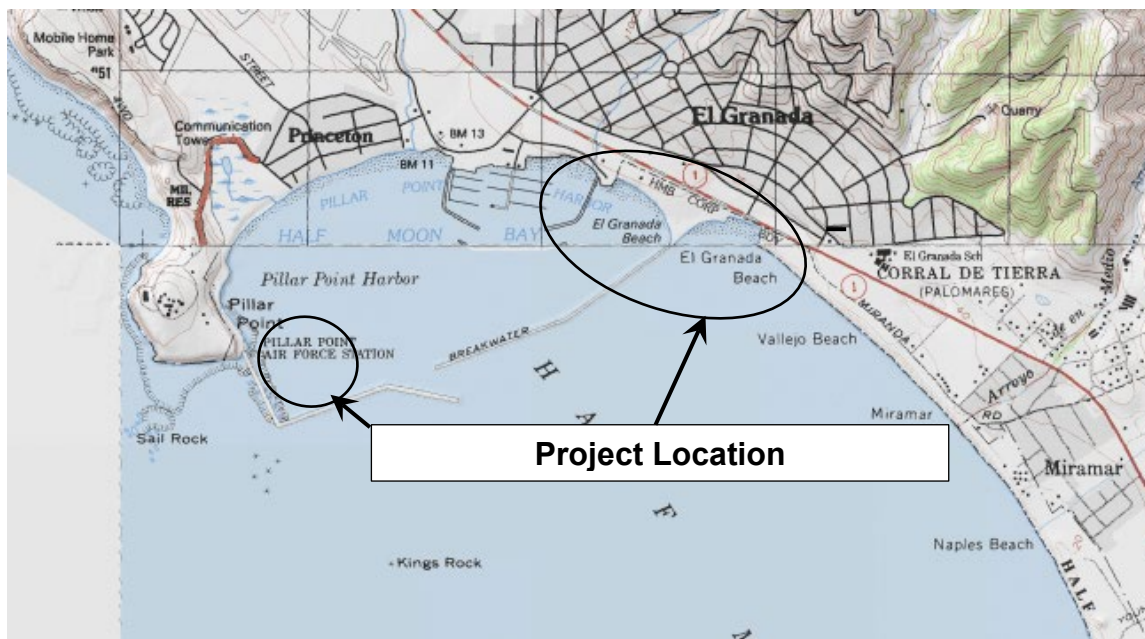


## Surfers Beach Pilot Restoration Project Description:

Surfers Beach is a popular beach and recreation area located on the San Mateo County coast, just south of Pillar Point Harbor (PPH), immediately north of the City of Half Moon Bay, and west of the unincorporated community of El Granada (Figure 1). In addition to general beach recreation, Surfers Beach is a very popular surf spot for surfers of all levels of experience, and in particular beginners because of its sheltered location. The proposed Surfers Beach Pilot Restoration Project (Project) would involve dredging of up to 100,000 cubic yards (CY) of clean sand accumulated along the inside of Pillar Point Harbor's East Breakwater and a one-time placement of that sand to form an elevated berm along an approximately 1,000-foot-long section of shoreline at Surfers Beach in Half Moon Bay. In addition to the opportunistic placement of sand on Surfers Beach and conducting maintenance dredging inside the harbor to ensure safe navigation and anchorage, the overall Project also involves implementing a plan to mitigate for impacts to eelgrass beds in the dredging areas by establishing new eelgrass habitat and transplants within PPH's west basin. Permitting level (30%) engineering design plans and preliminary design reports have been provided along with this permit application, which include the precise details of the dredging and sand placement activities and the eelgrass restoration elements.



**Figure 1: Location Map**

Since construction of the PPH breakwater in 1961 by the U.S. Army Corps of Engineers (USACE), Surfers Beach has experienced a significant amount of beach and bluff erosion, leading to a recent permanent loss of sandy intertidal beach area and bluff-top coastal scrub and grassland, as well as an increased exposure of Highway 1 to erosion and flood hazards during coastal storms (Figure 2). While the shore at Surfers Beach eroded, significant accretion and deposition of sediment inside PPH has resulted in impacts on navigation and use of the boat launch ramp (Figure 3). As subtidal areas in PPH filled in, eelgrass beds established and spread to areas where the depths were conducive to their growth. Growth and expansion of the eelgrass

beds has added another constraint to harbor maintenance dredging, as eelgrass habitat is protected by federal and state law, and impacts would require mitigation. If no dredging occurs in the future, then ultimately the harbor would not be available for navigation or anchoring.



**Figure 2: Photo of Surfers Beach on January 13, 2021 at low tide, showing Highway 1 at left with rock revetment, eroded beach and exposed rocks**



**Figure 3: Photograph showing significant accumulation of sand near boat launch ramp in foreground and along the East Breakwater in background (1/13/21)**

The erosion at Surfers Beach and the impacts of sand shoaling (i.e., accretion) inside the harbor generated significant interest and concern of local community members over the past several decades. A recent Army Corps of Engineers study concluded that the bluffs along Surfers Beach eroded at an average rate of 1.64 feet per year between 1993 and 2012. This erosion rate was determined to be approximately seven times higher than the rate of erosion at a geologically similar stretch of shoreline farther down the coast. Powerful storms during the past two winter seasons have resulted in even more severe erosion, causing major threats to Highway 1, Mirada Road and other coastal infrastructure and leading to emergency repairs by Caltrans and the County of San Mateo. While the Surfers Beach area has eroded, areas immediately inside the harbor have significantly shoaled, which often results in the temporary closure of one or more of the boat launch ramps until the material is dredged and moved elsewhere. The loss of active boat launch ramps significantly reduces the ability of recreational boats to be launched, which in turn reduces fees collected by the District. Community members have voiced concerns at this situation and support the ideas of implementing a sensible solution where the sand that has accumulated in the harbor is used to nourish the beach at Surfers Beach.

To address impacts to eelgrass beds from the proposed Project, the District contracted with Marine Taxonomic Services, Ltd. (MTS) to identify the extent of eelgrass (*Zostera marina* and *Z. pacifica*) within PPH and prepared a *Pillar Point Harbor-Wide Eelgrass Management and Mitigation Plan*<sup>1</sup> (MTS 2020; EMMP). The EMMP provides a long-term strategy for the District to establish and expand eelgrass beds in the harbor's west basin, in an area with fewer impacts

from human use such as anchoring, vessel navigation and recreational shellfish harvesting and where future maintenance dredging is not required. This document provides a management and mitigation plan to account for impacts to eelgrass due to Project activities. It includes details on the location and methods for creating new eelgrass habitat as part of the proposed mitigation. Additionally, the plan includes a five-year monitoring plan to assess establishment of the created eelgrass habitat to ensure that the minimum coverage and density obligations are met per the California Eelgrass Mitigation Policy (CEMP).

Upon request of the District in 2009, the USACE conducted a series of studies and evaluations to assess the cause of the erosion and whether there was a federal interest in mitigating for damages that occurred after construction of the harbor. Specifically, the USACE conducted coastal engineering and economic studies for a range of project alternatives where sand was dredged from the harbor and placed as a berm along the shore of Surfers Beach (USACE 2015a, USACE 2015b). The USACE efforts culminated in a *Continuing Authorities Program (CAP) Section III Detailed Project Report and Draft Environmental Assessment*, which concluded that while the project alternatives considered would be feasible and have less than significant environmental impacts, there was no economic justification for a federal interest in the project (USACE 2016<sup>ii</sup>). With no federal partner on the project, the San Mateo County Harbor District Board of Commissioners unanimously approved a pilot project to design and implement a scaled-down version of the USACE project in 2015. The Surfers Beach Pilot Restoration Project was proposed as an opportunity to demonstrate that the beneficial reuse of dredged harbor sediments as beach nourishment at Surfers Beach can be implemented with no significant impacts to marine resources in the Monterey Bay National Marine Sanctuary (MBNMS or Sanctuary; GFNMS 2017<sup>iii</sup>). The District received grant funding from the California Division of Boating and Waterways (DBW) and the California Ocean Protection Council (OPC) to help fund the project planning, design and implementation.

The purpose of the Project is to address erosion at Surfers Beach by restoring sandy beach area using dredged material from navigable areas of Pillar Point Harbor, including the boat launch ramp. The Project seeks to demonstrate the feasibility of successfully implementing a beach nourishment project at Surfers Beach in the MBNMS without having significant impacts to the coastal resources. This demonstration consists of a pilot restoration project that dredges up to 100,000 cubic yards of sand from the harbor and places it at Surfers Beach. One of the major anticipated outcomes of the proposed Project is that it will address impaired public access (including positive recreational impacts) and address damages from coastal storms. The Project will also mitigate shoaling and impacts to navigation within the Harbor by dredging the sand that has accumulated there since the construction of the outer breakwaters in the early 1960s. The Harbor-wide eelgrass mitigation and management program will significantly increase the area of suitable eelgrass habitat in the Harbor's west basin and allow for future expansion of the beds by using clean sediment sourced from necessary maintenance dredging projects in the Harbor's east basin. The Project will employ extensive physical and ecological monitoring to assess the project's effects on the environment, which would help to establish metrics that could be used to evaluate the performance of the project and to calibrate expectations for a larger or repeated future effort.

The goal of the Project is to study the potential benefits and impacts of implementing a pilot project that beneficially reuses up to 100,000 cubic yards of sand dredged from Pillar Point Harbor and placed at Surfers Beach. Objectives include:

- Prevent or mitigate beach erosion and sea cliff retreat
- Improve protection of Highway 1 and other structures
- Increase quality and quantity of public access and recreation
- Reduce the need for coastal armoring
- Improve biological habitat
- Design project to minimize biological impacts and disturbances
- Maintain safe navigation for boats in Pillar Point Harbor

The proposed Surfers Beach project is a Pilot Project, meaning that a major objective is to closely study and monitor the project to determine whether or not it is effective and also to identify any environmental impacts. If post construction monitoring and review indicate that the Project is effective in mitigating erosion and does not cause unacceptable impacts, then a larger beach restoration project at Surfers Beach would be pursued in the future. The project is necessary to reduce the threat of structural damage and recreation loss along Surfers Beach. The Project is one of the two demonstration projects highlighted in the California Coastal Sediment Master Plan and included as a case study in the Greater Farallones National Marine Sanctuary's *Coastal Resilience Sediment Plan*<sup>iv</sup> (GFNMS 2019). The Project has been supported by the Coastal Sediment Management Workgroup (CSMW) since it is being designed to evaluate the effectiveness of beach nourishment as a coastal resilience measure and assess any impacts from placing sand dredged from PPH on the beach immediately downcoast of the harbor jetty. The Project also is a recommended activity in the *Coastal Regional Sediment Management Plan for the Santa Cruz Littoral Cell*, and the site has been identified as a Beach Erosion Concern Area within the CSMW's *California Beach Erosion Assessment Survey*.

#### **Methods:**

For the beach restoration construction, the Project will utilize up to 100,000 cubic yards of clean sand that has accumulated inside the protective breakwaters of PPH for restoring Surfers Beach. The sand will be dredged and transported from the harbor to Surfers Beach in a slurry (water/sand) mixture via a pipeline. Dredging technology options include use of a suction dredge with cutterhead, transported directly to beach via slurry pipeline, or a clamshell bucket to dredge the sand and place it in a hopper that is fed into a slurry pump and through the pipeline to the placement area. The contractor that wins the bid to construct the project will determine the dredge methodology used. The sand will be contained by a sand berm constructed on the existing beach at the east end of the project site. Sand slurry will be discharged landward of the containment berm and allowed to decant. Once sufficient sand is built up, it can be mechanically spread using heavy equipment. The proposed construction methods and Project design have been developed with

extensive input from a Technical Advisory Group (TAG) consisting of coastal experts and permitting and resource agency staff, and are based on extensive surveys, sediment sampling and analysis, and numerical modelling of various scenarios. The methods have been established with the goals of minimizing impacts to the environment and public access. To determine the degree to which multiple benefits are being achieved by beneficial reuse of sediment at Surfers Beach, extensive monitoring will be used to assess the response of physical and ecological parameters at the project site and at one geologically and ecologically similar reference site before and for at least five years after construction. Beach profiles and ecological conditions will be monitored. To determine project success, we will compare the relative responses between project and reference sites after construction, as well as to pre-project modeling of predicted physical performance. The monitoring data will be used to inform the design of future opportunistic beach nourishment episodes.

For the eelgrass mitigation, an area has been identified in PPH's west basin off of the west breakwater dogleg. The proposed mitigation site occurs around currently growing eelgrass and covers 7.6 acres, including 5.4 acres of planting area, which is enough to accommodate the initial mitigation need based on the late 2019 estimate of potential impacts. Proposed mitigation site modifications would result in creation of an eelgrass planting platform and would include removal (cut) of up to 14,000 cubic yards of sediment from the nearshore areas within the west basin and placing this material as fill along the offshore portion of the eelgrass beds currently growing there (Figure 7). A total of 17,500 cubic yards of fill material are needed to shallow deeper portions of the mitigation site. Given that 17,500 cubic yards of fill are needed, and 14,000 cubic yards would come from material cut from within the mitigation site, an additional 3,500 cubic yards of sediment would be needed to accomplish the proposed site modifications. The additional sediment would come from maintenance dredging at the launch ramp and east basin right before the dredging for Surfers Beach placement occurs. After creation of the initial mitigation site future expansion could occur by using additional fill material from maintenance dredging events at the launch ramp area (every 6-8 years). This fill material would be used to expand the mitigation site and accommodate for more eelgrass resources over time based on the success of the mitigation site proposed.

Any eelgrass harvest material required for transplanting at the proposed planting area would be salvaged from proposed dredge footprints (prior to dredging). Since all harvested eelgrass will be salvaged from areas proposed to be dredged, there is no need to designate a specific harvest site within existing eelgrass beds for collecting donor material. Donor material will be harvested by first removing loose sediment around the rhizome and then removing the rhizome using a hand raking method. Eelgrass harvested from the harvest site will be bundled into transplant units comprised of approximately 5-8 turions each. This bundling method has a high success rate in achieving self-sustaining eelgrass habitat post-transplanting. Transplant units will be installed by hand digging a hole approximately the size of the unit and placing the unit with the rhizomes approximately two inches below the surface. The unit will then be anchored to the substrate using biodegradable stakes and the hole will be back filled. Divers will conduct planting on monumented grid system, accessing the planting area from boats. The grid layout will provide for ease of tracking and quality control of planting. Transplant units will be spaced 1 meter on centers (one unit per square meter). The mitigation site will be planted with approximately 29,000 units to fill the areas devoid of eelgrass in the mitigation site. Once the planting effort has concluded, monitoring of the mitigation site will be conducted for 60 months (5 years) to document the success

of the mitigation as outlined in the CEMP. Monitoring surveys will begin immediately after transplanting has been completed at intervals of 0, 6-, 12-, 24-, 36-, and 60-months post-transplant. The monitoring program will assess the aerial extent, percent cover, and density of eelgrass in the mitigation sites by SCUBA and side-scan sonar. SCUBA divers will swim transects across the mitigation site to confirm side-scan sonar recordings and to randomly place quadrats for density. Monitoring dates will be scheduled during the active eelgrass growing season to collect information on growth and survival.

\*See engineering design plans and preliminary design reports for more detailed description of methods.

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<sup>i</sup> MTS, 2020. Pillar Point Harbor-Wide Eelgrass Management and Mitigation Plan

<sup>ii</sup> U.S. Army Corps of Engineers (USACE), 2016, Continuing Authorities Program, Section 111 Detailed Project Report and Draft Environmental Assessment, North Half Moon Bay Shoreline Improvement Project, Pillar Point Harbor, CA, April 2016.

<sup>iii</sup> Greater Farallones National Marine Sanctuary (GFNMS), 2017, White Paper on the Potential for Beneficial Reuse of Dredged Sediment for Restoration at Surfer's Beach, in San Mateo County, in the Monterey Bay National Marine Sanctuary, Prepared by Max Delaney and Doug George, GFNMS, December 6, 2017.

<sup>iv</sup> GFNMS 2019. Kordesch, W.K., M. Delaney, S. Hutto, M. Rome, and S. Tezak. 2019. Coastal Resilience Sediment Plan. Report of Greater Farallones National Marine Sanctuary. NOAA. San Francisco, CA. 104 pp.