also evaluates the alternatives' ability to accomplish the project objectives. This section is organized into four parts:

5.3.1 No Project Alternative

5.3.2 Alternatives Components to Proposed Project

5.3.2.1 EPB Component Alternatives

5.3.2.2 SRPS Component Alternatives

5.3.3 Alternatives Projects to Proposed Project

Section 5.4, Environmentally Superior Alternative*,* identifies an environmentally superior alternative, as required by CEQA.

5.1.2 Project Objectives

In compliance with the MOU and to avoid a JO issued by NMFS, the proposed project has been developed as a multi-objective, multi-year, multi-organizational effort to improve habitat for threatened and endangered species in the lower Carmel River and Lagoon, improve natural floodplain function, and protect public infrastructure while maintaining flood protection to existing developed areas. Consideration for how to restore the natural breaching regime in the Lagoon while maintaining current flood protection to low-lying areas has been a cooperative effort between multiple Federal, State, regional, and local agencies, as well as conservation organizations, for more than a decade, and has included evaluating numerous project alternatives to get to the proposed EPB and SRPS options.

Recognizing the challenges associated with the existing development in the low-lying areas that has occurred over the past century adjacent to the Lagoon and the degradation caused by historic farming and breaching activities, the primary objective of the proposed project is to implement a solution to improve the functions and values of the ecosystem in and around the Lagoon by restoring the Lagoon's historic hydrologic, pre-management conditions to the extent feasible to protect and improve habitat for fish and wildlife while maintaining flood protection. In addition, a natural beach in the northerly direction is preferred by the resource agencies to facilitate a longer and more natural flow channel, improving conditions for fish and wildlife within the Lagoon. To accomplish this primary objective, the proposed project would need to meet the following objectives:

- Consistent with the MOU, reduce the necessity for mechanical breaching of the sandbar to the greatest extent practicable;
- Maintain the current level of flood protection for existing public facilities and private structures in the low-lying developed areas located immediately to the north of and within the Lagoon;
- Protect Scenic Road embankment and the State Parks' restroom, interpretive, and parking facilities from scour resulting from a northerly-aligned Lagoon outflow channel that may result from a reduction in mechanical breaching;
- Protect the Scenic Road embankment from the increasing risk of erosion resulting from ocean storm surge and high tides, which could increase in severity due to climate change;
- Allow for interim management of the sandbar while the design and construction of the other project components proceed;
- Design and construct project elements within the required timeframe of the MOU; and
- Minimize infrastructure that could detract from the function and value of the natural environment.

5.1.3 Significant Impacts of the Proposed Project

In **Chapter 4**, this EIR found that the proposed project would result in the significant impacts identified in **Table 5-1**, below, all of which would be reduced to a less-than-significant level with implementation of mitigation measures, with the exception of scenic vista and visual quality impacts resulting from the operation of the proposed EPB project component, flooding impacts resulting from the operation of the proposed EPB project component, and operation and construction noise impacts resulting from the proposed EPB project component.

The EIR found that operation impacts on scenic vistas and the visual quality at the proposed EPB project component site would permanently degrade the visual character of the site and the surrounding area, which is a significant and unavoidable impact.

Construction of the proposed project would not result in any significant unavoidable impacts, except for construction noise impacts at the proposed EPB project component site. Given the proximity of existing residential land uses to the proposed pile driving locations, construction of the proposed EPB project component would likely still exceed the County's noise standard at the nearest residential property lines. Implementation of **Mitigation Measure NV-3** would reduce construction noise at the proposed EPB project component site, but would not reduce the impact to a less-than-significant level. This is a significant and unavoidable impact.

The predicted operational noise levels for both the pump station and the generator/control building at the proposed EPB project component site are projected to exceed applicable thresholds at the nearest residential property line. Implementation of **Mitigation Measure NV-2** would reduce operational noise impact, but would not reduce the impact to a less-than-significant level. This is a significant and unavoidable impact.

Table 5-1 summarizes the significant adverse construction and operational impacts identified in this EIR by the applicable proposed project component sites. In some cases, the operation of the proposed project would result in beneficial impacts on an environmental resource. Please refer to **Table 5-2**, below, for the proposed project's less-than-significant and beneficial impacts.

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Table 5-1. Significant Impacts of Proposed Project

Significant Impacts of Proposed Project	Applicable Proposed Project Component(s)
Significant Impacts That Can Be Reduced To Less-Than-Significant With Mitigation	
4.3 Biological Resources	
BIO-1: Construction Impacts to Special-Status Species and Habitat.	Ecosystem Protective Barrier Interim Sandbar Management Plan
BIO-2: Construction Impacts to Sensitive Habitats.	Ecosystem Protective Barrier Interim Sandbar Management Plan
BIO-3: Construction Impacts to Movement of Native Wildlife and Native Wildlife Nursery Sites.	Ecosystem Protective Barrier Scenic Road Protection Structure
4.4 Cultural Resources	
CR-1: Construction Impacts on Historic Resources.	Ecosystem Protective Barrier
CR-2: Construction Impacts on Archaeological Resources or Human Remains.	Ecosystem Protective Barrier Scenic Road Protection Structure Interim Sandbar Management Plan
CR-3: Construction Impacts on Human Remains	Ecosystem Protective Barrier Scenic Road Protection Structure Interim Sandbar Management Plan
CR-4: Construction Impacts on Tribal Cultural Resources	Ecosystem Protective Barrier Scenic Road Protection Structure Interim Sandbar Management Plan
4.8 Hydrology & Water Quality	
HYD-4: Operational Impacts to Water Quality due to Drainage Pattern Alterations and Discharges.	Ecosystem Protective Barrier
HYD-7: Operational Risks due to Location within a 100-Year Flood Hazard Area.	Ecosystem Protective Barrier
4.9 Land Use & Planning	

Table 5-1. Significant Impacts of Proposed Project

Significant Impacts of Proposed Project	Applicable Proposed Project Component(s)
Significant Impacts That Can Be Reduced To Less-Than-Significant With Mitigation	
LU-1: Conflict with Plans, Policies, and Regulations during Construction and Operation.	Ecosystem Protective Barrier Scenic Road Protection Structure Interim Sandbar Management Plan
4.10 Noise	
NV-1: Construction Ground-Borne Vibration and Noise.	Ecosystem Protective Barrier
NV-2: Construction Noise.	Scenic Road Protection Structure Interim Sandbar Management Plan
4.11 Public Services, Recreation, & Utilities	
PS-3: Construction Solid Waste Policies and Regulations.	Ecosystem Protective Barrier
4.12 Traffic & Circulation	
TRA-2: Construction-Related Traffic Delays, Safety Hazards, and Access Limitations.	Ecosystem Protective Barrier Scenic Road Protection Structure
TRA-3: Construction-Related Roadway Deterioration.	Ecosystem Protective Barrier Scenic Road Protection Structure
TRA-4: Construction Parking Interference.	Ecosystem Protective Barrier Scenic Road Protection Structure
Significant and Unavoidable Impacts	
4.1 Aesthetics	
AES-2: Operation Impacts on Scenic Vistas and Visual Quality of the Surrounding Areas.	Ecosystem Protective Barrier

Table 5-1. Significant Impacts of Proposed Project

Significant Impacts of Proposed Project	Applicable Proposed Project Component(s)
Significant and Unavoidable Impacts	
4.8 Hydrology & Water Quality	
HYD-6: Operational Drainage Pattern Alterations	Ecosystem Protective Barrier
4.10 Noise	
NV-2: Construction Noise.	Ecosystem Protective Barrier
NV-3: Operational Noise.	Ecosystem Protective Barrier

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5.2 ALTERNATIVES CONSIDERED BUT ELIMINATED

In accordance with the State CEQA Guidelines, the lead agency is responsible for selecting a range of potentially feasible project alternatives for examination, and must briefly discuss the alternatives it eliminated from detailed consideration. Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are:

- Failure to meet most of the basic project objectives,
- Infeasibility, or
- Inability to avoid significant environmental impacts.

The following section discusses those alternatives that were considered but eliminated during the course of this CEQA evaluation. The CEQA alternatives that were considered but eliminated from more detailed evaluation are presented using the following framework:

5.2.1 Alternative Components of the Proposed Project Considered but Eliminated

5.2.2 Alternative Projects of the Proposed Project Considered but Eliminated

5.2.1 Alternative Components of the Proposed Project Considered but Eliminated

During preliminary design and project development, and as an initial phase of the EIR process, several feasibility-level and technical analyses were conducted to support development of the proposed EPB and SRPS project components and provide an initial screening for environmental issues. The technical reports provided an initial screening process to address key feasibility issues including alternative alignments and elevations, alternative materials, engineering feasibility, environmental considerations, permitting requirements, and timing. This section describes the alternative EPB and SRPS project components and why these alternative components were eliminated from more detailed evaluation in this EIR.

5.2.1.1 EPB – Low Elevation Alternative

The EPB – Low Elevation Alternative includes the same design elements as the proposed EPB project component, except proposes a design elevation of 16 feet instead of 17.5 feet. Elevation 16 feet is equal to the current FEMA 100-year flood elevation for the lagoon and is 0.6 feet higher than the highest lagoon level on record (15.4 feet in January 2008). It is also approximately equal to the elevation of the County's sandbag barrier, which was constructed along the periphery of the Fourth Addition neighborhood in the fall of 2012.

Because this alternative would be located along the same alignment, it would generally result in the same environmental impacts as the proposed EPB project component, and none of the impacts of the proposed EPB project component would be avoided or substantially reduced. Although the reduced height of this alternative may reduce visual impacts from some public vantage points, due to the high visual quality and exposure sensitivity of the site, this alternative would alter the existing visual character of the open space and this impact would remain significant and unavoidable. In addition, a top elevation of 16 feet is the current 100-year flood elevation, and would not account for flood elevation changes due to sea level rise over the life of the project (50 years). As a result, top elevation of 16 feet would result in significantly increasing the frequency of breach management activities, potentially to an unacceptable frequency, especially as peak lagoon levels increase over the life of the structure due to sea level rise.

Rationale for elimination from more detailed evaluation in this EIR: The EPB – Low Elevation Alternative would not avoid or reduce one or more significant impacts of the proposed EPB project component and would likely increase the need for breach management, and, thus, would not better accomplish the project objectives. Therefore, this alternative was rejected.

5.2.1.2 EPB – High Elevation Alternative

The EPB – High Elevation Alternative includes the same design elements as the proposed EPB project component, except proposes a design elevation of 19 feet instead of 17.5 feet. A top elevation of 19 feet would likely eliminate the need for breach management activities over the life of the structure taking into account sea level rise and would provide the necessary freeboard that would remove homes in the Fourth Addition from flood risk. However, this alternative would increase visual impacts. This alternative would also likely increase flooding impacts to the CAWD and Mission Ranch properties. In addition, this alternative would result in the same environmental impacts since the alignment would be in the same location, and none of the environmental impacts would be avoided or reduced.

Rationale for elimination from more detailed evaluation in this EIR: The EPB – High Elevation Alternative would increase visual impacts and would not avoid or reduce one or more significant impacts of the proposed EPB project component. Therefore, this alternative was rejected.

5.2.1.3 EPB at Property Line Alternative

The EPB at Property Line (P/L) Alternative includes the same design elements as the EPB Near P/L (please refer to **Section 5.3.2.2** below), except that the wall is located along the Fourth Addition neighborhood property line. This alternative attempts to eliminate (or nearly eliminate) encroachment into State Parks property, depending on whether the maintenance easement is over private or State Park property. Since essentially no stormwater detention would be provided, approximately 40 cfs (18,000 gpm) of pumping capacity would be required, in addition to a 70 cfs bypass storm drain system. The bypassed storm water would not pass through any water quality treatment BMPs, but would pass through vault-based gross pollutant stormwater control measures such as screen filters. The wall could be constructed either on the north (Fourth Addition) or south (State Parks) side of the property line. If constructed on the Fourth Addition side of the line, property would have to be acquired from 14 property owners. Whether the height of the EPB at P/L is 16 feet or 19 feet, visual impacts would be increased significantly due to the proximity to the property line. Although this alternative would reduce encroachment into State Parks property and reduce biological resources impacts, this alternative would result in increased significant and unavoidable operational aesthetic and noise impacts and increased water quality impacts.

Rationale for elimination from more detailed evaluation in this EIR: An alignment closer to the property line was considered technically infeasible, due to 1) the need for access along the barrier for operation and maintenance activities, 2) the size of pumping equipment that would be required (due to the reduction in stormwater detention volume provided), and 3) the resulting lack of right of way for implementation of stormwater treatment facilities. A closer alignment would also require obtaining easements from approximately 14 residential property owners, in addition to State Parks and Mission Ranch, and increased operation and maintenance costs due in part to the lack of storm water storage. Therefore, this alternative was rejected.

5.2.1.4 EPB Levee Alternative

The EPB Levee Alternative includes similar design elements as the proposed EPB project component, except that an earthen levee would be constructed in lieu of a floodwall. However,

the EPB Levee Alternative would increase temporary and permanent impacts to the Lagoon by directly and indirectly impacting sensitive habitats (e.g., filling wetlands and waters of the U.S.), decreasing stormwater detention volume due to the presence of the levee, increasing pumping capacity and frequency (and associated increase in noise from the pump operation), and increasing visual impacts.

Rationale for elimination from more detailed evaluation in this EIR: The EPB Levee Alternative would result in additional significant impacts, and therefore, would have insufficient benefit over a floodwall alternative. Therefore, this alternative was rejected.

5.2.1.5 EPB with Access Road Alternative

The EPB with Access Road Alternative has the same design elements as the proposed EPB project component, except that a maintenance access road would be constructed along the north side of the wall and the alignment would be located a minimum of 15 feet from the property line to avoid impacts to sensitive habitats and reduce the amount of land acquisition required. This alternative would be beneficial to allow ease of access for maintenance activities, including periodic painting, replacement of mechanical components, or clearing of drain inlets or pipes. However, this alternative would increase visual impacts due to the addition of an access road along the wall; increases noise and visual impacts due to larger pumping capacity and more frequent use of pumps (due to more limited detention volume relative to no-road alternative); and reduces opportunity for implementation of stormwater control measures due to maintenance of access road.

Rationale for elimination from more detailed evaluation in this EIR: The EPB with Access Road Alternative would result in additional significant impacts and insufficient benefit over a no-road alternative. Therefore, this alternative was rejected.

5.2.1.6 EPB with Reduced Drainage Infrastructure Alternative

The EPB with Reduced Drainage Infrastructure Alternative includes the same design elements as the proposed EPB project component, except that the interior drainage system would be sized based on a storm probability analysis. This alternative decreases noise and visual impacts due to smaller pumping capacity and less frequent use of pumps, and decreased temporary construction impacts to the neighborhood. In addition, this alternative would be a significant improvement over the current level of flood protection, but less protection than the proposed EPB project component.

Rationale for elimination from more detailed evaluation in this EIR: The EPB with Reduced Drainage Infrastructure Alternative would provide less flood protection than proposed EPB project component, and, thus, would not better accomplish the project objectives. Therefore, this alternative was rejected.

5.2.1.7 SRPS – Reinforced Earth Wall Located at Mid-Slope Alternative

The Reinforced Earth Wall Located at Mid-Slope Alternative consists of a retaining wall constructed at some location mid-slope below Scenic Road, but above beach level. A reinforced earth structural system (e.g., a soil nail wall with shotcrete facing) would be installed in the northern portion, while the southern portion would be revetment placed in the same locations and elevations of proposed SRPS project component. It is unknown whether this type of wall is feasible from an engineering standpoint as site-specific geotechnical investigations have not been conducted. Geotechnical feasibility would be based on proposed wall elevations, embankment slopes, and soil properties.

However, this alternative would have increased impacts to aesthetics as wall heights increase for each foot moved away from the toe of slope. Since the wall would be higher, the wall face may also be exposed. In addition, if the river were to scour the beach from in front of the wall, a portion of the wall (possibly up to an approximately 25-foot tall portion) could become exposed because of the higher top elevation. Summer and fall wave action may rebuild the beach in front of the wall, but the top half of the wall would remain exposed since it would be above normal beach elevations. The entire face of the wall may require an aesthetic treatment to address long-term visual considerations. Lastly, this alternative may have increased significant impacts on public access as pedestrian guard rail would be required along the top of the wall, or, alternatively, along Scenic Road. A vehicular guard rail may also be required.

Rationale for elimination from more detailed evaluation in this EIR: The Reinforced Earth Wall Located at Mid-Slope Alternative would result in an increase in significant impacts to aesthetic, recreational, and public access resources. Therefore, this alternative was rejected.

5.2.1.8 Sandbar Management Plan Only Alternative

The Sandbar Management Plan Alternative would involve sandbar management activities, including mechanical breaching as necessary in emergency, while implementing BMPs. This is currently the practice of the County. This alternative would meet all the project objectives with the exception of the goal to reduce mechanical breaching. The County had previously submitted permit applications related to this alternative. However, the NMFS informed the County that implementing the proposed plan would result in significant impacts to steelhead and would not be able to issue the necessary permits.

Rationale for elimination from more detailed evaluation in this EIR: The Sandbar Management Plan Alternative would not reduce the need for breach management, and would be infeasible since the NMFS would not issue the necessary permits for this alternative. Therefore, this alternative was rejected.

5.2.1 Alternative Projects of the Proposed Project Considered but Eliminated

This section describes the alternative projects to the proposed project, and why these alternative projects were eliminated from more detailed evaluation in this EIR.

5.2.1.1 Elevate Structures Alternative

Elevating is the most common means of reducing a structure's flood risk. The process consists of raising the building to, or above, the base flood elevation level. While NFIP policy requires only the lowest floor of the building to be raised to the base flood elevation, some States and the National Flood Insurance Program (NFIP) communities enforce a "freeboard" requirement, which mandates that the building be raised above the base flood elevation to meet the community's flood protection level. The alternative would require revisions to Monterey County Code to require homeowners to elevate habitable structures in the floodplain. This alternative may improve views from some homes along the Lagoon, but could also block views from other home locations. It would reduce damage to vulnerable structures constructed on the natural floodplain of the Carmel River and Lagoon; however, the flood impacts would remain until homeowners make the necessary improvements, the timing of which would be uncertain. The alternative does not solve the problem of the Lagoon backwater affecting low-lying stormwater drains on residential streets upstream of the Lagoon, unless these structures were also raised or flood-proofed. Although the Lagoon would be allowed to naturally breach once improvements were made, there would still be the potential to impact Scenic Road.

Rationale for elimination from more detailed evaluation in this EIR: The Flood-Proof Structures Alternative was rejected as it would not achieve the objectives of protecting public infrastructure. In addition, these improvements may not occur for many years, and there is the potential that they might never occur. This alternative would also require residential structures to make elevation improvements, which is beyond the regulatory authority of the County.

5.2.1.2 Floodproof Structures Alternative

The Floodproof Structures Alternative would include floodproofing the existing structures in the low-lying areas of the Lagoon, thus allowing the Lagoon to naturally breach. Floodproofing is defined as any combination of structural and non-structural additions, changes, or adjustments to structure which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures, and their contents. Floodproofing techniques include installation of watertight shields for doors and windows, drainage collection systems, sump pumps, and check valves; reinforcement of walls to withstand floodwater pressures; use of sealants to reduce seepage through and around walls; and anchoring the building to resist floatation, collapse, and lateral movement.

Floodproofing measures are widely applied throughout the country where two types of floodproofing are widely recognized: wet and dry. Wet floodproofing reduces damage from flooding in three ways; (1) allowing flood waters to easily enter and exit a structure in order to minimize structural damage; (2) use of flood damage resistant materials; and (3) elevating important utilities. On the other hand, dry floodproofing is the practice of making a building watertight or substantially impermeable to floodwaters up to the expected flood height.

Wet floodproofing measures typically include structural measures, such as properly anchoring structures against flood flows, using flood resistant materials below the expected flood depth, protection of mechanical and utility equipment, and use of openings or breakaway walls to allow passage of flood waters without causing major structural damage. A dry floodproofed structure is made watertight below the expected flood level in order to prevent floodwaters from entering in the first place. Making the structure watertight requires sealing the walls with waterproof coatings, impermeable membranes, or a supplemental layer of masonry or concrete, installing watertight shields on openings and fitting measures to prevent sewer backup.

Floodproofing can be applied in residential and non-residential buildings and the principles of floodproof design can also be applied to other important infrastructure such as electricity substations and sewage treatment facilities. However, residential and non-residential buildings are treated differently. A residential building must have a higher level of protection; if it is to be built in the floodplain, it must be elevated above the base flood elevation. Non-residential buildings, on the other hand, may be elevated or floodproofed. Floodproofing areas below the base flood elevation in residential buildings is not permitted under the NFIP except in communities that have been granted an exception to permit floodproofed basements. Floodproofing is not permitted in Coastal High Hazard Areas (Zone V, VE, or V1-30). It is recommended by FEMA that floodproofing be implemented up to one foot above base flood elevation for a factor of safety and to receive full credit for flood insurance rating.

The NFIP allows a new or substantially improved non-residential building in an A Zone (Zone A, AE, A1-30, AR, AO, or AH) to have a lowest floor below the base flood elevation, provided that the design and methods of construction have been certified by a registered professional engineer or architect as being dry floodproofed in accordance with established criteria.

Rationale for elimination from more detailed evaluation in this EIR: The alternative would require floodproofing of residential structures located in low-lying areas of the Lagoon (i.e., Zone AE). Floodproofing areas below the base flood elevation in residential buildings is not permitted under the NFIP except in communities that have been granted an exception to permit floodproofed basements, which does not apply to the Lagoon area. Therefore, the Floodproof Structures Alternative is infeasible due to conflicts with existing floodplain regulations, and was rejected.

5.2.1.3 Condemn Housing/Properties Alternative

The Condemn Housing/Properties Alternative includes removing buildings and structures within the floodplain, thus allowing the Lagoon to naturally breach. This alternative would require the County to purchase the properties and require the relocation of the owners. This would be of significant cost to the County and may also result in a decrease to property tax revenue depending on the relocation sites. This alternative would not protect public infrastructure. It may result in improving fish and wildlife habitat and may even result in an increase in habitat where properties are removed, if restored. There would also likely be significant opposition from affected property owners, as there are not many available equivalent properties for them to relocate.

Rationale for elimination from more detailed evaluation in this EIR: The Condemn Housing/Properties Alternative does not reduce significant impacts on public infrastructure, and thus would not better accomplish the project objectives. In addition, this alternative would involve regulatory action to require local residents and public facilities to relocate. Not only is this regulatory authority beyond that of the proposed project, but the high property acquisition costs and potential loss of property tax revenue makes this alternative infeasible based on the budget of the proposed project. Therefore, this alternative was rejected.

5.2.1.4 Relocation of Threatened Public Infrastructure Alternative

The Relocation of Threatened Public Infrastructure Alternative would close the vulnerable portion of Scenic Road and relocate public infrastructure (i.e., State Parks facilities and sewer infrastructure). However, it would not address flooding issues and future conditions would still encroach on Scenic Road. In addition, there would still be public safety issues.

Rationale for elimination from more detailed evaluation in this EIR: The Relocation of Threatened Public Infrastructure Alternative would not achieve most of the project objectives and would not reduce the significant impacts of the proposed project. Therefore, this alternative was rejected.

5.2.1.5 Mechanical Control of Lagoon Level Alternative

The Mechanical Control of Lagoon Level (e.g., additional outfalls, culvert with flap gate) Alternative would entail providing a secondary, man-made, fully-controllable outfall so that the Lagoon level could be "controlled," primarily for the purpose of managing the Lagoon level in anticipation of a large storm event. It would meet the project objectives to reduce the necessity for mechanical breaching and maintain current level of flood protection. It may also avoid or reduce impacts to public infrastructure, depending on the location of the outfall. However, the proposed new infrastructure improvements would have to be extremely large in order to accommodate design flood flows (thousands of cfs), unless the proposed project added a component to pre-drawdown the Lagoon (at a few hundred cfs, over the course of a day or two). In addition, the alternative would not meet the project goal of allowing the Lagoon to "naturalize" by definition.

Rationale for elimination from more detailed evaluation in this EIR: The Mechanical Control of Lagoon Level Alternative does not meet most of the proposed project objectives, specifically it would not allow for restoration of a natural hydrologic condition within the Carmel River and Lagoon, and may not reduce potential impacts on fish and wildlife. Therefore, this alternative was rejected.

5.2.1.6 Bypass Channel Alternative

The Bypass Channel Alternative, or flood overflow channel, would be constructed to reroute the water out of the Lagoon and into the ocean at a point far enough from significant fish habitat in the Lagoon so that fish populations would not be adversely affected. The channel or culvert would be constructed so that it remains permanently open throughout the flood season (note that the Salinas River Lagoon has this option). It would meet the project objectives to reduce the necessity of mechanical breaching, restore lagoon's historic hydrological conditions, and maintain current level of flood protection. However, this alternative may have significant impacts on fish habitat and does not meet the project goal of allowing the Lagoon to "naturalize" by definition.

Rationale for elimination from more detailed evaluation in this EIR: The Bypass Channel Alternative does not meet most of the proposed project objectives, specifically it would not allow for restoration of a natural hydrologic condition within the Carmel River and Lagoon, and may not reduce potential impacts on fish and wildlife. Therefore, this alternative was rejected.

5.2.1.7 Weir Alternative

The Weir Alternative would entail either finding an existing, or creating, a "rock sill," which would act as a weir to keep the Lagoon in some preferred (e.g., perched) hydrologic condition. The breach channel would have to be managed in order to keep the channel flowing over this weir. It would not meet the objective of reducing the necessity to mechanically breach the Lagoon. The

technical feasibility of this alternative is questionable. This alternative may not protect public infrastructure depending on the location of the weir and channel management activities.

Rationale for elimination from more detailed evaluation in this EIR: The Weir Alternative was rejected due to technical infeasibility and not meeting the project objective to reduce the necessity of mechanical breaching.

5.2.1.8 Variable-Height Outlet Weir Alternative

The Variable-Height Outlet Weir Alternative would include a temporary, rubberized inflatable bladder dam could be placed in an excavation pit, before excavation of a breach channel, within the crown of the dune at the onset of the wet season. A breach channel would then be constructed on either side of the bladder to an appropriate invert elevation. Actual breaching and drainage of the Lagoon could then commence without risk to the operator and equipment by deflation of the rubber dam to a spillway elevation that avoids excessive evacuation of the Lagoon water and under controlled outflow discharge rates. This alternative may meet the project objectives to reduce the necessity for mechanical breaching, protect and improve habitat for fish and wildlife, and maintain current level of flood protection. However, the alternative is technically infeasible and would not protect public infrastructure.

Rationale for elimination from more detailed evaluation in this EIR: The Variable-Height Outlet Weir Alternative was rejected due to technical infeasibility and would not meet most project objectives.

5.2.1.9 Utilize CAWD Outfall Alternative

The CAWD Outfall Alternative includes utilizing an existing 36-inch discharge line which extends 600 feet to the ocean. However, assuming that the CAWD is not using the pipe for any flow from its own facility and the proposed project were to pump at the maximum rate the pipe could handle (which would be no more than 7 fps), the proposed project could only push 50 cfs through the pipe. This would not be adequate compared this to the average daily river flow observed on the day of annual peak lagoon level (2,000 cfs) and the peak 10-year river flow (10,800 cfs).

Rationale for elimination from more detailed evaluation in this EIR: The CAWD Outfall Alternative was rejected due to technical infeasibility.

5.2.1.10 Permeable Outfall (High Permeability Beach Barrier) Alternative

The Permeable Outfall Alternative would increase the seepage through the beach berm and include a rip-rap option for Scenic Road. This could be accomplished by having the toe of the rip-rap function as a high seepage pathway between the Lagoon and the ocean. The toe itself would be scalable in width because it would be essentially buried below the beach. It could provide a conduit for a high amount of seepage from the Lagoon. Outflow could be controlled, if needed, in the summer by closing off the drainage (buried structure). The rock would be wrapped in fabric.

Rationale for elimination from more detailed evaluation in this EIR: The Permeable Outfall Alternative would not eliminate the need for proposed EPB project component; thus, not reducing impacts and not meeting the primary project objective. In addition, there is potential for the fabric wrapped around the rock to rip, thus allowing sand into the structure and plugging up the permeable seepage pathway. Therefore, this alternative was rejected.

5.2.1.11 Expand and Deepen the Lagoon Alternative

Additional areas of the Lagoon could be expanded and deepened by dredging out backwater areas away from the mouth of the river where it is typically breached (i.e., the South Arm). The alternative would allow for more deepwater habitat and low velocity refugia for juvenile fish and other aquatic organisms that have the ability to swim to calm water to avoid being swept out to ocean prematurely. In addition, expanding the interior Lagoon may also attract more juvenile and overwintering steelhead to productive areas of the Lagoon less affected by the breach. This alternative would meet the project objectives to reduce the necessity of mechanical breaching and maintaining current level of flood protection. However, it may not necessarily improve habitat for fish and wildlife due to potentially impacts to water quality and habitat resulting from dredging and alteration of the existing habitat. It would also not protect public infrastructure.

Rationale for elimination from more detailed evaluation in this EIR: The volume and extent of dredging associated with this alternative to be effective is uncertain. In addition, results of this alternative are uncertain without further studies, the costs of dredging and regulatory permits may be high (if even feasible), and there may be short-term impacts on water quality and benthic organisms. Therefore, this alternative was rejected.

5.2.1.12 Temporary Flood Protection Alternative

The Temporary Flood Protection Alternative would provide temporary/seasonal flood protection measures (e.g., sand bagging). This alternative would meet the project objectives of restoring the Lagoon's historic hydrological conditions and protecting and improving habitat for fish and wildlife.

Rationale for elimination from more detailed evaluation in this EIR: Although there would be low initial costs associated with the Temporary Flood Protection Alternative, annual costs would be relatively high in perpetuity. In addition, this alternative may have increased significant flooding impacts to public and private property, and thus would not better accomplish the project objectives. Therefore, this alternative was rejected.

5.2.1.13 Southern Breach – Emergency Alternative

The Southern Breach - Emergency Alternative would include mechanically breaching the southern sandbar in emergency situations. The alternative would meet the project objective of maintaining current levels of flood protection. However, it would still require mechanical breaching and may result in increased impacts on fish and wildlife habitat and cultural resources.

Rationale for elimination from more detailed evaluation in this EIR: The Southern Breach-Emergency Alternative does not meet most project objectives, most specifically to reduce the necessity of mechanical breaching, and may result in increased impacts on fish and wildlife habitat and cultural resources.

5.2.1.14 Southern Breach – Managed Alternative

The Southern Breach - Managed Alternative would include performing a managed, mechanical southern breach. A channel through the sand dune and beach prism would be cut along the base of bluff at the south edge of the Lagoon to allow the natural bedrock sill underlying the beach sand to prevent complete deep incision at the breach and evacuation of the Lagoon. This alternative would be designed to ensure that the Lagoon always retains an optimal level of water to provide shelter to steelhead and limit the depth and width of the breach to reduce flow rate.

The advantage of this alternative is that it uses a natural grade control (weir) to prevent the breached channel from incising to an elevation so low that extensive areas of the Lagoon are dewatered suddenly at a high rate of drainage outflow. In addition, there is the possibly of improved operational safety because the outflow discharge rate will be lower and actual breaching can occur closer to the lagoon end of the graded channel. However, cultural resources impacts may occur and there may be additional potential biological impacts to western snowy plover and Smith's blue butterfly.

Rationale for elimination from more detailed evaluation in this EIR: The Southern Breach - Managed Alternative may result in increased significant impacts on cultural resources and biological resources, specifically western snowy plover and Smith's blue butterfly. Therefore, this alternative does not better accomplish the project objectives and was rejected.

5.2.1.15 Installation of a Pump or Overflow Device Alternative

The Installation of a Pump or Overflow Device Alternative would include installing a pump that could move water from the Lagoon into the ocean to be installed. The pump would have to be screened to protect fish. Studies would be conducted to determine the optimal water level for habitat in the Lagoon, and the pump could be used to maintain this level while preventing flooding until permanent breaching is considered acceptable to meet fish species life stage requirements. The design of this alternative would include constructing a water pumping pipe along rock wall at southern edge of the Lagoon that could be used to gradually open the barrier beach and reduce the level of the Lagoon prior to reaching flood height and, thereby, reduce the need to continuously breach.

Rationale for elimination from more detailed evaluation in this EIR: The Installation of a Pump or Overflow Device Alternative is unlikely to meet any project alternatives and would likely result in increased significant environmental impacts. In addition, the alternative is technically infeasible due to the required large size of the pump and pipe. Therefore, this alternative was rejected.

5.2.1.16 Levee Modifications of Lower Reach Alternative

The Levee Modification of Lower Reach Alternative would be the same concept as the proposed EPB project component, except in lieu of using sheet piling, the barrier would be a levee. Adding new levees sufficient to maintaining existing flood protection historically provided by mechanical breaching would result in significant unavoidable impacts to biological resources.

Rationale for elimination from more detailed evaluation in this EIR: The Levee Modification of Lower Reach Alternative does not reduce significant impacts and does not meet most of the project objectives. Therefore, this alternative was rejected.

5.2.1.17 Channel Maintenance Alternative

The Channel Maintenance Alternative assumes vegetation removal or channel dredging. However, either of these would pose significant impacts to biological resources and have no impact on reduction in flood risk for the Fourth Addition.

Rationale for elimination from more detailed evaluation in this EIR: The Channel Maintenance Alternative does not reduce significant impacts and does not meet most of the project objectives. Therefore, this alternative was rejected.

5.2.1.18 Carmel River Bank Stabilization Alternative

Bank stabilization (e.g., rip-rap, revegetation, or levees) along the lower Carmel River would result in increased impacts to biological resources and may not maintain the current level of flood protection in the context of reducing mechanical breaching of the barrier beach. This alternative would unlikely meet any of the project objectives and would not improve or fish and wildlife habitat.

Rationale for elimination from more detailed evaluation in this EIR: The Bank Stabilization Alternative does not reduce significant impacts and does not meet most of the project objectives. Therefore, this alternative was rejected.

5.2.1.19 Upstream Flood Relief Measures Alternative

There are no upstream flood relief measures that would result in meeting the project objectives, including reducing the necessity to mechanically breach the Lagoon. The Upstream Flood Relief Measures Alternative could provide improvements to flood conditions upstream; however, they would likely have little to no effect in achieving project objectives downstream.

Rationale for elimination from more detailed evaluation in this EIR: The Upstream Flood Relief Measure Alternative does not reduce significant impacts and does not meet most of the project objectives. Therefore, this alternative was rejected.

5.3 ALTERNATIVES ANALYSIS

This section describes the alternatives to the proposed project that were selected and evaluated in additional detail. The following information is provided for each alternative: (1) a description of the alternative, (2) analysis of the alternative's ability to reduce the impacts of the proposed project or result in any additional environmental impacts, and (3) assessment of the alternative's ability to meet the project objectives. A summary comparison of the alternatives is provided at the end of the section. This section is organized into four parts:

5.3.1 No Project Alternative

5.3.2 Alternatives Components to Proposed Project

5.3.2.1 EPB Component Alternatives

5.3.2.2 SRPS Component Alternatives

5.3.3 Alternative Projects to Proposed Project

5.3.1 No Project Alternative

CEQA Guidelines Section 15126.6(e) requires that an EIR include an evaluation of the No Project Alternative to provide decision-makers the information necessary to compare the relative impacts of approving a project to not approving a project. The No Project Alternative is defined as a continuation of existing conditions, as well as conditions that are reasonably expected to occur in the event that a proposed project is not implemented. Under the No Project Alternative for the proposed project, the proposed project would not be built and no project objectives would be achieved.

It is reasonably likely that, pursuant to the regulatory agencies requiring a long-term solution to reduce the necessity of mechanical breaching and threat of litigation against the County for ceasing breaching activities, another project would be proposed and constructed. This project would be required to undergo its own environmental review and discretionary approvals and is not appropriately included in the No Project Alternative.

5.3.1.1 Description of Alternative

This alternative is considered because it is required by CEQA (i.e., continuation of existing conditions). In the event that the County of Monterey and its partner agencies do not implement the proposed project, the "no project" analysis assumes a "no action" scenario where none of the proposed project components would be constructed or operated. Although the regulatory agencies have stated that they will not permit the mechanical breaching activities that have historically occurred, future flood events are anticipated under the No Project Alternative and it is assumed that implementation of flood protection activities would be required to protect low-lying structures and public infrastructure under the No Project Alternative. This underlies the purpose and necessity of implementing a long-term solution, such as the proposed project. Future flood protection activities may include more intense sandbagging and public outreach efforts, and may include mechanical breaching in an emergency situation. These activities may be implemented by the County or other entity.

5.3.1.2 Environmental Impacts of the Alternative Compared to those of the Proposed Project

The No Project Alternative would eliminate all operational impacts at each of the proposed project component sites, including avoiding all significant impacts identified for the proposed project. However, the No Project Alternative would result in similar "construction-related" impacts to the proposed ISMP project component since it is assumed mechanical breaching would be required in emergency situations. Benefits of the proposed project related to special-status species, sensitive habitats, movement of native wildlife, and native nursery sites would not occur if the No Project Alternative was implemented. In fact, the emergency mechanical breaching would likely result in significant, unavoidable impacts to many of these resources. The beneficial impacts of the proposed project on water quality, specifically in respect to treatment of stormwater runoff before it enters the Lagoon, would also not occur. Please refer to **Table 5-2** for a comparison of the impacts of the No Project Alternative to the impacts of the proposed project.

5.3.1.3 Ability of the Alternative to Meet the Project Objectives

Under the No Project Alternative, none of the objectives of the proposed project would be met, and the benefits of the proposed project would not occur. The No Project Alternative would not enable the County to reduce the necessity of mechanical breaching, maintain existing flood protection, or protect public infrastructure. Private property along the northern edge of the Lagoon would remain vulnerable to flooding; infrastructure would be continue to be susceptible to damage from scour; and the RMA would be at risk of not meeting regulatory requirements for sandbar management, until non-emergency permits could be obtained. Further, this alternative cannot be permitted by the agencies.

5.3.2 Alternative Components to the Proposed Project

This section describes the alternative EPB and SRPS project components to the proposed project that were selected and evaluated in additional detail in this EIR.

5.3.2.1 EPB with Drainage Bypass Alternative

DESCRIPTION OF ALTERNATIVE

The EPB with Drainage Bypass Alternative has the same design elements as the proposed EPB project component, except a 70 cfs bypass storm drain would be constructed to collect runoff from areas upslope from the Fourth Addition neighborhood and would be setback 15 feet from the property line. The intent of this alternative would be to minimize the volume and rate of stormwater which would need to be detained and pumped during the design storm event. In this alternative, storm drain inlets would be constructed at strategic locations within the drainage area and up-slope of the Fourth Addition neighborhood so as to collect and gravity drain as much of the tributary drainage area as possible. This storm drain would bypass the low-lying Fourth Addition neighborhood because the Fourth Addition is too low to be able to gravity drain into the lagoon at higher lagoon stages. The "bypass storm drain" would enable approximately 75% of the project drainage area to gravity drain to the lagoon. Some of the bypass storm drain system would be located within CSA 1. This would enable the pump stations in the Fourth Addition to be reduced in size. The bypassed storm water would not pass through any water quality treatment BMPs, but would pass through vault-based gross pollutant stormwater control measures such as screen filters.

ENVIRONMENTAL IMPACTS OF ALTERNATIVE COMPARED TO THOSE OF THE PROPOSED PROJECT

This proposed EPB project component alternative would result in nearly the same environmental impacts as the proposed EPB project component. However, due to the closer proximity to the property line (i.e., this EPB alternative alignment would be setback 15 feet while the proposed EPB alternative would have a minimum setback of 40 feet from the property line), the significant and unavoidable impacts associated with operational aesthetic impacts and construction noise and vibration impacts would increase in severity. This alternative would reduce the encroachment onto State Parks property, reduce operational noise associated with the pump and generator facilities, and reduce impacts to biological resources. This alternative may increase impacts to water quality due to the lack of available space to implement water quality treatment areas. The EPB with Drainage Bypass Alternative may also increase impacts associated with alteration of drainage patterns. A closer alignment would also result in increased operation and maintenance costs due in part to the lack of storm water storage.

ABILITY OF ALTERNATIVE TO MEET PROJECT OBJECTIVES

The EPB with Drainage Bypass Alternative would meet the objectives of the project to reduce the necessity of mechanical breaching and maintaining the current level of flood protection. It would need to be implemented in combination with a SRPS project component alternative to meet the project objectives to protect public infrastructure. This alternative would not fully accomplish the project objectives as it would not meet the project objective of minimizing infrastructure that could detract from the natural environment.

5.3.2.2 EPB Near Property Line Alternative

DESCRIPTION OF ALTERNATIVE

The EPB Near P/L Alternative has the same design elements as the proposed EPB project component, except that the flood wall would be located near the property line with an approximate 15-foot setback in closer proximity to the Fourth Addition neighborhood. This alternative targets 2.6 acre feet of detention volume, and a minimum 15 foot-wide access corridor between the Fourth Addition neighborhood and the flood wall. If a bypass storm drain is not provided as described above, approximately 40 cfs (18,000 gpm) of pumping capacity would be required. If a 70 cfs bypass storm drain system were provided, the pumping capacity could be reduced to approximately 10 cfs.

ENVIRONMENTAL IMPACTS OF ALTERNATIVE COMPARED TO THOSE OF THE PROPOSED PROJECT

This EPB project component alternative would result in nearly the same magnitude of environmental impacts as the proposed EPB project component. However, due to the closer proximity to the property line (i.e., this EPB alternative alignment would be setback 15 feet while the proposed EPB alternative would have a minimum setback of 40 feet from the property line), the significant and unavoidable impacts associated with operational aesthetic impacts and construction and operational noise and vibration impacts would increase in severity. This alternative would reduce the encroachment onto State Parks property. It would also reduce impacts to biological resources. This alternative may increase impacts to water quality due to the lack of available space to implement water quality treatment areas. The EPB Near P/L Alternative may also increase impacts associated with alteration of drainage patterns. A closer alignment would also result in increased operation and maintenance costs due in part to the lack of storm water storage.

ABILITY OF ALTERNATIVE TO MEET PROJECT OBJECTIVES

The EPB Near P/L Alternative would meet the objectives of the project to reduce the necessity of mechanical breaching and maintaining the current level of flood protection. It would need to be implemented in combination with a SRPS project component alternative to meet the project objectives to protect public infrastructure. This alternative would not fully accomplish the project objectives as it would not meet the project objective of minimizing infrastructure that could detract from the function and value of the natural environment.

5.3.2.3 Variable Height EPB Alternative

DESCRIPTION OF ALTERNATIVE

The design elements of the Variable Height EPB Alternative would be similar to the proposed EPB project component in that it would be approximately 2,000 lf of flood wall and include reconstruction of 400 lf of Carmelo Street. However, the alignment location would occur at a 15-foot minimum setback from the property line. The alignment could be located at the same location as the proposed EPB project component (i.e., minimum of 40 feet from property line), but for the purposes of comparing alternatives, the 15-foot setback was selected. This alternative would implement the drainage bypass alternative described above in **Section 5.3.2.1**. The bypassed storm water would not pass through any water quality treatment BMPs, but would pass through vault-based gross pollutant stormwater control measures such as screen filters.

ENVIRONMENTAL IMPACTS OF ALTERNATIVE COMPARED TO THOSE OF THE PROPOSED PROJECT

The Variable Height EPB Alternative would reduce the significant and unavoidable aesthetic impacts associated with placement of a flood wall in a scenic viewshed since the view impacts would occur only temporarily during flood events. This impact could be reduced to a less-than-significant impact with mitigation since the flood wall foundation could be screened by vegetation and would not be visible from public vantage points. In addition, this alternative would reduce impacts to habitat and species due to the reduced encroachment into the Lagoon. This alternative would also reduce land use policy inconsistency impacts to a less-than-significant level since the aesthetic impacts would be reduced. However, due to the closer proximity to the property line (i.e., this EPB alternative alignment would be located on the property line or setback 15 feet while the proposed EPB alternative would have a minimum setback of 40 feet from the property line), the significant and unavoidable impacts associated with construction and operational noise and vibration impacts would increase in severity. This alternative would result in higher costs related to construction, operation, and maintenance, as the wall would require rising and lowering for each flood event.

ABILITY OF ALTERNATIVE TO MEET PROJECT OBJECTIVES

The Variable Height EPB Alternative provides a unique nexus of benefits for visual impacts, encroachment into State Parks property, flood control, and habitat impacts while meeting most of the project objectives when combined with a SRPS Component Alternative. The alternative provides a significant improvement over the current level of flood protection and unique costs and benefits when compared to the proposed EPB project component. On one hand, a variable height EPB could reduce the flood risk in the long term, since the wall could be raised if required by sea level rise or other factors. On the other hand, a non-permanent wall has a higher risk of failure (over time) than a permanent/passive barrier (of the same elevation) because of the necessity for ongoing and timely operation and maintenance.

5.3.2.4 SRPS – Seawall Located at the Toe of Slope Alternative

DESCRIPTION OF ALTERNATIVE

The SRPS – Seawall Located at the Toe of Slope Alternative consists of two sections of wall: the northern half would be a retaining wall constructed vertically (or near vertically) at the toe of slope, along an alignment similar to proposed SRPS project component; and the southern half would consist of revetment identical to proposed SRPS project component. Revetment is proposed for the southern half because beach topography in this area lends itself well to installation of revetment. Also, continued vehicle beach access across from the beach parking lot, both for breach management and emergency response, lends itself to a revetment alternative. The retaining wall structural system would consist of a tangent or secant pile wall.

The wall would be designed and constructed such that it would be completely buried most of the year, and would only be exposed during large riverine flow events or large wave events. Once the event has passed, normal wave action or mechanical sand movement would recover the structure with sand.

ENVIRONMENTAL IMPACTS OF ALTERNATIVE COMPARED TO THOSE OF THE PROPOSED PROJECT

This SRPS alternative is very similar to the proposed SRPS project component in terms of the alignment and profile of the earth slope above the wall, and in terms of the type of protection provided to Scenic Road. Therefore, the potential environmental impacts are very similar. Potential impacts to historical and archaeological resources and human remains would increase due to the increased amount of excavation. The ROW required for this alternative is slightly less than for the proposed component due to reduced encroachment onto the beach. The beach width available during a northerly-aligned breach is also slightly greater for this alignment than for the proposed alignment. The major differences between this alternative and the proposed SRPS project component are the increase in estimated project costs, and there would be the ability to provide an aesthetic treatment to the face of the wall for this alternative that may reduce aesthetic impacts compared to the revetment when visible. This alternative would have one of the highest costs of any of the alternatives and would create barriers to access and safety when the beach is eroded from the toe; a potentially 10-foot high vertical drop would exist if river flows to the north scour away the bluff toe, which is a public safety issue.

ABILITY OF ALTERNATIVE TO MEET PROJECT OBJECTIVES

This alternative meets most project objectives when combined with a sandbar management or EPB proposed component alternative. Specifically, the alternative meets the project objective to protect public infrastructure (Scenic Road embankment, State Parks restroom, and parking facilities) from scour resulting from a northerly-aligned lagoon outflow channel that may result from a reduction in mechanical breaching. In addition, the alternative protects the Scenic Road embankment from increasing risk of erosion from wave and river action, and sea level rise due to global warming.

5.3.2.5 SRPS Full Height Wall – Secant Pile Wall Alternative

DESCRIPTION OF ALTERNATIVE

The SRPS Full Height Wall – Secant Pile Wall Alternative would consist of construction within the footprint of the existing Scenic Road roadway. Preliminary 30% Plans have been prepared and are depicted in **Figures 5-1** and **5-2**. Due to its location at the top of the bluff, the full-height wall has a potential exposed height of approximately 25 feet. A cantilever wall of this height is infeasible, and, therefore, tieback anchors would have to be incorporated into the retaining wall design concept. The type of retaining wall would be a secant pile wall embedded into the marine terrace layer and tied back with earth anchors at the top of the wall extending under Scenic Road. After construction is completed, the roadway would be reconstructed and repaved. The completed pile wall would be completely below grade.

The wall would be completely buried until large riverine flow events or large wave events scour away the bluff toe. As the bluff toe scours, more of the pile wall becomes visible; eventually the entire retained height could be exposed. Unlike the seawall toe wall alternative (**Section 5.3.2.4**), after the storm event has passed, normal wave action or mechanical sand movement would only partially recover the pile wall with sand, leaving the top portion visible.

The tiebacks would likely extend beyond the ROW and an easement would be needed for the tiebacks to extend onto private property. It does include a rock toe to protect from scour, but that may be optional as well depending on the characteristics of the existing hard pan (marine terrace). An additional section of revetment extends around and protects the beach parking lot.

ENVIRONMENTAL IMPACTS OF ALTERNATIVE COMPARED TO THOSE OF THE PROPOSED PROJECT

Construction of the secant pile wall would require the full roadway width of Scenic Road. Large equipment (e.g., cranes, loaders, excavators, concrete trucks, dump trucks) would be required. Temporary access and detours would be provided during construction. Public access, including vehicles and pedestrians, would be prohibited along Scenic Road during construction. The existing parking lot would be protected by a 300-foot long rock revetment. The rock revetment would require excavation, rock placement, and backfill. Construction of the rock revetment would be landward of the MHW line and, thus, would be out of jurisdictional limits. The parking lot would also be used as a contractor staging area for equipment and materials, and, therefore, public access to the parking lot and adjacent beach would be prohibited during revetment construction.

This SRPS alternative is very similar to the proposed SRPS project component in terms of the revetment alignment and in terms of the type of protection provided to Scenic Road. Therefore, the potential environmental impacts are very similar. Potential impacts to historical and archaeological resources and human remains would increase due to the increased amount of excavation. The SRPS Full Height Wall Alternative may be exposed after storm events and may not be recovered by the sand, and, therefore, aesthetic impacts would increase compared to the proposed SRPS project component. However, this impact could be mitigated through application of an architectural facing on the pile wall after it has been exposed. This alternative would result in the smallest footprint, providing the maximum beach width for riverine flow and beach users. It would also have the highest potential wall height and project cost. It would create significant barriers to beach access and safety once the beach is eroded from the toe and a 30- to 40-foot vertical drop occurs. As a result, this alternative may have the most significant impact on public access from Scenic Road since pedestrian and vehicular guard railing would be required along the top of the wall (which would be at level of Scenic Road).

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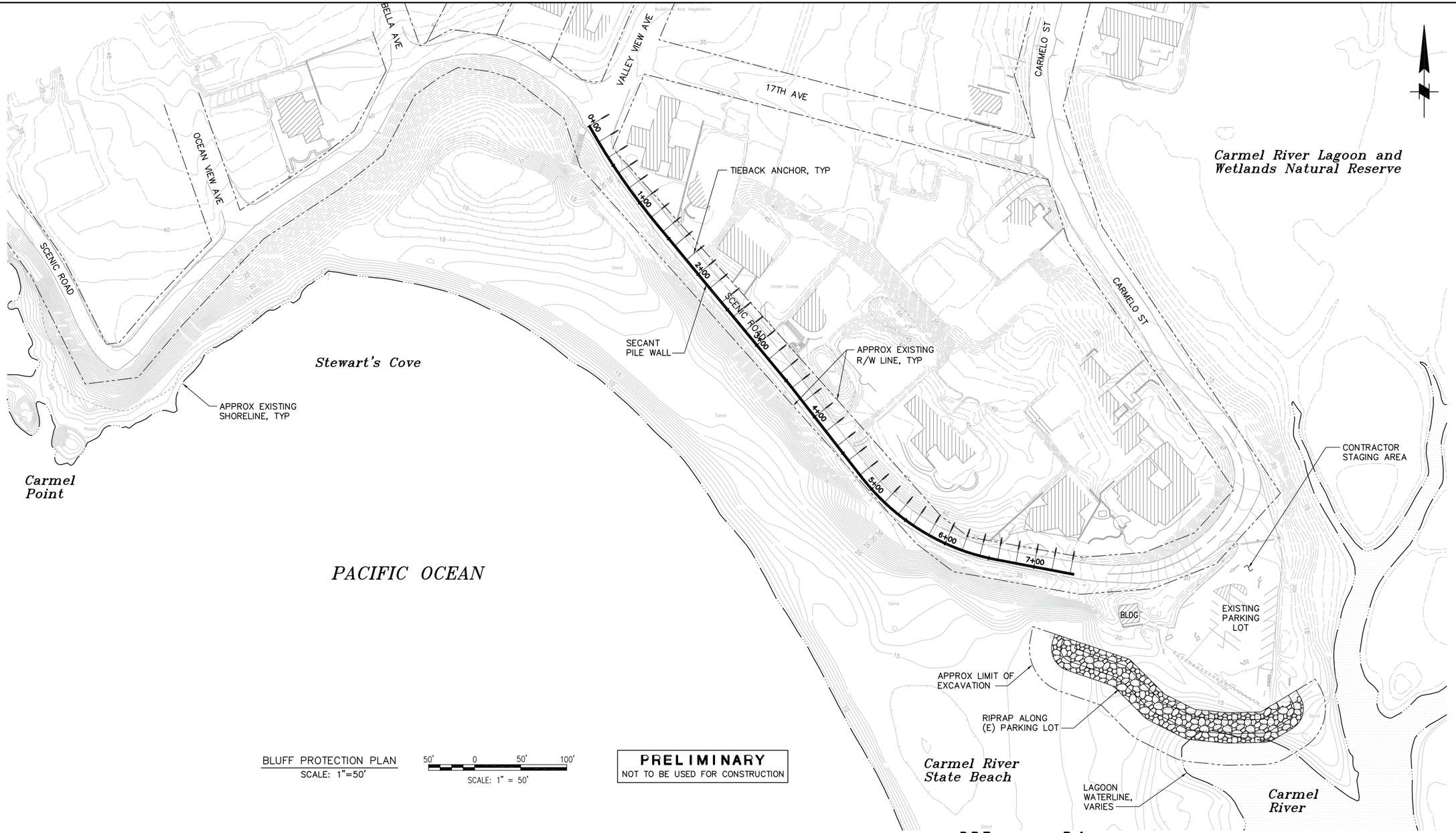

BLUFF PROTECTION PLAN
SCALE: 1"=50'

50' 0 50' 100'
SCALE: 1" = 50'

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Source: Moffatt & Nichol, June 29, 2015

SRPS Full Height- Secant Pile Wall Alternative: Preliminary Site Plan

Denise Duffy and Associates, Inc. Planning and Environmental Consulting	Date 10-4-2016 Scale	Figure **5-1**

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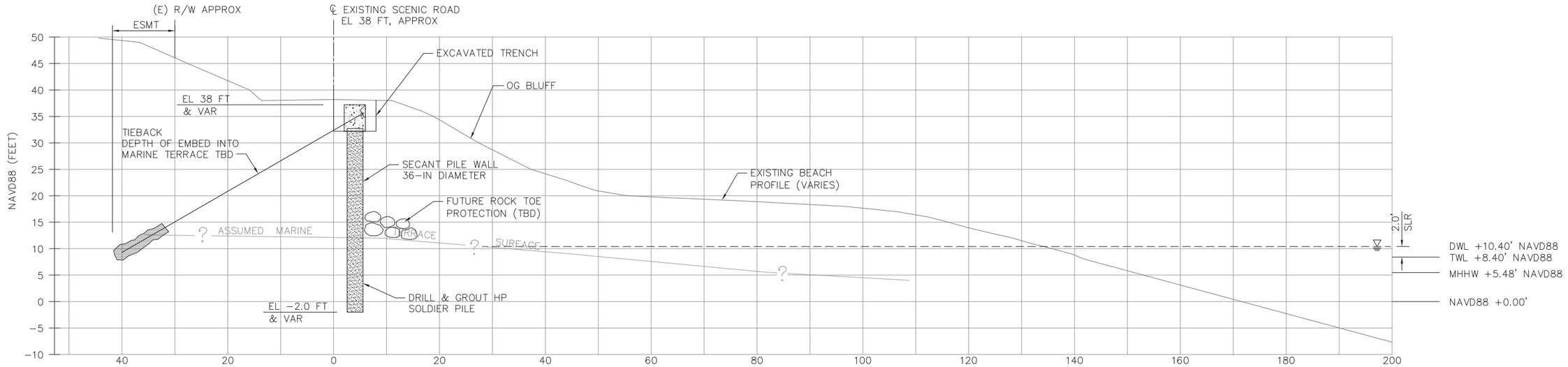
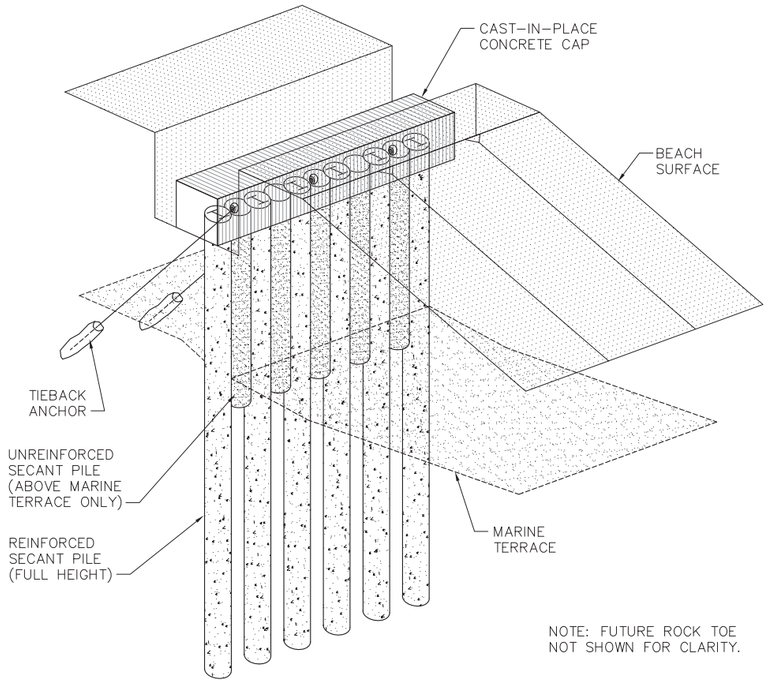
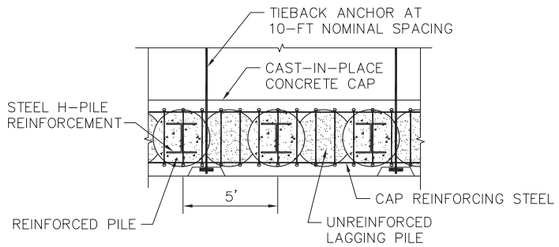


TYPICAL CROSS SECTION



NOTE: FUTURE ROCK TOE
NOT SHOWN FOR CLARITY.

TYPICAL ISOMETRIC VIEW
NOT TO SCALE



TYPICAL PLAN VIEW
NOT TO SCALE

NOTES:

1. STRUCTURAL ELEMENTS SHOWN ARE SCHEMATIC ONLY. ACTUAL SIZES AND DIMENSIONS WILL BE DETERMINED AS PART OF DESIGN PHASE.

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Source: Moffatt & Nichol, Full-Height Wall, August 2015

SRPS Full Height Wall - Scant Pile Wall Alternative: Preliminary Plan Views

Denise Duffy and Associates, Inc. Planning and Environmental Consulting	Date 10-4-2016 Scale	Figure **5-2**

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This alternative would result in increased significant construction noise impacts due to the closer proximity to residential areas. The ROW required for this alternative is significantly less than for the proposed component due to reduced encroachment onto the beach. This alternative would be the highest cost SRPS alternative.

ABILITY OF ALTERNATIVE TO MEET PROJECT OBJECTIVES

This alternative meets most project objectives when combined with a sandbar management or proposed EPB component alternative. Specifically, the alternative meets the project objective to protect public infrastructure (Scenic Road embankment, State Parks restroom, and parking facilities) from scour resulting from a northerly-aligned lagoon outflow channel that may result from a reduction in mechanical breaching. In addition, the alternative protects the Scenic Road embankment from increasing risk of erosion from wave and river action, and sea level rise due to global warming.

5.3.2.6 SRPS Mid-Slope Toe Wall – Soldier Pile Wall Alternative

DESCRIPTION OF ALTERNATIVE

The SRPS Mid-Slope Toe Wall – Soldier Pile Wall Alternative would be constructed near the existing bluff toe of slope. Preliminary 30% Plans have been prepared and are depicted in **Figures 5-3** and **5-4**. This location would be mid-slope once the beach sand is transported offshore by wave and river flow. A cantilever wall of this height is feasible and, therefore, tieback anchors would not be required as part of the design concept. The type of retaining wall recommended is a soldier pile wall consisting of drilled soldier piles and lagging panels. The soldier piles are steel structural shapes and the lagging panels are precast concrete planks or panels.

The design of this alternative does not include an aesthetic treatment of the exposed face, if it ever does get exposed. It does include a rock toe to protect from scour, but that may be optional as well depending on the characteristics of the existing hard pan (marine terrace).

ENVIRONMENTAL IMPACTS OF ALTERNATIVE COMPARED TO THOSE OF THE PROPOSED PROJECT

Construction of the soldier pile wall would be done from the beach. Large equipment (e.g., cranes, loaders, excavators) would be required to access the beach. Public access, including vehicles and pedestrians, would be prohibited along the portion of the beach north of the river mouth. The existing parking lot would be protected by a 300-foot long rock revetment. The rock revetment would require excavation, rock placement, and backfill. Construction of the rock revetment would be landward of the MHW line and, thus, would be out of jurisdictional limits. The parking lot would also be used as a contractor staging area for equipment and materials, and, therefore, public access to the parking lot and adjacent beach would be prohibited during revetment construction.

This SRPS alternative is very similar to the proposed SRPS project component in terms of the revetment alignment and in terms of the type of protection provided to Scenic Road. Therefore, the potential environmental impacts are very similar. Potential impacts to historical and archaeological resources and human remains would increase due to the increased amount of excavation. The SRPS Mid-Slope Toe Wall – Soldier Pile Alternative may be exposed, and if so, would result increased aesthetic impacts compared to the proposed SRPS project component. This alternative would have a moderate cost when compared to other SRPS project component alternatives.

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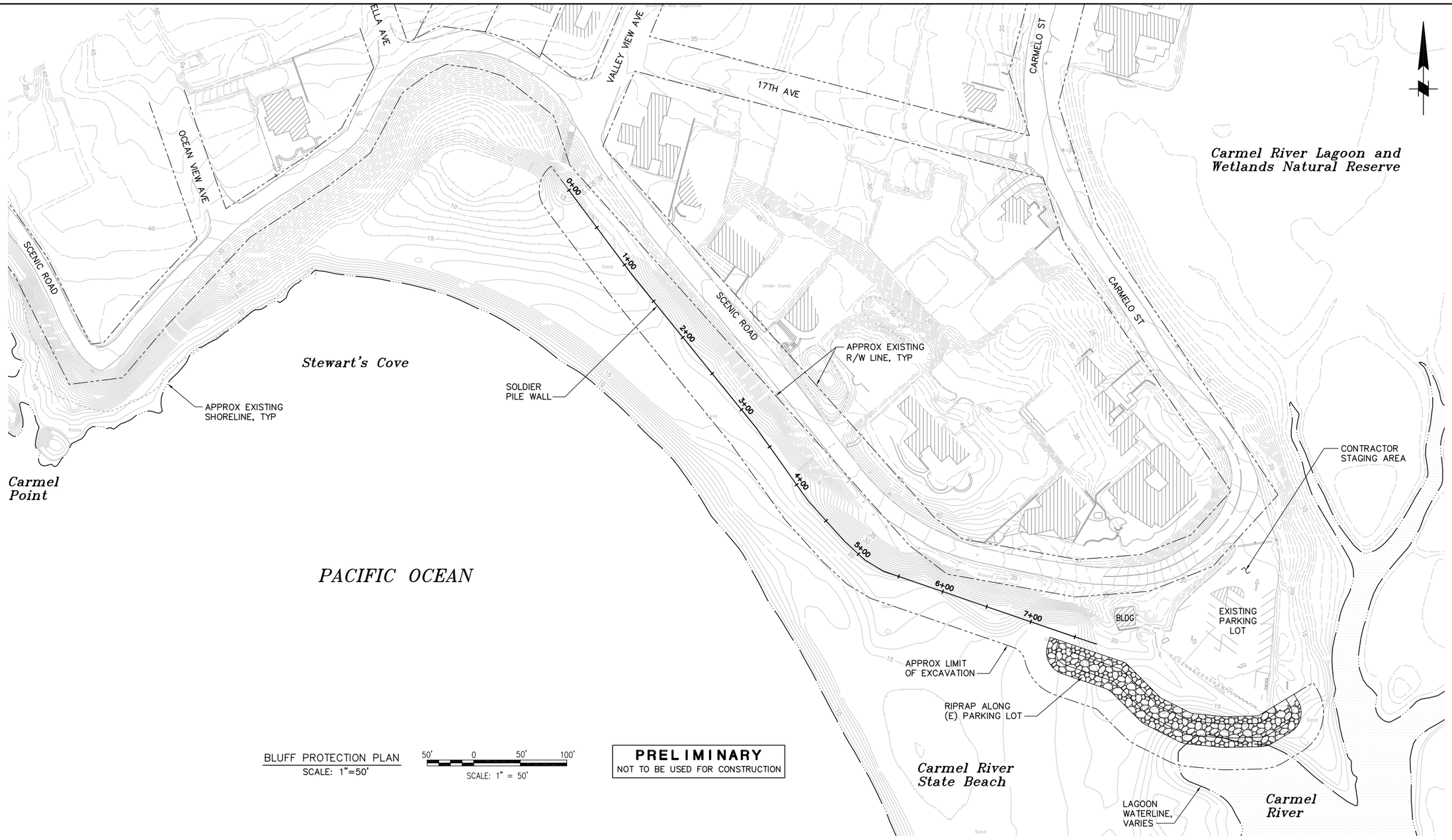

BLUFF PROTECTION PLAN
SCALE: 1"=50'

50' 0 50' 100'
SCALE: 1" = 50'

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Source: Moffatt & Nichol, June 29, 2016

SRPS Mid-Slope Toe Wall Alternative: Preliminary Site Plan

Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Date
10-4-2016

Scale

Figure
5-3

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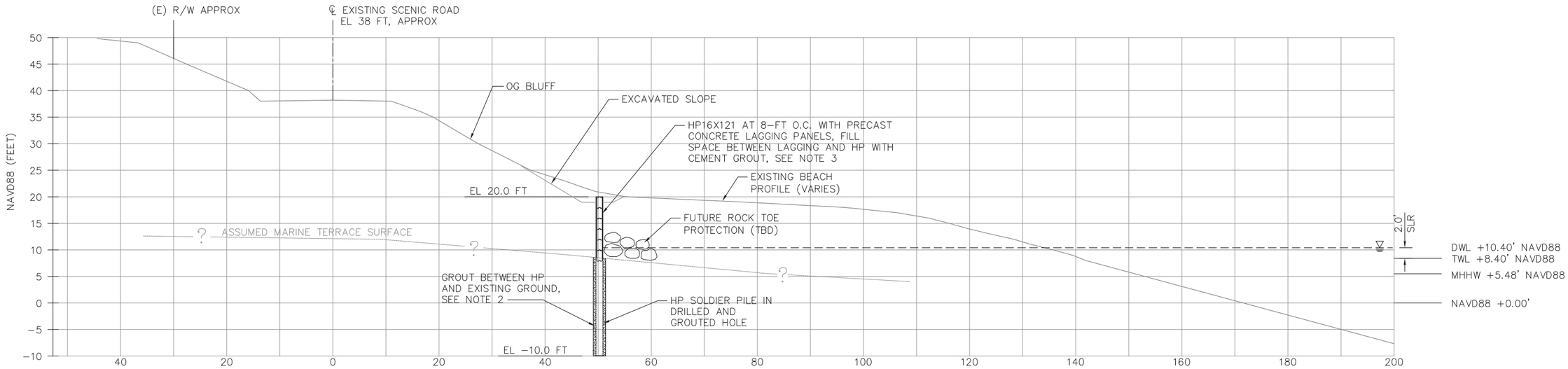
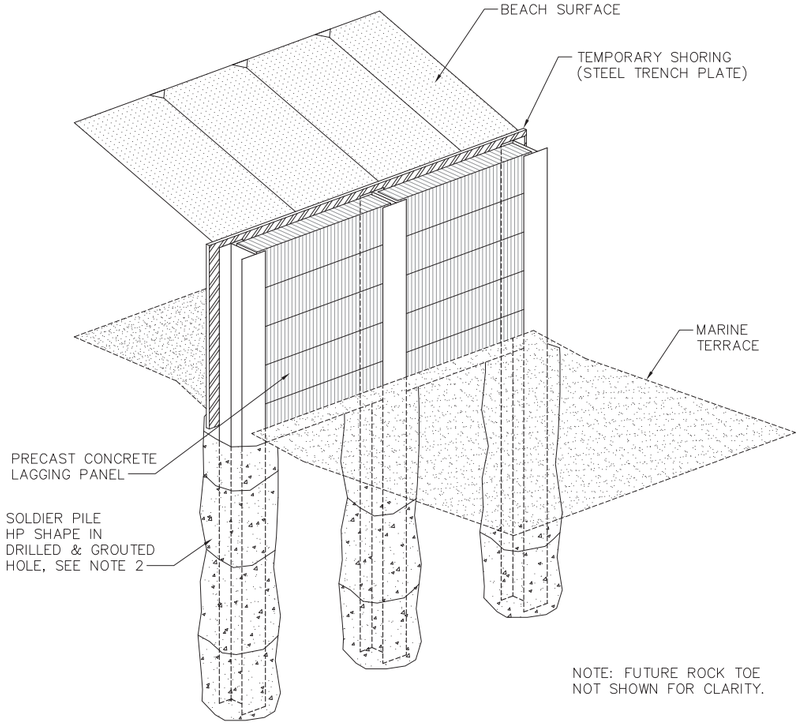


TYPICAL CROSS SECTION



TYPICAL ISOMETRIC VIEW
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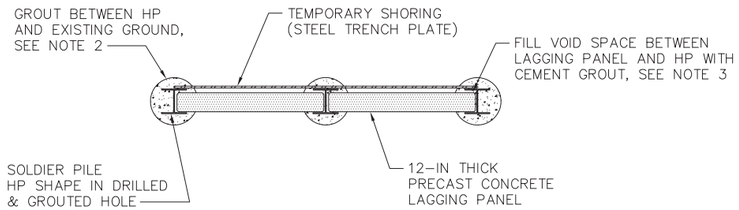

TYPICAL PLAN VIEW
NOT TO SCALE

NOTES:

1. STRUCTURAL ELEMENTS SHOWN ARE SCHEMATIC ONLY. ACTUAL SIZES AND DIMENSIONS WILL BE DETERMINED AS PART OF DESIGN PHASE.
2. GROUT IN DRILLED HOLE FOR H−PILE SHALL BE CONCRETE FILL, 2500 PSI MINIMUM COMPRESSIVE STRENGTH, NOMINAL AGGREGATE SIZE OF 3/8−INCH (PEA GRAVEL).
3. CEMENT GROUT FOR VOID SPACE BETWEEN LAGGING PANEL AND H−PILE SHALL BE A MIX OF CEMENT, SAND, AND WATER, 4000 PSI MINIMUM COMPRESSIVE STRENGTH, AND MAX SLUMP OF 3−IN. INJECT CEMENT GROUT AFTER LAGGING PANEL PLACEMENT IS COMPLETE.

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Source: Moffat & Nichol, Mid-Slope Toe Wall, August 2015

SRPS Mid-Slope Toe Wall - Soldier Pile Alternative: Preliminary Plan Views

Denise Duffy and Associates, Inc.
Planning and Environmental Consulting

Date	Figure
10-4-2016	5-4
Scale	

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ABILITY OF ALTERNATIVE TO MEET PROJECT OBJECTIVES

This alternative meets most project objectives when combined with a sandbar management or proposed EPB component alternative. Specifically, the alternative meets the project objective to protect public infrastructure (Scenic Road embankment, State Parks restroom, and parking facilities) from scour resulting from a northerly-aligned lagoon outflow channel that may result from a reduction in mechanical breaching. In addition, the alternative protects the Scenic Road embankment from increasing risk of erosion from wave and river action, and sea level rise due to global warming.

5.3.3 Alternative Projects to the Proposed Project

This section describes the alternative projects to the proposed project that were selected and evaluated in additional detail in this EIR.

5.3.3.1 SRPS, ISMP, and Delayed EPB

DESCRIPTION OF ALTERNATIVE

The SRPS, ISMP, and Delayed EPB Alternative would include implementation of the proposed SRPS project component in the near-term and implementation of the proposed ISMP project component while additional data is collected to determine the efficacy and design of the proposed EPB project component to be constructed in the future. Once the SRPS is constructed, the County would continue to implement the proposed ISMP project component as needed, but the river could flow north, as preferred by NOAA Fisheries. This alternative would allow the collection of data before and after the proposed SRPS project component is constructed.

This alternative would include an 8-year Management and Monitoring Plan (MMP) to collect more data to inform the efficacy and design of an EPB project component. An 8-year MMP was recommended by Balance Hydrologics, Inc. in order to obtain additional information on the effects to biological resources, water quality, geology, and hydrology under a change in management from south end of the beach to the north, and to better inform sandbar management. The MMP would be initiated when the SRPS is constructed to understand the change in river breach dynamics. The proposed ISMP project component would continue, as needed, on the south end of the beach until construction of the SRPS is completed. Once constructed, the SRPS would provide protection to infrastructure when and if the river breaches to the north and allow the County to manage on that end of the beach.

During this time period, the implementation of the ISMP would include surveying the sandbar and assess if the elevation would create a flood risk. If so, then the County would consult with the resource agencies on a plan where and to what level to lower the sandbar elevation. Based on recent years of management activity, sandbar management could consist of lowering the sand level to an elevation that would allow the barrier to saturate and breach on its own prior to flooding. Each year would require assessing the conditions and discussing the desired location and elevation for the breach. Some years may require little or no management depending on conditions. The County would also coordinate with the regulatory agencies to close the breach to maintain water levels, as well. This addresses possible taking issue by allowing smaller fish to move upstream when they feel the barrier weaken, which is similar to natural conditions. This alternative would also allow time to require impacted homes to abate flood risk, which may avoid the need for a future EPB.

Since mechanical breaching would only occur in emergency situations, the MMP would have to collect data that would allow reasonable inferences, addressing the duality of the flooding risks: riverine, which can evolve very slowly to rapidly; and wave overtopping, which likely evolve quickly. Potential monitoring actions may include:

- Beach topography: Surveying the geometry and dynamics of the barrier beach, specifically the minimum beach crest elevation and other key characteristics such as width at different elevations. At a minimum then, beach topography would be assessed once a year.
- Beach dynamics: As a supplement to detailed topographic information, time-lapse photography of the beach from Scenic Road has the potential to provide important information on the dynamics.
- Lagoon water level: The MMP should make certain that there is enough redundancy that data is not lost at very crucial times due to equipment failure or calibration issues. The sampling rate should be no less than every 15 minutes and potentially every 5 minutes with respect to wave overtopping. With enough operating probes of sufficient resolution, it would be possible to fairly accurately calculate the volume of inflow to the lagoon from overtopping events. That would then allow the volume to be correlated to wave power data already collected off-shore by NOAA. Making that connection would allow for hindcast modeling using historical wave power data that could be very useful in EPB design. Also, it could be used in forecasting mode to tell the County when to be ready with extra sand bags, or when anticipatory breaching might be justified.
- Lagoon salinity: Measure salinity at various depths in the water column so that the partitioning between fresh and salt water could be identified. This would give additional info on the volume associated with overtopping events and allow for the quantification of the freshwater lens with respect to breach timing and location.
- Rainfall Runoff: Install a couple of simple instrumented gauging weirs at good locations and a minimum of two tip-bucket rain gauges in the respective catchments. The runoff information collected would help better inform the location of the EPB alignment, if determined necessary.

This alternative would also allow the County time to explore and implement programs to fund and/or incentivize projects to elevate homes and public infrastructure (e.g., road and pipelines) out of the floodplain.

ENVIRONMENTAL IMPACTS OF ALTERNATIVE COMPARED TO THOSE OF THE PROPOSED PROJECT

Deferring construction of an EPB allows the ability to collect data using a northern management strategy in order to evaluate the necessity and efficacy of an EPB component under this condition. Implementing this alternative would result in avoiding or reducing the adverse impacts (e.g., aesthetics, noise, biological, etc.) associated with the proposed EPB project component in the near-term. However, this alternative assumes that the proposed EPB project component would be constructed in the future, and, therefore, the environmental impacts are anticipated to be similar to the proposed EPB project component. The future EPB project component would still result in significant and unavoidable aesthetic, hydrology, and noise impacts. Depending on the information gathered during the 8-year MMP, some environmental impacts could be reduced in the future. Similar to the current sandbar management regime, this alternative would also include sandbagging, which has implications for runoff and may require pump facilities. However, pump

facilities may be required, but could be located away from sensitive receptors to reduce potential noise impacts.

ABILITY OF ALTERNATIVE TO MEET PROJECT OBJECTIVES

This alternative would fully achieve the project objectives. This alternative would include a sandbar management plan similar to the ISMP which would allow the river to flow to the north, as preferred by NMFS, once the SRPS is constructed. This alternative would also allow the County time to obtain additional information on the effects to biological resources, water quality, geology, and hydrology under a change in management from south end of the beach to the north, and to better inform sandbar management. This information may address some of the impacts associated with the EPB, including landowner agreements. The future EPB may not be supported by State Parks.

5.3.3.2 Scenic Road Protective Structure and Sandbar Management Plan (No EPB)

DESCRIPTION OF ALTERNATIVE

The SRPS and Sandbar Management Plan (SMP) Project Components Alternative would include implementation of the proposed SRPS project component and sandbar management. The proposed EPB project component would not be implemented in this alternative.

The SMP would be similar to the ISMP; however, under the SMP, sandbar management would consist of lowering the sandbar by cutting a pilot channel, as agreed upon in consultation with NFMS, leaving a sand plug (i.e., a portion of the sandbar) in place. The Lagoon would continue to the lowered level or wave action would breach the Lagoon unassisted. Only in rare, emergency events would the County actually breach the sandbar. In these events, the County uses hand tools and only mechanically breaches if conditions are dangerous for crews. The breach would be managed to the south until the SRPS is constructed, and after the SRPS is in place, the sandbar could be lowered to manage to the north end.

This alternative would include preparing and implementing a Management and Monitoring Plan (MMP) to collect data to inform the procedures of the sandbar management plan and provide adaptive management criteria. Mechanical breaching would occur only in emergency situations, the MMP would have to collect data that would allow reasonable inferences, addressing the duality of the flooding risks: riverine, which can evolve very slowly to rapidly, and wave overtopping, which likely evolve quickly. Potential monitoring actions may include:

- Beach topography: Surveying the geometry and dynamics of the barrier beach, specifically the minimum beach crest elevation and other key characteristics such as width at different elevations. At a minimum then, beach topography would be assessed once a year.
- Beach dynamics: As a supplement to detailed topographic information, time-lapse photography of the beach from Scenic Road has the potential to provide important information on the dynamics.
- Lagoon water level: The MMP should make certain that there is enough redundancy that data is not lost at very crucial times due to equipment failure or calibration issues. The sampling rate should be no less than every 15 minutes and potentially every 5 minutes with respect to wave overtopping. With enough operating probes of sufficient resolution, it would be possible to fairly accurately calculate the volume of inflow to the lagoon from overtopping events. That would then allow the volume to be correlated to wave power data already collected off-shore by NOAA. Making that connection would allow for

hindcast modeling using historical wave power data that could be very useful in EPB design. Also, it could be used in forecasting mode to tell the County when to be ready with extra sand bags, or when anticipatory breaching might be justified.

- Lagoon salinity: Measure salinity at various depths in the water column so that the partitioning between fresh and salt water could be identified. This would give additional info on the volume associated with overtopping events and allow for the quantification of the freshwater lens with respect to breach timing and location.
- Rainfall Runoff: Install a couple of simple instrumented gauging weirs at good locations and a minimum of two tip-bucket rain gauges in the respective catchments. The runoff information collected would help better inform the location of the EPB alignment, if determined necessary.

This alternative would also allow the County time to explore and implement programs to fund and/or incentivize projects to elevate homes and public infrastructure (e.g., road and pipelines) out of the floodplain to reduce the need to implement the SMP.

ENVIRONMENTAL IMPACTS OF ALTERNATIVE COMPARED TO THOSE OF THE PROPOSED PROJECT

Eliminating the construction of the proposed EPB project component would result in avoiding or reducing all less-than-significant and potentially significant impacts associated with the proposed EPB. The elimination of the proposed EPB project component would result in reduced construction impacts associated with aesthetics, air quality, biological resources, cultural resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, noise, public services/utilities/recreation, and traffic. The elimination of the proposed EPB project component would also reduce operational impacts to aesthetics, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, public services/utilities, and traffic. Most importantly, eliminating the proposed EPB project component would avoid significant and unavoidable impacts to aesthetics, hydrology, and noise. This alternative would retain the beneficial impacts to biological resources and water quality (please refer to **Table 5-2**). This alternative would also include sandbagging, which has implications for runoff and may require pump facilities. Pump facilities may be required, but could be located away from sensitive receptors to reduce potential noise impacts. This alternative would include the proposed SRPS project component and, therefore, the identified potential environmental impacts would remain the same. This alternative would likely result in a reduction of impacts compared to the proposed ISMP project component since the SMP would implement the sand plug approach, which may reduce potential impacts from typical mechanical breaching activities, including impacts to S-CCC steelhead.

ABILITY OF ALTERNATIVE TO MEET PROJECT OBJECTIVES

This alternative would fully achieve the project objectives. This alternative would include a sandbar management plan similar to the proposed ISMP project component, but would include and incorporate recommendations from the data collected and would also implement the sand plug approach, reducing potential impacts from typical mechanical breaching activities. The SMP would manage the river and allow flows to the north, as preferred by NMFS, once the SRPS is constructed. However, this alternative does not include implementing the proposed EPB project component, and therefore is not consistent with the approved MOU approved by the County, USACOE, and NMFS as currently written. This alternative would also include annual sandbagging, which would require permission from adjacent private property owners. This alternative would resolve State Parks and CAWD's objections to the proposed EPB project component.

5.4 ENVIRONMENTALLY SUPERIOR ALTERNATIVE TO BE UPDATED PER COMMENTS

The CEQA Guidelines (Section 15126.6(e)(2)) require that an environmentally superior alternative be identified among the alternatives considered. According to CEQA Guidelines section 15126.6(e), if the environmentally superior alternative is the "no project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives. The environmentally superior alternative is generally defined as the alternative that would result in the fewest adverse environmental impacts on the project site and surrounding area.

Table 5-2 compares the impacts of the No Project Alternative, the Alternative Components, and the Alternative Projects to the impacts of the proposed project. Of the alternatives considered, the No Project Alternative would eliminate all the identified significant impacts, but would not attain any of the project objectives. All of the impacts of the proposed project can be reduced to less-than-significant levels with mitigation with the exception of operational aesthetic, operational hydrology, and construction and operation noise impacts. The EIR found that the proposed EPB project component would permanently degrade the visual character of the site and the surrounding area, which is a significant and unavoidable impact. In addition, the operation of the proposed EPB project component would result in significant and unavoidable impacts to flooding on- and off-site.

Construction of the project would not result in any significant and unavoidable impacts, except for construction noise impacts at the proposed EPB project component site. Given the proximity of existing residential land uses to the proposed pile driving locations, construction of the proposed EPB project component would likely still exceed the County's noise standard at the nearest residential property lines. Implementation of **Mitigation Measure NV-3** would reduce construction noise at the proposed EPB project site, but would not reduce the impact to a less-than-significant level. The predicted operational noise levels for both the pump station and the generator/control building at the proposed EPB project component site are projected to exceed applicable thresholds at the nearest residential property line. Implementation of **Mitigation Measure NV-2** would reduce operational noise impact, but would not reduce the impact to a less-than-significant level.

The SRPS and SMP (No EPB) Alternative would eliminate the significant and unavoidable operational aesthetic, operational hydrology, and construction and operational noise impacts associated with the proposed EPB project component, as well as reduce the majority of the identified impacts (**Table 5-2**). This alternative would also achieve all the project objectives. Accordingly, other than the No Project Alternative, the Environmentally Superior Alternative would be the SRPS and SMP (No EPB) Alternative.

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Table 5-2. Impact Summary for Proposed Project and Alternatives to the Proposed Project

Impact Statement	Proposed Project			No Project	EPB Component Alternatives			SRPS Component Alternatives			Project Alternatives	
	EPB	SRPS	ISMP		EPB with Drainage Bypass	EPB Near P/L	Variable Height EPB	SRPS Seawall Located at the Toe of Slope	SRPS Full Height Wall	SRPS Mid-Slope Wall	SRPS, ISMP, and Delayed EPB	SRPS and SMP (No EPB)
KEY to ACRONYMS: **SU = Significant Unavoidable Impact even with Mitigation; LSM = Significant Without Mitigation/Less-than-Significant with Mitigation; LS = Less-than-Significant Impact; BI = Beneficial Impact; NI = No Impact** *"+" Greater = Impact is greater compared to project impact* *"—" Reduced = Impact is reduced compared to project impact* *If neither "—" nor "+" is shown, the impact is the same or similar compared to the project impact*												
4.1 Aesthetics												
Impact AES-1: Construction Impacts on Scenic Vistas and Visual Quality of the Surrounding Areas.	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS-
Impact AES-2: Operation Impacts on Scenic Vistas and Visual Quality of the Surrounding Areas.	SU	LS	NI	NI	SU+	SU+	LSM	LSM	LSM	LSM	SU	LS
Impact AES-3: Impacts due to Permanent Light and Glare during Operations.	LS	NI	NI	NI	LS	LS	LS	NI	NI	NI	LS	NI

Impact Statement	Proposed Project			No Project	EPB Component Alternatives			SRPS Component Alternatives			Project Alternatives	
	EPB	SRPS	ISMP		EPB with Drainage Bypass	EPB Near P/L	Variable Height EPB	SRPS Seawall Located at the Toe of Slope	SRPS Full Height Wall	SRPS Mid-Slope Wall	SRPS, ISMP, and Delayed EPB	SRPS and SMP (No EPB)
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Criterion AES-b: Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within view from a state scenic highway.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Criterion AES-d: Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area during construction	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

Impact Statement	Proposed Project			No Project	EPB Component Alternatives			SRPS Component Alternatives			Project Alternatives	
	EPB	**SRPS**	**ISMP**		**EPB with Drainage Bypass**	**EPB Near P/L**	**Variable Height EPB**	**SRPS Seawall Located at the Toe of Slope**	**SRPS Full Height Wall**	**SRPS Mid-Slope Wall**	**SRPS, ISMP, and Delayed EPB**	**SRPS and SMP (No EPB)**
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4.2 Air Quality												
Impact AQ-1: Conflict with or Obstruct Implementation of Applicable Air Quality Plans.	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS-
Impact AQ-2: Violate any Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation.	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS-
Impact AQ-3: Result in a Cumulatively Considerable Net Increase of Any Criteria Pollutant for which the Project region is	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS-

Impact Statement	Proposed Project			No Project	EPB Component Alternatives			SRPS Component Alternatives			Project Alternatives	
	EPB	**SRPS**	**ISMP**		**EPB with Drainage Bypass**	**EPB Near P/L**	**Variable Height EPB**	**SRPS Seawall Located at the Toe of Slope**	**SRPS Full Height Wall**	**SRPS Mid-Slope Wall**	**SRPS, ISMP, and Delayed EPB**	**SRPS and SMP (No EPB)**
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Non-Attainment under an Applicable Federal or State Ambient Air Quality Standard.												
Impact AQ-4: Expose Sensitive Receptors to Substantial Pollutant Concentration.	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS-
Impact AQ-5: Create Objectionable Odors Affecting a Substantial Number of People.	LS	LS	LS	NI	LS	LS	LS	LS	LS	LS	LS	LS-
4.3 Biological Resources												
Impact BIO-1: Construction Impacts to	LSM	LSM	LSM	SU	LSM-	LSM-	LSM-	LSM	LSM	LSM	LSM	LSM-

Impact Statement	Proposed Project			No Project	EPB Component Alternatives			SRPS Component Alternatives			Project Alternatives	
	EPB	**SRPS**	**ISMP**		**EPB with Drainage Bypass**	**EPB Near P/L**	**Variable Height EPB**	**SRPS Seawall Located at the Toe of Slope**	**SRPS Full Height Wall**	**SRPS Mid-Slope Wall**	**SRPS, ISMP, and Delayed EPB**	**SRPS and SMP (No EPB)**
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Special-Status Species and Habitat.												
Impact BIO-2: Construction Impacts to Sensitive Habitats.	LSM	LSM	LS	SU	LSM-	LSM-	LSM-	LSM	LSM	LSM	LSM	LSM-
Impact BIO-3: Construction Impacts to Movement of Native Wildlife and Native Wildlife Nursery Sites.	LSM	LSM	LS	SU	LSM-	LSM-	LSM-	LSM	LSM	LSM	LSM	LSM-
Impact BIO-4: Operational Impacts to Special-Status Species and Habitat.	BI	BI	NI	NI	BI	BI	BI	BI	BI	BI	BI	BI

Impact Statement	Proposed Project			No Project	EPB Component Alternatives			SRPS Component Alternatives			Project Alternatives	
	EPB	SRPS	ISMP		EPB with Drainage Bypass	EPB Near P/L	Variable Height EPB	SRPS Seawall Located at the Toe of Slope	SRPS Full Height Wall	SRPS Mid-Slope Wall	SRPS, ISMP, and Delayed EPB	SRPS and SMP (No EPB)
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Impact BIO-5: Operational Impacts to Sensitive Habitats.	BI	BI	NI	NI	BI	BI	BI	BI	BI	BI	BI	BI
Impact BIO-6: Operational Impacts to Movement of Native Wildlife and to Native Wildlife Nursery Sites.	BI	BI	NI	NI	BI	BI	BI	BI	BI	BI	BI	BI
Criterion BIO-e: Conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state habitat conservation plan.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

Impact Statement	Proposed Project			No Project	EPB Component Alternatives			SRPS Component Alternatives			Project Alternatives	
	EPB	**SRPS**	**ISMP**		**EPB with Drainage Bypass**	**EPB Near P/L**	**Variable Height EPB**	**SRPS Seawall Located at the Toe of Slope**	**SRPS Full Height Wall**	**SRPS Mid-Slope Wall**	**SRPS, ISMP, and Delayed EPB**	**SRPS and SMP (No EPB)**
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4.4 Cultural Resources												
Impact CR-1: Construction Impacts on Historic Resources (Extant Buildings and Structures).	LSM	LS	LS	LS	LSM	LSM	LSM	LS	LS	LS	LSM	LS
Impact CR-2: Construction Impacts on Historical and/or Archaeological Resources.	LSM	LSM	LSM	LSM	LSM	LSM	LSM	LSM+	LSM+	LSM+	LSM	LSM-
Impact CR-3: Construction Impacts on Human Remains.	LSM	LSM	LSM	LSM	LSM	LSM	LSM	LSM+	LSM+	LSM+	LSM	LSM-
Impact CR-4: Construction Impacts on Tribal Cultural Resources.	LSM	LSM	LSM	LSM	LSM	LSM	LSM	LSM	LSM	LSM	LSM	LSM-

Impact Statement	Proposed Project			No Project	EPB Component Alternatives			SRPS Component Alternatives			Project Alternatives	
	EPB	**SRPS**	**ISMP**		**EPB with Drainage Bypass**	**EPB Near P/L**	**Variable Height EPB**	**SRPS Seawall Located at the Toe of Slope**	**SRPS Full Height Wall**	**SRPS Mid-Slope Wall**	**SRPS, ISMP, and Delayed EPB**	**SRPS and SMP (No EPB)**
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Criterion CR-a: Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Section 15064.5 during operation.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Criterion CR-b: Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Section 15064.5 during operation.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Criterion CR-c: Directly or indirectly destroy	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

Impact Statement	Proposed Project			No Project	EPB Component Alternatives			SRPS Component Alternatives			Project Alternatives	
	EPB	SRPS	ISMP		EPB with Drainage Bypass	EPB Near P/L	Variable Height EPB	SRPS Seawall Located at the Toe of Slope	SRPS Full Height Wall	SRPS Mid-Slope Wall	SRPS, ISMP, and Delayed EPB	SRPS and SMP (No EPB)
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a unique paleontological resource or site or unique geologic feature during operation.												
Criterion CR-d: Disturb any human remains, including those interred outside of formal cemeteries during operation.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Criterion CR-e: Cause a substantial adverse change to a tribal cultural resource, as defined in PRC Section 21074 during operation.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

Impact Statement	Proposed Project			No Project	EPB Component Alternatives			SRPS Component Alternatives			Project Alternatives	
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4.5 Geology, Soils, & Seismicity												
Impact GS-1: Construction-Related Erosion and Loss of Topsoil.	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS-
Impact GS-2: Construction-Related Soil Collapse and Soil Constraints.	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS-
Impact GS-3: Exposure to Fault Rupture.	LS	LS	NI	NI	LS	LS	LS	LS	LS	LS	LS	LS-
Impact GS-4: Exposure to Seismic Ground Shaking and Liquefaction.	LS	LS	NI	NI	LS	LS	LS	LS	LS	LS	LS	LS-
Impact GS-5: Exposure to Coastal Erosion and Sea Level	LS	LS	NI	NI	NI	NI	NI	LS	LS	LS	LS	LS-

Impact Statement	Proposed Project			No Project	EPB Component Alternatives			SRPS Component Alternatives			Project Alternatives	
	EPB	**SRPS**	**ISMP**		**EPB with Drainage Bypass**	**EPB Near P/L**	**Variable Height EPB**	**SRPS Seawall Located at the Toe of Slope**	**SRPS Full Height Wall**	**SRPS Mid-Slope Wall**	**SRPS, ISMP, and Delayed EPB**	**SRPS and SMP (No EPB)**
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Rise.												
Impact GS-6: Operation-Related Erosion and Loss of Topsoil/Sand.	LS	LS	NI	NI	LS	LS	LS	LS	LS	LS	LS	LS-
Criterion GS-d: Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Criterion GS-e: Have soils incapable of adequately supporting the use of septic tanks or alternative	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

Impact Statement	Proposed Project			No Project	EPB Component Alternatives			SRPS Component Alternatives			Project Alternatives	
	EPB	SRPS	ISMP		EPB with Drainage Bypass	EPB Near P/L	Variable Height EPB	SRPS Seawall Located at the Toe of Slope	SRPS Full Height Wall	SRPS Mid-Slope Wall	SRPS, ISMP, and Delayed EPB	SRPS and SMP (No EPB)
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waste water disposal systems where sewer are not available for the disposal of waste water.												
4.6 Greenhouse Gases												
Impact GHG-1: Construction Greenhouse Gas Emissions.	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS-
Impact GHG-2: Operational Greenhouse Gas Emissions.	LS	LS	NI	NI	LS	LS	LS	LS	LS	LS	LS	LS-
Criterion GHG-b: Conflict with any applicable plan, policy, or regulations of an agency adopted for the purpose of reducing the	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

Impact Statement	Proposed Project			No Project	EPB Component Alternatives			SRPS Component Alternatives			Project Alternatives	
	EPB	SRPS	ISMP		EPB with Drainage Bypass	EPB Near P/L	Variable Height EPB	SRPS Seawall Located at the Toe of Slope	SRPS Full Height Wall	SRPS Mid-Slope Wall	SRPS, ISMP, and Delayed EPB	SRPS and SMP (No EPB)
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emissions of GHGs.												
4.7 Hazards & Hazardous Materials												
Impact HH-1: Use and Disposal of Hazardous Materials During Construction.	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS-
Impact HH-2: Accidental Release of Hazardous Materials During Construction.	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS-
Impact HH-3: Use of Hazardous Materials During Construction Within 0.25-Mile of Schools.	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS-
Impact HH-4: Use and Disposal of Hazardous	LS	LS	NI	NI	LS	LS	LS	LS	LS	LS	LS	LS-

Impact Statement	Proposed Project			No Project	EPB Component Alternatives			SRPS Component Alternatives			Project Alternatives	
	EPB	SRPS	ISMP		EPB with Drainage Bypass	EPB Near P/L	Variable Height EPB	SRPS Seawall Located at the Toe of Slope	SRPS Full Height Wall	SRPS Mid-Slope Wall	SRPS, ISMP, and Delayed EPB	SRPS and SMP (No EPB)
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Materials and Accidental Release or Creation of Safety Hazards During Operation.												
Criterion HH-d: Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

Impact Statement	Proposed Project			No Project	EPB Component Alternatives			SRPS Component Alternatives			Project Alternatives	
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Criterion HH-e, f: For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, the project would result in a safety hazard for people residing or working in the project area, or, for a project within the vicinity of a private airstrip, the project would result in a safety	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

Impact Statement	Proposed Project			No Project	EPB Component Alternatives			SRPS Component Alternatives			Project Alternatives	
	EPB	SRPS	ISMP		EPB with Drainage Bypass	EPB Near P/L	Variable Height EPB	SRPS Seawall Located at the Toe of Slope	SRPS Full Height Wall	SRPS Mid-Slope Wall	SRPS, ISMP, and Delayed EPB	SRPS and SMP (No EPB)
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hazard for people residing or working in the project area.												
Criterion HH-g: Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Criterion HH-h: Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

Impact Statement	Proposed Project			No Project	EPB Component Alternatives			SRPS Component Alternatives			Project Alternatives	
	EPB	**SRPS**	**ISMP**		**EPB with Drainage Bypass**	**EPB Near P/L**	**Variable Height EPB**	**SRPS Seawall Located at the Toe of Slope**	**SRPS Full Height Wall**	**SRPS Mid-Slope Wall**	**SRPS, ISMP, and Delayed EPB**	**SRPS and SMP (No EPB)**
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adjacent to urbanized areas or where residences are intermixed with wildlands.												
4.8 Hydrology & Water Quality												
Impact HYD-1: Construction Impacts to Water Quality due to Discharges.	LS	LS	NI	LS	LS	LS	LS	LS	LS	LS	LS	LS-
Impact HYD-2: Construction Groundwater Depletion, Levels, and Recharge.	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS-
Impact HYD-3: Construction Impacts to Water Quality due to Earthmoving, Drainage	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS-

Impact Statement	Proposed Project			No Project	EPB Component Alternatives			SRPS Component Alternatives			Project Alternatives	
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Alteration, and Use of Hazardous Chemicals.												
Impact HYD-4: Operational Impacts to Water Quality due to Drainage Pattern and Discharges.	LSM	NI	NI	NI	LSM+	LSM+	LSM	NI	NI	NI	LSM	NI
Impact HYD- 5: Operational Impacts to Groundwater Depletion, Levels, and Recharge.	LS	LS	NI	NI	LS	LS	LS	LS	LS	LS	LS	LS-
Impact HYD-6: Operational Drainage Pattern Alterations resulting in erosion and/or flooding on- or off-site.	SU	LS	NI	NI	LSM+	LSM+	LSM-	LS	LS	LS	LSM	LS-

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Impact HYD-7: Operational Risks due to Location within a 100-Year Flood Hazard Area.	LSM	LS	NI	NI	LSM	LSM	LSM	LS	LS	LS	LSM	LS-
Impact HYD-8: Operational Risks due to Flooding due to Levee/Dam Failure, or Coastal Inundation.	LS	LS	NI	NI	LS	LS	LS	LS	LS	LS	LS	LS-
Impact HYD-9: Operational Risks due to Seiche, Tsunami, or Mudflow.	LS	LS	NI	NI	LS	LS	LS	LS	LS	LS	LS	LS-
Criterion HYD-g: Place housing within a 100-year flood hazard area.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

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4.9 Land Use & Planning												
Impact LU-1: Conflict with Plans, Policies, and Regulations during Construction and Operation.	LSM	LSM	LSM	NI	LSM	LSM	LSM	LSM	LSM	LSM	LSM	LSM-
Criterion LU-a: Physically divide an established community.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Criterion LU-c: Conflict with any applicable habitat conservation plan or natural community conservation plan.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
4.10 Noise												
Impact NV-1: Construction Ground-Borne	LSM	LS	LS	LS	LSM+	LSM+	LSM+	LSM	LSM	LSM	LSM	LS-

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Vibration and Noise.												
Impact NV-2: Construction Noise.	SU	LSM	LSM	LS	SU+	SU+	SU+	LSM+	LSM+	LSM+	SU	LSM-
Impact NV-3: Operational Noise.	SU	LS	NI	NI	SU-	SU+	SU+	LS	LS	LS	SU	LS
Criterion NV-b: Result in exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels during operation.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Criterion NV-e: For a project located within an airport land use plan or, where such a plan has	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

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	EPB	**SRPS**	**ISMP**		**EPB with Drainage Bypass**	**EPB Near P/L**	**Variable Height EPB**	**SRPS Seawall Located at the Toe of Slope**	**SRPS Full Height Wall**	**SRPS Mid-Slope Wall**	**SRPS, ISMP, and Delayed EPB**	**SRPS and SMP (No EPB)**
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not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?												
Criterion NV-f: For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

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4.11 Public Services, Recreation, & Utilities												
Impact PS-1: Construction Public Services Demand.	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS-
Impact PS-2: Construction Landfill Capacity.	LS	LS	NI	NI	LS	LS	LS	LS	LS	LS	LS	LS-
Impact PS-3: Construction Solid Waste Policies and Regulations.	LSM	LS	LS	NI	LSM	LSM	LSM	NI	NI	NI	LSM	LS-
Impact PS-4: Water Supply During Construction.	LS	LS	NI	NI	LS	LS	LS	LS	LS	LS	LS	LS-
Impact PS-5: Public Services Demand During Operation.	LS	LS	NI	NI	LS	LS	LS	LS	LS	LS	LS	LS-
Impact PS-6: Energy Use During Construction and	LS	LS	LS	NI	LS	LS	LS	NI	NI	NI	LS	LS-

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Operation.												
Impact PS-7: Construction or Expansion of Recreational Facilities.	NI	LS	LS	LS	LS	LS	LS	LSM	LSM	LSM	LS	LS
Criterion PS-b, c: Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs or be out of compliance with federal, state, and local statutes and regulations related to solid waste.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

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Criterion PS-d: Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Criterion PS-f: Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

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Criterion PS-g: Require or result in the construction of new water or wastewater facilities or require the expansion of existing facilities, the construction of which could cause significant environmental effects.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Criterion PS-h: Have insufficient water supplies available to serve the project from existing entitlements and resources, or	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

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require new or expanded entitlements.												
Criterion PS-i: Result in a determination by the wastewater treatment provider, which serves or may serve the project, that it has inadequate capacity to serve the project's project demand in addition to the provider's existing commitments.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
4.12 Traffic & Circulation												
Impact TRA-1: Construction Traffic.	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS	LS-

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Impact TRA-2: Construction- Related Traffic Delays, Safety Hazards, and Access Limitations.	LSM	LSM	LS	LS	LSM	LSM	LSM	LSM	LSM	LSM	LSM	LSM-
Impact TRA-3: Construction-Related Roadway Deterioration.	LSM	LSM	LS	NI	LSM	LSM	LSM	LSM	LSM	LSM	LSM	LSM-
Impact TRA-4: Construction Parking Interference.	LSM	LSM	LS	NI	LSM	LSM	LSM	LSM	LSM	LSM	LSM	LSM-
Impact TRA-5: Operational Traffic.	LS	LS	NI	LS	LS	LS	LS	LS	LS	LS	LS	LS-
Criterion TRA-b: Conflicts with Congestion Management Programs.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Criterion TRA-c: Air Traffic Patterns.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

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Criterion TRA-d: Increased Hazards Due to Design or Incompatible Uses.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Criterion TRA-f: Conflict with Adopted Policies Regarding Transit, Bicycle, or Pedestrian Facilities.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

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