

APPENDIX L

ALTERNATIVES SCREENING

Alternative Screening Process and Discussion of Alternatives Eliminated from Full Evaluation

Alternatives Development and Screening Process

An important aspect in considering the effects of a project on public trust resources is the identification and assessment of reasonable alternatives that may avoid or lessen adverse effects on such resources. A range of reasonable alternatives to the proposed Broad Beach Restoration Project (Project) were screened for whether they: (1) could feasibly attain most of the basic Project objectives; and (2) would avoid or substantially lessen significant impacts of the Project. This screening analysis does not focus on relative economic factors of the alternatives (as long as they are feasible).

This screening analysis does not include a discussion of the previously proposed Broad Beach Restoration Project, as described in the 2012 Draft APTR, which utilized offshore sand sources. Use of offshore sand was found to be infeasible due to a number of issues. Consequently, alternatives related to offshore sand sources have been removed from this analysis.

Project Objectives

The Project includes the following basic objectives:

- 1) Protect existing homes, structures and other improvements including septic systems along Broad Beach from coastal erosion;
- 2) Create and maintain a wide sandy beach backed by a restored dune system similar to that which historically occurred along this reach of coastline;
- 3) Provide for enhanced public access along Broad Beach while maintaining homeowner beach access and privacy through establishment of consistent lateral access along the beach;
- 4) Restore and enhance native dune habitats along Broad Beach; and
- 5) Add sandy intertidal habitat to support native fauna (e.g., grunion, shorebirds).

Alternatives Screening Methodology

Alternatives to the Project were selected based on information provided by the Trancas Property Owners Association (TPOA) and Broad Beach Geologic Hazards Abatement District (BBGHAD), as well as input received from the California State Lands Commission (CSLC), California Coastal Commission (CCC), city of Malibu, the public, and other parties and agencies. The alternatives screening process consisted of four steps:

Step 1: Define the alternatives to allow comparative evaluation.

Step 2: Evaluate each alternative in the context of the following criteria:

- The extent to which the alternative would accomplish most of the basic objectives of the Project;
- The extent to which the alternative would avoid or lessen one or more of the identified significant environmental effects of the Project;
- The extent to which the alternative would be consistent with the public trust doctrine, including protection of public access, enjoyment, and use of public trust resources; and
- The potential feasibility of the alternative, taking into account site suitability, economic viability, availability of infrastructure, consistency with the city of Malibu Local Coastal Plan and State Coastal Act, and consistency with other applicable plans and regulatory limitations.

Step 3: Determine suitability of the proposed alternatives for full analysis in the Analysis of Impacts to Public Trust Resources and Values (APTR). If an alternative is unsuitable, eliminate it from further consideration, with appropriate justification.

Step 4: Consider initial agency and public input regarding the feasibility and issues of concern with potential alternatives and further refine the alternatives analysis to reflect this information.

Feasible alternatives that did not clearly offer the potential to reduce substantial impacts and infeasible alternatives were removed from further analysis. In the final phase of the screening analysis, environmental advantages and disadvantages of the remaining alternatives were carefully evaluated with respect to their potential for overall environmental advantage, technical feasibility, and consistency with Project and public objectives.

If selection and implementation of an alternative clearly would not provide any advantages when compared to the Project, it was eliminated from further consideration. At the screening stage, it is not possible to quantitatively evaluate potential impacts of the alternatives or the Project with certainty; however, it is possible to identify elements of the Project that are likely to be the sources of impact. A preliminary assessment of potential major issues of concern for adverse effects on public trust resources resulting from implementation of the Project identified the following impacts:

- Potential short-term construction impacts to terrestrial biological resources during nourishment and renourishment (Section 3.3, *Terrestrial Biological Resources*);

- Inadequate protection from coastal processes over the long term, extending past the 20-year life of the Project, due to substandard construction of the emergency revetment (Section 3.4, *Coastal Processes and Sea Level Rise*, and Section 3.10, *Geological Hazards and Mineral Resources*);
- Potential land use impacts and policy conflicts associated with formal approval of revetment and impacts to public access (Section 3.6, *Land Use, Recreation, and Public Access*);
- Potential short-term increase in air pollutant emissions from transportation of nourishment sand and operation of construction equipment during two major nourishment events as well as semiannual backpassing of sand (Section 3.8, *Air Quality and Greenhouse Gasses*);
- Potential exposure of Onsite Wastewater Treatment Systems over the long term, past the 20-year life of the Project, due to substandard construction of the emergency revetment (Section 2.13, *Utilities*)

For the screening analysis, technical and regulatory feasibility of potential alternatives were assessed at the general level; specific analyses were not conducted. Any alternative with infeasible characteristics was disregarded. The assessment of feasibility was conducted by utilizing “reverse reason” to identify anything about the alternative that would be infeasible on technical or regulatory grounds. For the Project, characteristics used to eliminate alternatives from further consideration included:

- Inability to meet the most of the basic Project objectives;
- Limited effectiveness in reducing Project effects on public trust resources;
- Engineering feasibility and safety;
- Permitting feasibility;
- Potential adverse effects on public trust resources (e.g., marine and terrestrial resources);
- Potential adverse effects on public use and enjoyment of public trust resources;
- Potential for inconsistency with adopted State Coastal Act policies; and
- Reasonability when compared to other alternatives under consideration.

Step 5: For potential alternatives that passed the screening process, those that had multiple approaches for implementation underwent an additional layer of screening. Of the multiple implementation approaches for a particular alternative, the approach that was most consistent with the Project goals was selected as the basis for the impact discussion regarding the implementation of the alternative.

Summary of Alternatives Screening Results

Potential alternatives were evaluated using the screening criteria described above. Table 1 below summarizes the evaluation of potential alternatives addressed in the APTR. Those listed in the first column have been eliminated from further consideration, and those in the second column are evaluated in detail in Section 4.0, *Alternatives* of this APTR. Alternatives that were eliminated from full evaluation are described below, including the reason for excluding them from full evaluation.

Table 1: Summary of Alternatives Screening Results

Alternatives Eliminated from Full Evaluation	Alternatives Evaluated in this APTR
<ul style="list-style-type: none"> • Retention of Temporary Emergency Revetment in its Current Location; No Beach Nourishment • Landward Relocation of All or a Portion of the Revetment; No Beach Nourishment • Elimination of Septic Systems and Connection to a Common Treatment Facility; No Beach Nourishment • Maximum Pull-back of Seawall with Connection to Public or Shared Wastewater Treatment System with Beach Nourishment and Dune Restoration • Managed Retreat; No Beach Nourishment • Placement of Sand into an Up-Coast Offshore Cell and Reliance on Natural Littoral Patterns for Sand Distribution to Broad Beach • Construction of Groins for Sand Retention, with Beach Nourishment and Dune Restoration • Installation of Offshore Sand Retention Reefs with Beach Nourishment, Dune Restoration, and Revetment Removal • Alternative Sand Supply Sources 	<ul style="list-style-type: none"> • Relocation of Improved Revetment Landward of January 2010 Mean High Tide Line (MHTL) with Beach Nourishment and Dune Restoration • Relocation of Improved Revetment Landward of Easements with Beach Nourishment and Dune Restoration • Maximum Pull-back of Seawall with Beach Nourishment and Dune Restoration • Reduced Beach Nourishment Volume and Dune Restoration with Revetment in Current Location • Beach Nourishment and Dune Restoration with No Shore Protection Structure • Relocation of Improved Revetment along Upgraded Leach Fields with Beach Nourishment and Dune Restoration • Removal of Temporary Existing Revetment on the Eastern End of Broad Beach with Beach Nourishment and Dune Restoration • No Beach Nourishment at West Broad Beach with Revetment at Current Location • Reduced and Phased Beach Nourishment at West Broad Beach with Existing Revetment

Alternatives Eliminated from Full Evaluation

As discussed above, the selection of alternatives included a screening process to determine which alternatives could minimize or avoid adverse effects on public trust resources and feasibly meet most basic project objectives. The following alternatives were considered but eliminated from full evaluation by the CSLC due to infeasibility, inconsistency CSLC requirements for management of public trust resources or for inability to meet primary Project objectives.

Retention of Temporary Emergency Revetment in its Current Location – No Beach Nourishment

This alternative would prolong the condition in which the temporary revetment is in place but no beach nourishment or restoration has occurred. This alternative would not meet primary Project objectives to restore a wide sandy beach backed by a restored dune system and enhance public and private access along Broad Beach. In addition, retention of the revetment in its current location without beach nourishment would have no environmental benefits over the Project and may create substantially more severe impacts to public recreation and coastal access, aesthetics, and beach erosion due to the lack of beach nourishment and impacts of an uncovered revetment on lateral access, recreation and aesthetics. Further, the emergency revetment was not constructed to accepted engineering standards and utilized smaller (0.5 to 2 ton) rocks with a potentially inadequate foundation design and thus may not meet another primary Project objective to provide secure long-term protection to homes and septic systems. For these reasons, this alternative is eliminated from full analysis.

Landward Relocation of All or a Portion of the Revetment – No Beach Nourishment

This alternative would involve moving either all or the eastern segments of the revetment inland as suggested by the CCC and city of Malibu. This alternative would meet a key Project objective of protecting existing homes and septic systems and would also somewhat reduce associated potential impacts to lateral access due to the relocation of the revetment off of public lands and access and recreational easements (AREs) for coastal lateral access easements. However, this alternative is eliminated from further consideration as it would not meet the basic Project objectives to restore a wide sandy beach backed by a restored dune system and enhanced public and private access along Broad Beach. Several alternatives to relocate or remove the revetment in combination with beach nourishment and dune restoration are fully analyzed in Section 4.0, *Alternatives*.

Elimination of Septic Systems and Connection to a Common Treatment Facility –No Beach Nourishment

This alternative is intended to eliminate the series of independent septic systems that are seaward of most homes along Broad Beach, and connect them to a new common treatment facility that would be constructed in the vicinity; however, installation of a common treatment facility was found to be infeasible. As determined by Ensitu in their 2013 report and confirmed by the city of Malibu, there is not sufficient capacity in existing wastewater treatment systems to accommodate new use and there are no parcel(s) available for the construction of a package treatment plant along Broad Beach (Yi 2012; City of Malibu 2014).

The most recent retrofit of the wastewater treatment plant was completed in 2008 with permits, project designs, and approvals to accommodate and service only the existing parcels within the existing service area and would not have the capacity to accommodate the additional treatment required if additional homes connected to the treatment plant (Bouse 2012). In order for additional homes to connect to the wastewater treatment plant and receive public wastewater services, property owners within the Project area would need authorization, including accordance from the 177 homeowners within the Malibu West subdivision; approval by the Los Angeles County Board of Supervisors and the Local Agency Formation Commission; and a Regional Water Quality Control Board review (Yi 2012). Approvals from all these entities are highly politicized and unlikely to be granted due current treatment plant capacity, and existing tensions stemming from historical conflicts surround the initial wastewater treatment plant construction, utilization and service district. Even if these approvals were granted, actual connection to the treatment plant would require a change in the service district boundaries, plant expansion or replacement, and upsizing the pump stations and sewage force main. These changes and upgrades would require extensive time to process and costs of several million dollars (Bouse 2012). Given that the current location of the treatment plant is on a relatively small parcel with no room to expand into neighboring parcels, accommodation of additional sewage treatment would likely require a completely new wastewater treatment plant. This would require acquisition of nearby land, possible zoning code changes, a strategy for disposing of the increased amount of treated effluent, and, likely, an environmental review prior to construction of a new plant. All these requirements to build a new treatment plant would take years to complete. The amount of time and money required to obtain the needed approvals, complete the necessary administrative processes, complete any needed environmental reviews, find well-suited land, complete the land acquisition, and construct a new treatment plant is prohibitive to meeting the objectives of the Project.

In addition to limitations to use of a shared wastewater treatment system, this alternative does not include beach nourishment and dune restoration, and therefore would not meet a basic Project objectives to restore a wide sandy beach backed by a restored dune system and enhanced public and private access along Broad Beach or provide improved protection to existing homes. Given that this alternative is both infeasible and would not meet basic Project objectives, it was eliminated from full analysis.

Maximum Pull-back of Seawall with Connection to Public or Shared Wastewater Treatment System with Beach Nourishment and Dune Restoration

This alternative includes removal of the emergency revetment, construction of a seawall as far landward as possible, nourishment of the beach and dune system, and removal of septic systems and leach fields to be replaced with connections into a shared wastewater treatment system. As with the previous alternative, this alternative was

found to be infeasible due to the lack of capacity in existing wastewater treatment systems and no parcel(s) available for the construction of a package treatment plant (Yi 2012; City of Malibu 2014). Although this project would meet project objectives of restoring a wide sandy beach backed by a restored dune system, thereby enhancing public and private access along Broad Beach and providing improved protection to existing homes, it was removed from consideration due to the lack of feasibility. A similar alternative—Alternative 3: Maximum Pull-back of Seawall with Beach Nourishment and Dune Restoration—was fully evaluated in Section 4.0, *Alternatives*. The maximum pull-back of the seawall was reduced under the fully evaluated alternative since existing septic systems and leach fields were left in place, requiring that the seawall be located farther seaward than it would be otherwise.

Managed Retreat – No Beach Nourishment

This alternative would entail removal of the temporary emergency revetment and gradual landward relocation of structures and other improvements if and when threatened by coastal erosion. This alternative would not meet the basic Project objectives to restore a wide sandy beach backed by a restored dune system and enhanced public and private access along Broad Beach. Even with managed retreat of ancillary improvements and structures, Broad Beach would remain a narrow ribbon of sand with reduced opportunities for lateral public access and recreation, and the dune system would be subject to further erosion. In addition, this alternative may not meet a key Project objective of protecting existing homes and septic systems over the long term. Many of the homes along Broad Beach have limited room for retreat as they are backed by Broad Beach Road, steep bluffs, and eventually the Pacific Coast Highway. Therefore, this alternative is eliminated from full analysis. However, limited managed retreat of septic systems, leach fields, and outlying shoreward improvements (e.g., patios) is included as part of the alternatives evaluated in Section 4.0, *Alternatives*, that required landward movement of shoreline protection structures (e.g., relocation of emergency revetment or construction of a seawall farther landward).

Placement of Sand into an Upcoast Offshore Cell and Reliance on Natural Littoral Patterns for Sand Distribution to Broad Beach

This alternative would mimic natural longshore and cross-shore sand delivery processes as closely as possible by feeding the sand into an upcoast beach cell and letting it be moved by the existing longshore current to deposit it downcoast on Broad Beach. This alternative would also entail removal of the temporary emergency revetment to permit full restoration of natural processes. This alternative would reduce potential impacts to lateral access due to the relocation of the revetment off of public lands and coastal access easements.

While this alternative could incrementally increase the width of Broad Beach as sand is transported downcoast onto Broad Beach over time, it is unclear if natural upcoast

replenishment would create a wide sandy beach and restored dune system, thereby enhancing public and private access along Broad Beach. Sand-starved beaches upcoast may adsorb significant amounts of sand nourishment and Lechuza Point may interrupt or delay sand transport onto Broad Beach, diminishing the effectiveness or delaying the arrival of upcoast replenishment. Thus, this alternative may also only partially achieve a key Project objective to protect existing homes and septic systems. Removal of the temporary emergency revetment would somewhat reduce associated potential impacts to lateral access; however, it would also increase exposure of homes and septic systems to coastal erosion and damage. While such a regional approach to beach nourishment may have merit as part of a regional coastal management plan, it would not meet the basic Project objectives to protect homes and septic systems, restore a wide sandy beach backed by a restored dune system, and enhance public and private access along Broad Beach. Further, given uncertainties about the effectiveness of this approach in restoring Broad Beach, insufficient benefits may accrue to homeowners to permit the BBGHAD to fund such a regional project. Therefore, this alternative is eliminated from full analysis.

Construction of Groins for Sand Retention, With Beach Nourishment and Dune Restoration

This alternative would include installation of a groin field in the surf zone along Broad Beach, with beach nourishment, dune restoration, and removal of the temporary emergency revetment. A groin field would be constructed with approximately 4 or 5 individual groins spaced every 1,000 to 1,500 feet along Broad Beach, in a position roughly perpendicular to the shoreline. Installation of such a groin field would aid in maintaining a wider Broad Beach by trapping littoral drift and minimizing loss of the restored beach to littoral processes. Rock from removal of the temporary emergency revetment could be utilized for groin field construction, minimizing impacts from removal of the revetment and the need to import additional rock. Impacts to downcoast sediment transport from this groin field would be moderated by pre-filling the compartments between groins with sand during initial beach nourishment and ongoing sand backpassing as included in the Project. Such an alternative has the potential to substantially extend the life of a renourished Broad Beach and may reduce the frequency of future needed renourishment events.

Although this alternative could allow for maintenance of a broad sandy beach and protection of homes and septic systems, it would interfere with public lateral access. Exposed rock groins would tend to interrupt access along the low tide beach and berm face causing beach walkers, joggers and other users to have to detour inland around elevated portions of the groins. This effect would become more pronounced over time as sand is gradually lost down-coast, particularly after cessation of nourishment activities, eventually even obstructing such access over the long term. In addition, this alternative has the potential to materially impact down-coast beaches by interrupting or

reducing longshore transport of sand, particularly during times of erosion on Broad Beach when the groins would retain a greater proportion of sand from longshore transport. This effect would become more pronounced after cessation of nourishment by the BBGHAD when the groins would interrupt an ever increasing proportion of the limited amount of sand moving downcoast across Broad Beach. Further, preliminary interactions with the regulatory agencies by the applicant's team indicate that a groin field may be found inconsistent with adopted plans and policies and would thus not be a viable option moving forward. Therefore, this alternative has been eliminated from full analysis in the APTR.

Installation of Offshore Sand Retention Reefs with Beach Nourishment, Dune Restoration, and Revetment Removal

This alternative would entail construction of a series of offshore reefs combined with beach nourishment and dune restoration. The temporary emergency revetment would also be removed and its rocks used in reef construction, reducing but not eliminating the need for import of substantial amounts of rock. Although precise engineering plans have not been prepared, installation of five offshore reefs measuring 500 feet wide each in 10- to 15-foot-deep water along with beach nourishment and dune restoration would require major construction activities. This would include the import of hundreds of thousands of cubic yards of additional rock, likely via barge and the operation of heavy cranes and other equipment both on- and offshore to relocate and set the rock in place to create the five reefs.

Applicant-prepared studies indicate that these reefs would reduce wave energy reaching the shoreline, thus decreasing longshore transport and sand loss from an estimated 35,000 to 45,000 cubic yards per year to 10,000 to 20,000 cubic yards per year. This alternative may potentially meet key Project objectives of restoring a wide sandy beach backed by a restored dune system, enhancing public and private access along Broad Beach, and may substantially reduce the frequency of additional nourishment. Applicant-prepared studies indicate required nourishment would decrease to cycles of 25 years or more when compared to the expected Project nourishment requirements of 10 years or less. This alternative would also provide increased protection of homes and septic systems as it would reduce wave energy reaching the beach and increase sand retention, thus largely meeting another key Project objective.

This alternative would alter Project impacts in a number of ways. Removal of the revetment would potentially create beneficial impacts to public recreation and coastal access by eliminating the potential periodic exposure of the revetment and associated potential impacts to lateral access and aesthetics. Installation of offshore reefs has the potential to create beneficial long-term impacts to marine biological resources through creation of new hard substrate habitats, and to recreation through addition of potential new offshore surf breaks. Ongoing impacts of beach nourishment and backpassing

(movement of beach sand from a short distance downcoast using bulldozers and other heavy equipment) could potentially be reduced under this alternative.

However, initial construction impacts for this alternative on air and water quality and marine resources would be substantially more severe than the Project due to extended operation of marine vessels and heavy equipment offshore. In addition, such projects must still be considered experimental, with insufficient evidence available to determine anticipated coastal protection benefits or potentially increased downcoast erosion, or if such construction would adversely impact offshore recreation (e.g., surfing) or present marine navigation hazards. The undertaking of a major experimental coastal management project by a quasi-government agency such as the BBGHAD is also of concern. Finally, these uncertainties combined with the potential for such a project to be found inconsistent with adopted local and State coastal plans and policies and initial communication between the applicant's team and regulatory agencies regarding these issues, raise substantial concerns over this concept's feasibility. Therefore, this alternative has been eliminated from full analysis in the APTR.

Alternative Sand Supply Sources

A number of different sand sources—including onshore and offshore sources—have been considered for use as beach nourishment and dune restoration material since the initial development of the Project. The 2012 Draft APTR analyzed the use of sand from three offshore sources, including offshore of Dockweiler Beach, outside of Ventura Harbor, and offshore of Broad Beach. The alternatives in the 2012 Draft APTR also considered use of sand from alternate sources, including offshore of Manhattan Beach as well as an onshore stockpile of sand at Calleguas Creek. There were several other sources that were considered but not fully evaluated due to lack of compatibility of the sand source (i.e., average grain size). The sources that were analyzed in the 2012 Draft APTR have been found to be infeasible for numerous reasons, including lack of compatibility in grain size and chemical composition, inability to obtain access to the material, and concerns over the impact to other communities that may want to use local sand supplies to nourish their own beaches. As a result, the local onshore quarries that were evaluated in this document were determined to be the most feasible sand source, and all other potential sources were either previously analyzed in the 2012 Draft APTR or have been eliminated from full analysis.

Approaches to Evaluated Alternatives

Several alternatives that were fully evaluated in Section 4.0, *Alternatives*, included relocating or siting shoreline protective structures landward of the existing emergency revetment. Some alternatives include moving structures off of public land by relocating them landward of the MHTL while others include moving structures farther landward in order to locate them landward of both public land and AREs on private land as much as possible. All of these alternatives include protection of private property through the use

of a hard structure and would improve public access to recreational use by making more of the beach accessible by moving some or all of the revetment off of public land. Each of these alternatives could be evaluated with or without beach nourishment and dune restoration; however, these project would fulfill more of the Project objectives, including create and maintain a wide sandy beach backed by a restored dune system and providing additional protection to existing homes, structures and other improvements. Therefore, the evaluation for each of these alternatives in Section 4.0, *Alternatives*, includes beach nourishment and dune restoration.