Environmental Assessment (with Draft FONSI)
and
404 (b)(1) Analysis

for

Ocean Beach Storm Damage Reduction Beach Nourishment Project, San Francisco, San Francisco County, California

U.S. Army Corps of Engineers
San Francisco District

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APPENDICES

ACRONYMS AND ABBREVIATIONS

BAAQMD	Bay Area Air Quality Management District
BMP	Best Management Practice
CCC	California Coastal Commission
CCMP	California Coastal Management Program
CCSF	City and County of San Francisco
CD	Consistency Determination
CESA	California Endangered Species Act
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DPS	Distinct Population Segment
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
ER	Engineering Regulation
ESU	Evolutionarily Significant Unit
FESA	Federal Endangered Species Act
FMP	Fishery Management Plan
FONSI	Finding Of No Significant Impact
GGNRA	Golden Gate National Recreation Area
GMP	General Management Plan
LMWT	Lake Merced Wastewater Tunnel
LTMS	Long Term Management Strategy
NPS	National Park Service
MBTA	Migratory Bird Treaty Act
MHW	Mean High Water
MHHW	Mean Higher High Water
MLLW	Mean Lower Low Water
MMPA	Marine Mammal Protection Act
MSC	Main Ship Channel
MSFCMA	Magnuson Stevens Fisheries Conservation and Management Act
MSL	Mean Sea Level
ND	Negative Determination
NEPA	National Environmental Policy Act
NLAA	Not Likely To Adversely Affect
NMFS	National Marine Fisheries Service
OBDS	Ocean Beach Demonstration Site
O&M	Operations and Maintenance
SFPUC	San Francisco Public Utilities Commission
SWOO	Southwest Ocean Outfall
USACE	U.S. Army Corps f Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Society
USC	United States Code
WRDA	Water Resources Development Act
WST	Westside Transport/Storage Box

FIGURES AND TABLES

1.0 Proposed Project

1.1 Introduction

This environmental assessment (EA) is written in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. § 4321 *et seq*), as amended, the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the NEPA (40 C.F.R. §§1500-1508), and U.S. Army Corps of Engineers (USACE) Planning Regulations (Engineering Regulation (ER) 200-2-2). It presents an evaluation of the potential impacts associated with the proposed placement of dredged material from the operations and maintenance dredging of the San Francisco Main Ship Channel (MSC) onto Ocean Beach for beach nourishment.

The proposed placement of MSC maintenance dredging material on Ocean Beach and the operation and maintenance (O&M) dredging of the MSC are authorized by separate authorities and are separate projects. The MSC provides the source material for Ocean Beach; however, the MSC is maintenance dredged every year and this action would occur independently of the proposed placement at Ocean Beach described in this EA. The Federal Base Plan for maintenance dredging of the MSC, as practiced for the past several decades, is dredging by a hopper dredge, such as the Essayons, with placement in the designated nearshore placement sites located s off of Ocean Beach—SF-8 or the Ocean Beach Demonstration Site (OBDS) (encompassed by the proposed placement site SF-17). The evaluation of the potential impacts associated with the O&M dredging of the MSC is presented in the *Final Environmental Assessment/Environmental Impact Report for Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay Fiscal Years 2015-2024*. Placement of material on Ocean Beach is evaluated in this EA and is contingent upon availability of funds; and the availability of appropriate dredging equipment.

1.2 Description and Location

The proposed action involves the beneficial use of sediment from MSC O&M dredging for direct beach nourishment at Ocean Beach. Ocean Beach is located in the city of San Francisco, on the shoreline of the Pacific Ocean between Sloat Boulevard and Fort Funston. Material from the O&M dredging of the MSC would be pumped onto Ocean Beach for beach nourishment by a hopper dredge with pump-off capability.

<u>Main Ship Channel (MSC) & Nearshore Placement Sites</u>

The MSC is a deep-draft navigation channel immediately offshore San Francisco Bay, California that is the outer vessel traffic lane to the Golden Gate (Figure 5). The channel allows for navigation of large commercial ocean-going vessels into San Francisco Bay. The MSC channel is surrounded by a crescent-shaped ebb-tidal sand bar, the crest of which reaches 30 ft Mean Lower Low Water (MLLW).

SF-17 is a proposed placement site in the process of being designated by the USEPA located in the waters of the Pacific Ocean adjacent to the stretch of Ocean Beach south of Sloat Boulevard. The landward boundary, which lies approximately 0.25 mi offshore of the mean sea level (MSL) line, stretches from Sloat Blvd south to the San Mateo County line (~1.5 mi). SF-17 is outside of the southern lobe of the San Francisco Bar (Bar), which is a gigantic ebb-tidal delta (>39 mi^2) that contains relic sand and is fed by sediment flushed out of San Francisco Bay. The Bar is shaped by strong tidal currents associated with the Bay and waves originating from much of the Pacific (Barnard, 2005). The center of SF-17 is 4 mi southeast of the designated ocean disposal site, SF-8, which is on the southern lobe of the Bar just south of the MSC. A portion of the SF-17 footprint, the OBDS, has been used since 2005 for the near shore placing of sand from MSC in this area.

As previously noted, the evaluation of the potential impacts associated with the O&M dredging of the MSC and placement at these designated nearshore placement sites is presented in the *Final Environmental Assessment/Environmental Impact Report for Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay Fiscal Years 2015-2024*.

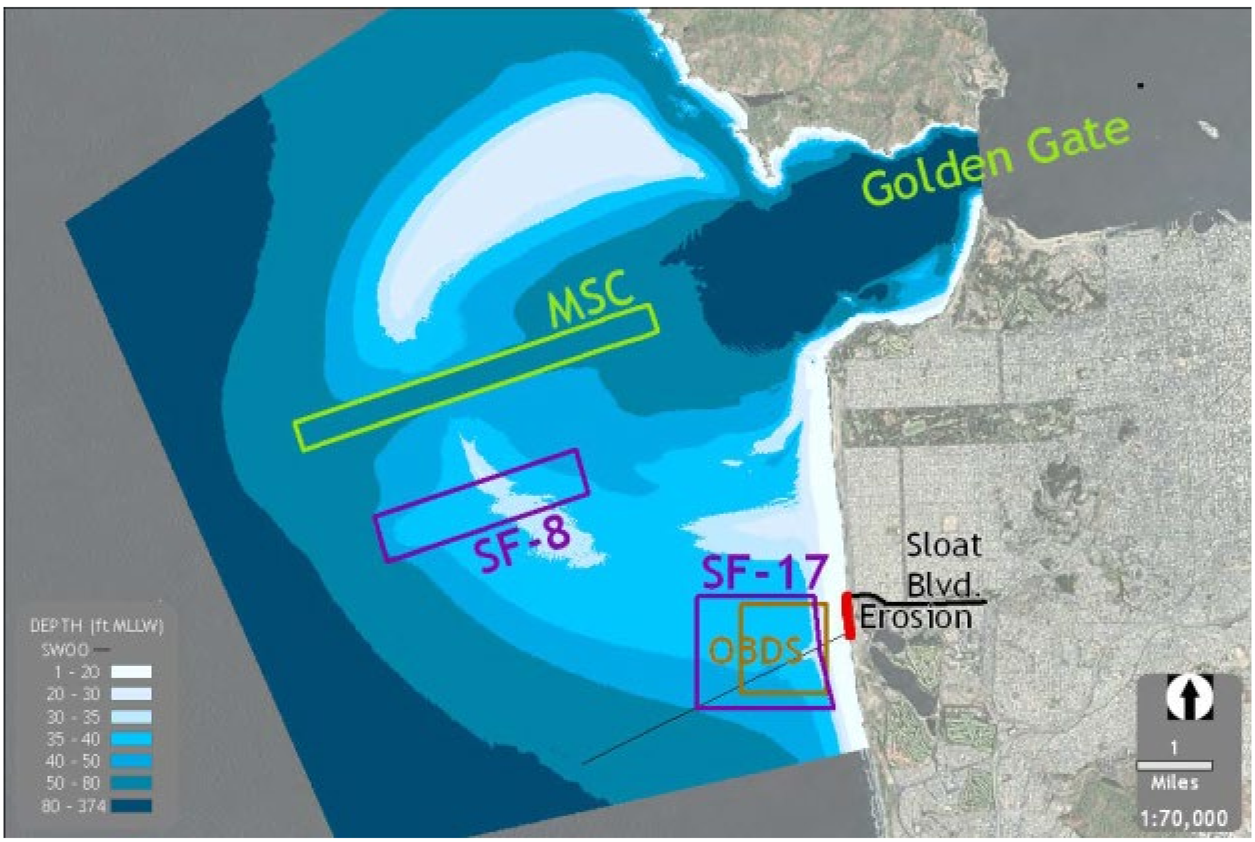

Figure1: Overall Project Area.

Ocean Beach

The Pacific Ocean coast of the City and County of San Francisco (CCSF) (Figure 1) stretches southward approximately 8.5 miles (mi) from the Golden Gate to the San Mateo county line. A rocky shoreline with pocket beaches constitutes the northern 3.6 mi, and a sandy beach constitutes the rest. Ocean Beach (Figure 2), which starts at the southern terminus of the rocky shoreline, extends approximately 3.5 mi southward. Throughout most of the 3,000-foot (ft) proposed project area south of Sloat Boulevard, there is a coastal bluff that is approximately 30 feet (ft) high. Much of the bluff is fronted by rock, and a significant stretch of the beach is completely inundated during higher tidal stages.

Figure 2: Ocean Beach (inside the red box); San Francisco Planning and Research Association [SPUR], 2011).

The Ocean Beach area was largely undeveloped throughout most of San Francisco's early history. Since the 1840's, Ocean Beach has been used for transportation and recreation. Significant development started in the late 19th century with a steam railroad being in place by 1884 to bring people to an amusement park and to the Ocean Beach Pavilion for concerts and dancing. The Cliff House, which opened in 1863, and Sutro Baths, which opened in 1896, drew thousands of visitors. By 1890, there were trolley lines to Ocean Beach. Major development occurred in the 1920s and 1930s with the construction of the Great Highway and the expansion of neighborhoods up to the Great Highway. Urbanization resulted in the replacement of a wide-spread dune field that covered Ocean Beach and adjoining land with houses, roads, seawalls, buried sewer structures, fill material, and construction debris. As the city expanded to the west, the native sand dunes that had blanketed the area (Figure 3) were sculpted, and a coastal bluff created to support that infrastructure.

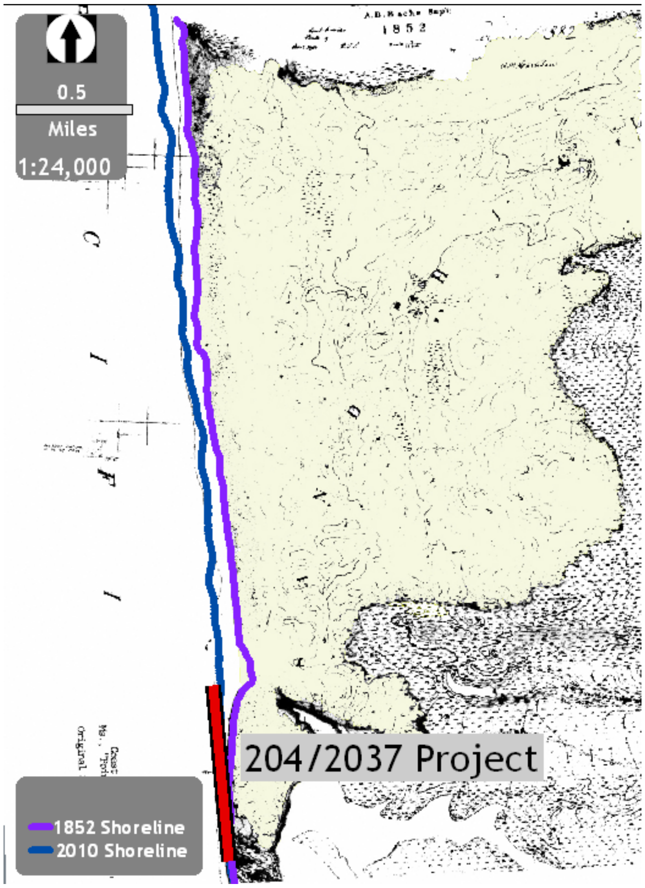

Figure 3: An 1852 Coast and Geodetic Survey map showing the "Sand Hill" (tinted yellow) that stretched inland from Ocean Beach toward downtown San Francisco.

Since the late 1800s, man has modified the natural shoreline along Ocean Beach, and nature has responded through wave and current driven accretion and erosion (Figure 4). The first major project was to move the shoreline seaward 200- to 250-ft through the deposition of imported sand, soils, and debris largely during the construction of the Great Highway (Lilly & Kingery, 1997). Later, material was deposited from local construction projects, such as a water-treatment facility and transport pipes at the southern end of Ocean Beach. From the Cliff House south, there are a number of seawalls (Figure 5) and constructed dunes that limit storm-generated impacts to public facilities, except for the 4,000-ft stretch of Ocean Beach south of Sloat Boulevard. That stretch is unprotected by seawalls, and parts of it have been armored with rock revetments in response to periodic winter storm erosion.

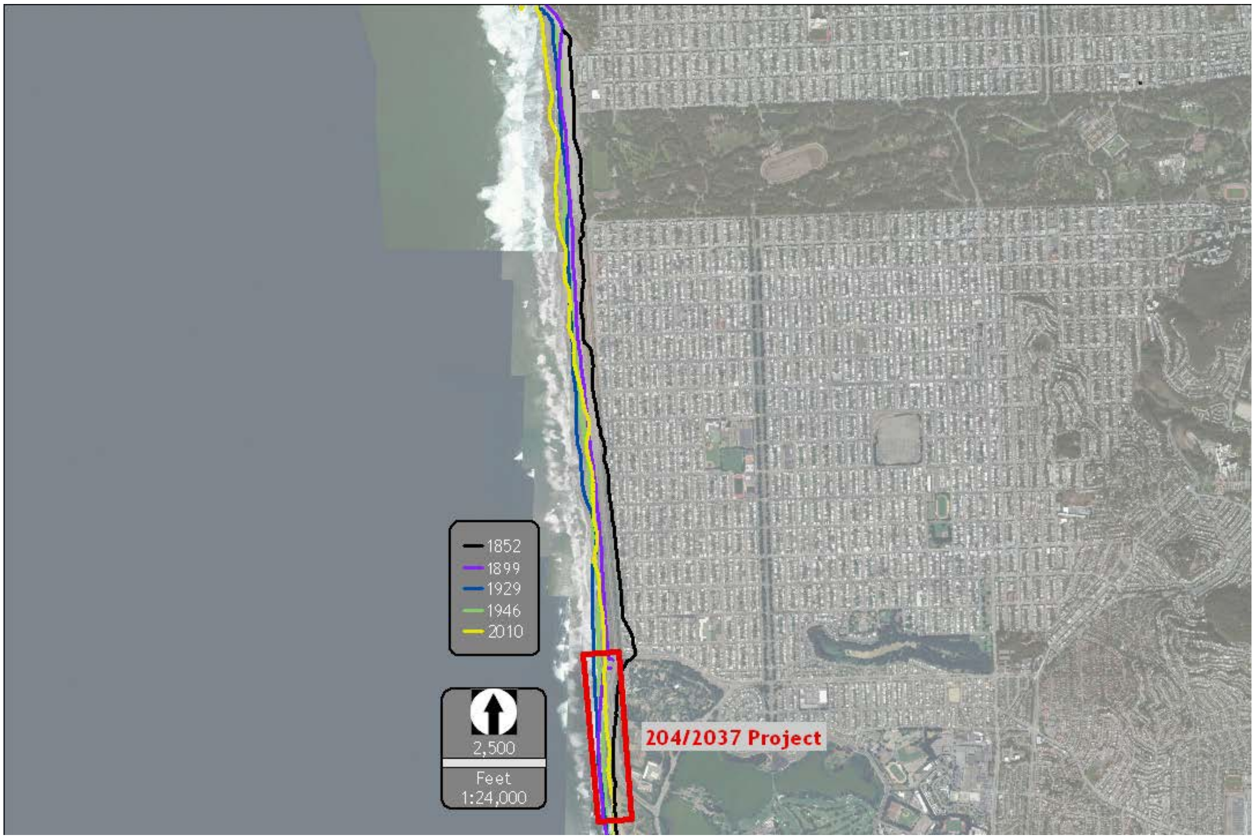

Figure 4: Ocean Beach shoreline variations between 1852 and 2010

Ocean Beach, which abuts a major urban area, serves both as a buffer between the Pacific Ocean and major CCSF infrastructure and as a recreational destination for residents of the CCSF and a multitude of visitors from all over the world. The Ocean Beach corridor includes beach, dunes, seawalls, the Great Highway, sewage and storm-water facilities, parking lots, a recreational trail, a landscaped linear park, and the Golden Gate National Recreation Area (GGNRA). Golden Gate Park extends inland from a stretch of the northern third of the beach, and the San Francisco Zoo is located just inland of the stretch of Ocean Beach south of Sloat Boulevard. The Oceanside Water Pollution Control Plant (OWPCP), which sits adjacent to the zoo and the beach, is fed by two massive transport boxes that lie under the Great Highway (Figure 6). The Southwest Ocean Outfall (SWOO), which carries treated sewage and storm water into the Pacific Ocean, runs southwestward from the OWPCP through the nearshore to a depth of approximately 80 ft. At the southern end of Ocean Beach, the westernmost point of Lake Merced, which in pre-historic time connected to the ocean at approximately Sloat Boulevard, is less than 1,200 ft landward of the top of the bluff. The GGNRA owns the beach from one quarter of a mile seaward of mean high water (MHW) to approximately the seaward pavement edge of the Great Highway southbound traffic lanes.

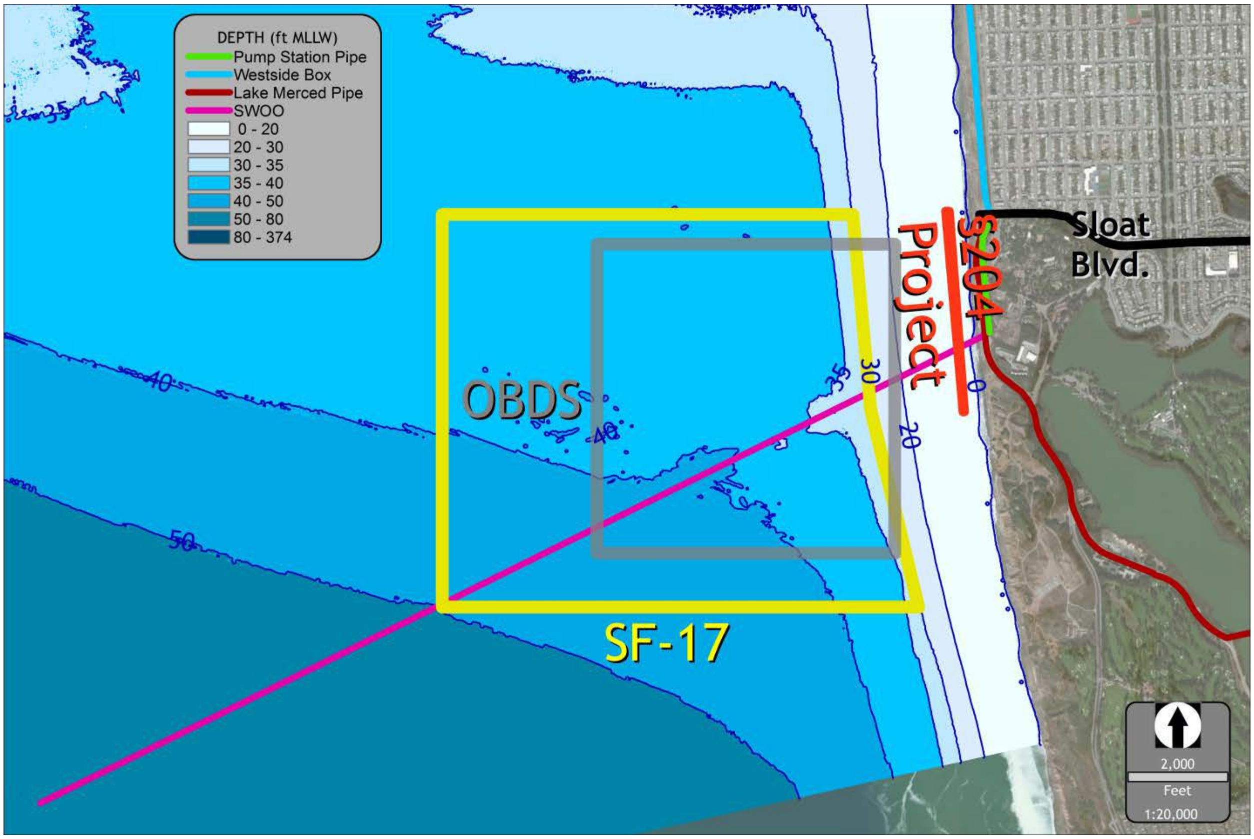

Figure 5: Location of the §204 storm damage reduction project relative to the wastewater infrastructure (Westside Transport/Storage Box (WST), Lake Merced Wastewater Tunnel (LMWT), and SWOO), Ocean Beach Demonstration Site (OBDS), and SF-17. The Great Highway runs above the WST and LMWT.

Ocean Beach experiences significant erosion. Winter storms, modifications to dredging and placement practices, changes in the location of the Bar, and sand mining in the Bay are possible causes of the erosion along Ocean Beach. Because of its westerly exposure, Ocean Beach is subject to direct attack from waves approaching from the southwest to the northwest. Large waves, especially during times of high tides, have caused bluff recession along the central and southern portions of the beach. Periodically, there is acute erosion of the beach and dunes between Kirkham and Noriega Streets, Taraval and Ulloa Streets, and from south of Sloat Boulevard to the Fort Funston cliffs. This erosion threatens shoreline improvements, local infrastructure, natural resources, public property, and recreational activities.

1.3 Purpose and Need for Proposed Action

- Purpose: The purpose of the proposed action is to reduce storm damage along the stretch of Ocean Beach between Sloat Boulevard and the Fort Funston Cliffs, where wave action threatens infrastructure and public safety, under the authority of section 204 of the Water Resources Development Act (WRDA). using dredged material from MSC dredged during O&M operations. The MSC is the only USACE O&M dredging

project in the San Francisco Bay Area that generates sediment suitable for beach nourishment at Ocean Beach.
Need: The stretch of Ocean Beach south of Sloat Boulevard has undergone severe erosion to the extent that part of the coast-side parking lot has been lost and the important CCSF sewage treatment infrastructure and the Great Highway are under great threat. There is a need to lessen the shortage of sand in the nearshore that has contributed to severe erosion along the south of Sloat stretch of Ocean Beach to protect infrastructure and public safety.

1.4 Basic and Overall Project Purpose

Section 404 of the Federal Water Pollution Control Act Amendments of 1972 (Clean Water Act) requires the U.S. Army Corps of Engineers to analyze its activities that involve placement of dredged or fill material into waters of the United States (33 U.S.C. § 1344). For water-dependent and non-water-dependent projects, the Guidelines prohibit discharges of dredged or fill material into waters of the United States if a practicable alternative to the proposed project exists that would have less adverse impacts on the aquatic ecosystem, including wetlands, and does not have other significant environmental consequences (40 Code of Federal Regulations [C.F.R] 230 [a]).

- Basic Project Purpose – The basic project purpose for the proposed action is to beneficially use all or portions of the suitable material generated from the annual MSC O&M dredging to lessen the severe erosion along Ocean Beach from Sloat Boulevard to Fort Funston. The proposed project is considered a water dependent activity.

- Overall Project Purpose – The overall project purpose is to beneficially use suitable dredged material to alleviate severe erosion south of Sloat Boulevard at Ocean Beach.

1.5 Study Authority

The authority for USACE to participate in a project to reduce storm damage at Ocean Beach is given in Section 2037 of the WRDA of 2007 (Pub. L. No. 110–114, 121 Stat. 269, 273, 1094-109), which amends Section 204 of the WRDA of 1992, and states "the Secretary of the Army is authorized to use sediment obtained through the construction, operation, or maintenance of a Federal water resources project to carry out projects to reduce storm damage to property."

2.0 Scope of Analysis

The scope of project analysis is limited in time and space by the reasonably foreseeable direct, indirect, and cumulative impacts of the proposed action. The scope of this analysis is generally (1) the sandy beaches and adjacent areas of Ocean Beach from Sloat Boulevard to Fort Funston extending approximately 140 ft from the bluff along the Great Highway (2) the water column and substrate at OBDS or the proposed SF-17 in the Pacific Ocean. For several environmental parameters such as air quality, noise, and biological resources, the scope of analysis extends beyond the immediate vicinity of the proposed project.

3.0 Proposed Action and Alternatives

To satisfy the requirements of NEPA and provide the basis for the required 404(b)(1) alternatives analysis, a total of two alternatives are analyzed in this EA, including the proposed action and the no action alternative. Alternatives that were considered but eliminated from further study in this assessment are described in section 3.4 below.

3.1 Proposed Action

The proposed action is beneficial use of sediment from MSC O&M dredging for direct beach nourishment along the stretch of Ocean beach between Sloat Boulevard and Fort Funston, an area of up to 3,000 ft in length. Placement of material on the beach is contingent upon availability of funds; and the availability of appropriate dredging equipment.

For the purpose of beach nourishment, a hopper dredge with pumpoff capability is the optimal dredge plant for this application. The USACE dredge *Essayons* currently does not have pump-off capabilities; therefore, for episodes where beach nourishment occurs, it is anticipated that a contract hopper dredge with pump-off capabilities would conduct this work. The proposed action would involve pumping of material onshore and then onshore construction of a sacrificial dune along a 3,000-foot stretch of Ocean Beach starting at Sloat Boulevard and extending southward to the northern part of Fort Funston.

Dredged material from MSC maintenance activities generally consist of fine sand (D50 range = 0.15 mm to 0.21 mm) and are generally consistent with grain size of local dunes in the area (D50 range = 0.19mm to 0.30 mm). Historic records show the grain size at Ocean Beach, from the Cliff House to Fort Funston, consists of fine to medium sand (D50 range = 0.21mm to 0.45 mm) (USACE 1996). These records also show a wide variation in the gradation of the sand from the general Ocean Beach area which is believed to reflect the influence of the coarser winter beach sand. In general, historic samples show coarser sand in the swash zone. Existing grain size conditions at Ocean Beach are believed to be consistent with these results.

In cross-section, the proposed design would be to match the elevation of the existing bluff at approximately 30 ft above MLLW. The design template for the beach fill consists of a crest with an elevation of 30 feet MLLW and 60-foot width. Example cross-sections are shown on Figures 6 through 8 and the cross-section locations are shown on Figure 9. Side slopes are assumed to be 1V:4H. Fill would extend up to 3,000 feet parallel to the shoreline and the beach and cliff footprint of the berm (toe to top of the bluff) is expected to be approximately 10.3 acres (Figure 10).The total project footprint including the staging area, mooring buoy, pipeline route, constructed berm and haul routes is approximately 21 acres. Imposed on the existing topography (2015/2016 data), this template would require roughly 250 kcy to 285 kcy of material from MSC. Based on this design, a dune crest width of 60 ft results in a toe of the dune terminating between MLLW and slightly below MSL, depending on the transect location, leaving it exposed to erosional forces of the waves and currents. This dune, which is expected to last 5 to 6 years, is expected to be constructed during one dredging cycle. However, while unlikely, there is the possibility of delays in dredging or onshore placement due to equipment malfunction, weather, or other factors and such delays could necessitate construction of the dune over multiple seasons.

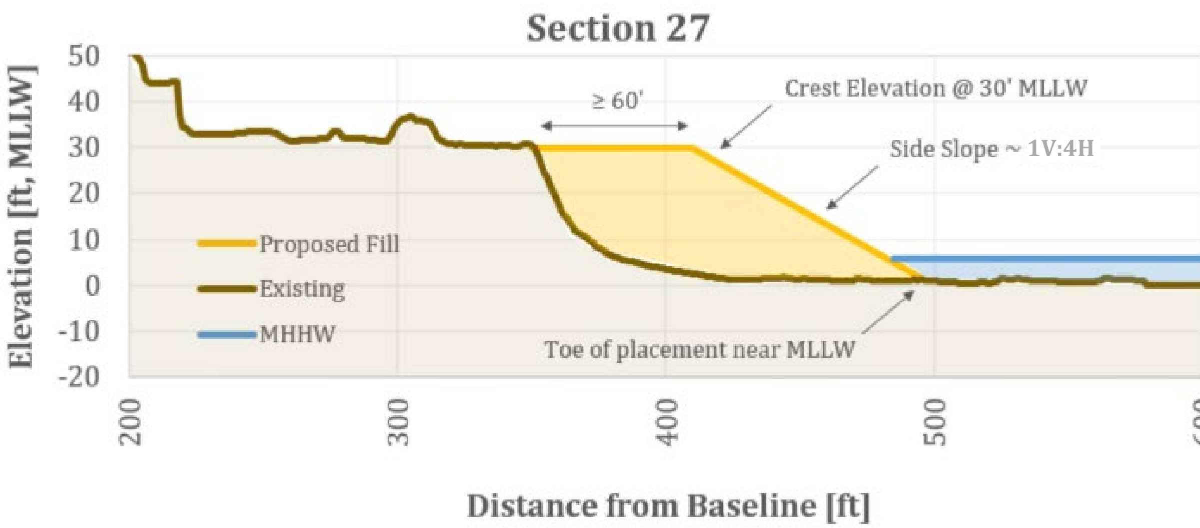

Figure 6**. Example Cross-Section 27. (Plan View location shown in Figure 9***)***

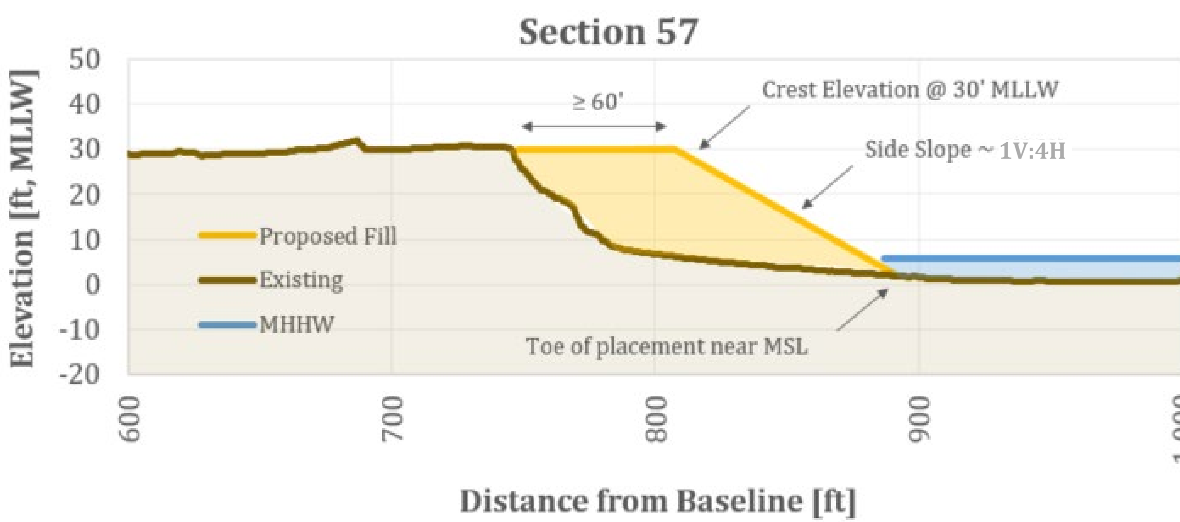

Figure 7. Example Cross-Section 57. (Plan View location shown in Figure 9)

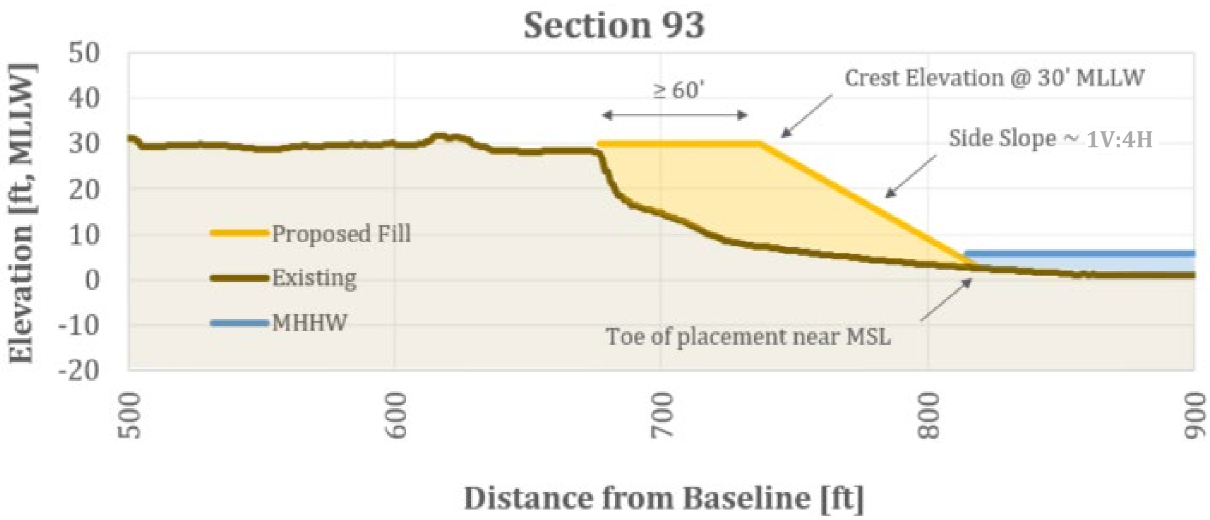

Figure 8. Example Cross-Section 93. (Plan View location shown in Figure 9)

Figure 9. Location of Example Cross-Sections in Project Area.

Figure 10. Approximate Footprint of Fill. Extends Approximately 3,000 Feet Along Shoreline.

The hopper dredge is assumed to have a daily production rate of approximately 15,000 yd^3 per day, including dredging, hauling, and pumpout operations. The hopper has a bin capacity of approximately 3,500 yd^3, and pumpout takes approximately 1.5 hr to complete. Based on a 24-hour workday, it is estimated that the hopper would make three to four trips per day. The annual average volume of material that is dredged from the MSC is approximately 324,000 yd^3 with a range of 78,000 to 667,000 yd^3. This means that there should be enough dredged material available to complete the project in one cycle in any given year. The placement of dredged material on the beach footprint would be expected to take from 18 to 20 days based on an estimated 265,000 yd^3 total volume of dredged material needed to construct the 3,000 ft long sacrificial dune. Operations would occur between July 15th and September 30th Any additional material from the MSC in excess of what is needed to construct the dune during that dredging cycle, would be placed at the proposed SF-17. However, while unlikely, there is the possibility of delays in dredging or onshore placement due to equipment malfunction, weather, or other factors and such delays could necessitate construction of the dune over multiple dredging cycles.

The hopper dredge would be expected to anchor approximately one-half mile offshore of the intersection of Sloat Boulevard and the Great Highway, in water that is approximately 35 ft MLLW deep. A 28-30 inch diameter pipeline would be placed perpendicular to the beach, beginning at a point that is approximately 30 ft seaward of the bluff (this varies based on the available width of the beach), cross the beach (Figure 11), and run along the ocean bottom to a mooring station located where the hopper dredge would anchor. The pipeline would need to extend approximately 2700 feet offshore in order to reach the required 35 ft depth. The terminal end of the pipeline would be fixed to a floating segment of pipeline and buoyant collar or floating platform that would be secured to the seafloor by an anchor. Once the hopper is anchored, the pipeline connection would be made. The pipeline would be filled with compressed air and positioned by tugs. Once the air was evacuated the pipeline would sink and remain in place on the sea floor under its own weight. Weighted collars would be used if necessary. Buoy markers would be attached to the pipeline as appropriate to warn small craft of its presence. Placement of dredged material would most likely begin at the center of the dune footprint and progress northward and southward as the dune structure is being constructed. The contractor may choose a different fill sequence based on sight conditions at the time of construction.

Figure 11 Typical beach-placement operation for sand pumped from a nearshore vessel.

Initially, a 100-foot long toe berm would be constructed during low tides using the available sand within the existing footprint of project on the beach or an initial placement of dredged sand. This would allow for work during high tides and contain the activities to within the beach nourishment footprint. The purpose of the toe berm is to contain the sand slurry as it comes out of the end of the pipeline and to minimize the loss of sand while it dewaters. The toe berm would collect the decanted water and guide it south to the end of the toe berm structure where it would then return to the ocean. The toe berm would be located parallel to the bluff and approximately 100 ft (or less depending on the available beach width) west of the bluff and would be built to an elevation of approximately 3-4 feet above the existing beach. The berm would be constructed using bulldozers that push sand into a berm-shaped structure of uncompacted sand that is approximately 10-ft high at the crest and 20-to-30-ft wide at the base. The berm would be extended out in front of the dredged material placement as the berm progresses, and there would always be at least 75 ft of toe berm in place ahead of the dredged material placement. A diffuser would be attached to the end of the pipe to control the deposition of the dredged material and to prevent the slurry water from scouring the surrounding area. As the dredged material is pumped into the area behind the toe berm, it would be piled higher than the toe berm and then graded to its final 1V:4H slope.

After each hopper bin load is pumped onto the beach behind the toe berm, bulldozers would shape the dredged material into the desired profile as it dewaters. It is estimated that the dune structure would be constructed at a rate of approximately 200 ft per day to achieve the desired dune profile. It is estimated that two bulldozers would operate 18 hrs per day each. As each 100-foot section of dune structure is completed, additional lengths of pipeline would be attached so the construction area can move up and down the beach.

Portions of the public parking lot located between the southbound lane of the Great Highway and the coastal bluff (referred to as North Parking Lot) would be used as a staging area for equipment and supplies (Figure 12). To prevent public access and/or theft, temporary fencing would be installed by the contractor around the immediate work areas on the beach and the staging area in the parking lot. No public access to or through the beach in the immediate construction area would be provided for the full construction period.

All earthwork heavy equipment would be stored and secured in the staging area or above the toe berm when not in use. Best management practices (BMPs) would be implemented to minimize the potential for releases of petroleum products from equipment in the staging and storage areas (Appendix A). Signage, security, and mobile lighting around the work areas would be the responsibility of the contractor.

Construction equipment would be refueled in an area behind the toe berm along the beach. Any gasoline, diesel, lubricating oil, engine oil, hydraulic oil, mineral oil, or cooking oil would be stored in a manner that affords the maximum protection against spills into the environment. The contractor would use secondary containments, dikes berms and other barriers to prevent any petroleum products from spilling and entering the ground, storm or sewer drains, stormwater ditches or canals, or navigable waters of the

United States. The contractor would monitor and remove any rainwater that accumulates in open containment dikes or berms, Before removal, water will be inspected to determine that there is no oil sheen.

Construction access for the beach work would likely be from the north end of the North Parking Lot where there is a sand ramp down to the beach. The contractor would be required to protect existing pavement and curbs when staging and transporting construction equipment to the work areas on the beach. The contractor would also be required to control public vehicle access to the beach from the construction access points. Emergency and Park Service vehicles would be allowed access to the beach and across the construction site. Provisions to ensure this access will be identified at the preconstruction meeting, which will include the participation of the NPS. At completion of construction, the contractor would be required to restore the access roads and parking areas to pre-construction or better conditions. Pre-construction and post-construction surveys of these features would be completed to document existing and final conditions.

Given the wave climate and the fine grain size of sand, the slope will start equilibrating immediately upon placement of sand, with some sloughing occurring. In areas with sloughing, equipment (such as a bulldozer or excavator or skid steer) may be needed to smooth the areas to ensure no drop-off areas. This could be needed weekly for the first two months and would be conducted by the NPS or SFPUC contractor. The sand placement is designed to last approximately 3-4 years before eventually eroding into the ocean.

Figure 12. Staging Area and Environs

3.2 Preferred Action Alternative

The proposed action is the agency-preferred action alternative.

3.3 No Action Alternative

To comply with NEPA and Section 404 of the Clean Water Act (CWA), USACE is required to consider effects of taking no federal action. The no-action alternative defines the "without project condition." Without action to reduce coastal storm damage at Ocean Beach south of Sloat Boulevard, severe beach and bluff erosion would continue and there would be a continued threat to infrastructure and public safety. In the No Action Alternative, the MSC would continue to be dredged annually with hopper dredge, such as the Essayons, with placement in the designated nearshore areas off Ocean Beach, SF-8 or the OBDS (encompassed by the SF-17).

3.4 Alternatives Considered but Eliminated

In evaluating USACE projects under Section 404 of the Clean Water Act, USACE must clearly demonstrate that there are no practicable, less damaging alternatives. Under the 404 guidelines, an alternative is considered practicable if it is "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the project purpose" (40 CFR 230.10 [a][2]). The purpose of this section is to provide information regarding the availability of alternatives to the proposed project that were considered but eliminated from further study, and therefore are not analyzed in detail in the EA.

The USACE maintains numerous federal channels in San Francisco, San Pablo and Suisun Bays, from Redwood City in the south to the Suisun Channel in the north. Most of these dredging projects produce silts and muds that are much too fine-grained to be used for the purpose of beach nourishment. The Suisun and Pinole Channel dredging produces sand, but not in the quantities required to build the berm Therefore, the MSC is the only USACE local maintenance dredging project being considered for placement at Ocean Beach.

The CCSF and GGNRA have collaborated in the past and have future plans to truck material from the northern areas of Ocean Beach to the problematic stretch south of Sloat Boulevard. These efforts have involved the placement of lesser volumes that only last one season. Beneficial reuse of the MSC channel would provide a larger volume of material, providing erosion protection for a significantly longer period, and avoiding the impacts of harvesting the sand from the northern beach area.

Over the years, a variety of rock and rubble have been placed in front of the bluff south of Sloat Boulevard for bluff protection. The rubble includes pieces of concrete, granite, marble, and bricks. Riprap has been placed in the project area to protect the bluff. The GGNRA and many residents want to find a means of bluff protection and beach creation that does not include rock or permanent constructed features in order to maintain the areas aesthetic and habitat values.

4.0 Affected Environment and Consequences

This section provides a discussion of the affected environment and potential consequences of the proposed action. Potential impacts are evaluated in relation to the no action alternative. If an environmental factor would not be affected by the proposed action or no action alternatives, the factor is followed by N/A for not applicable.

4.1 Physical Environment

(X) Water Quality - temp, salinity patterns and other parameters: Placement of dredged material at Ocean Beach under the proposed action would occur inside of a temporary toe berm, where dredge slurry would be placed within the contained area. Dozers would be used to create dikes from existing material or the start of pumped material to control the discharge slurry and keep the flow within the template long enough for the material to fall out of suspension from the slurry. Approximately 100 ft of berm per day would be constructed, and there would always be at least 75 ft of toe berm in place ahead of the dredged material placement area during the sand-placement period. The dredged material delivery pipeline would be lowered into place from tugboats and would be held in place by its own weight. Changes to water quality parameters such as temperature, salinity, and dissolved oxygen from the proposed action are not expected to occur as a result of beach placement or pipeline installation or removal. Impacts to water quality parameters from the no action plan would be minor, localized and in short duration, as discussed in the Federal Navigation Channels EA/EIR.

(X) Turbidity, suspended particulates: Turbidity is related to clarity of water. Factors affecting turbidity include suspended sediment, shape, size, refractive index, color, and absorption spectra of particles. Increased turbidity levels can affect flora and fauna by blocking sun penetration, injuring fish gills, interfering with prey/predator recognition, or egg/larvae development. Additionally, suspension of sediment in the water can mobilize sediment bound contaminants into the water column where they have the potential to become dissolved into the water itself. Contaminants bind to finer sediment such as silt, clay, and organic matter The MSC sediments generally range from 90% - 99% sand with a low organic matter content of <0.36%. Sediment from the MSC was last physically characterized in 2018. Percentage of sand was similar to past sampling, ranging from 91.4 to 98.8 %. The organic content in the 2018 sampling was slightly higher than in past events with a weighted average of 1.1%. This low level of organic content is still considered acceptable for beach nourishment. Therefore, these sediments have been found (based on past sampling and analysis) to be generally free of bound contaminants and to settle out of the water column quickly.

Placement of sand for construction of the dune under the proposed action would occur in an area contained by an appropriately sized toe berm. The toe berm would isolate construction activities and the resulting turbidity generated from the slurry from the ocean surface waters. The water from the slurry would run parallel to the toe berm and drain to the ocean after sediment has settled from the slurry. Given this, only minor and temporary changes to turbidity from placement of material at Ocean Beach may occur. Any potential changes in turbidity levels from this activity are expected to be localized at the point where the decant water returns to the surf, and is expected to remain generally within the ambient range of turbidity of the site given the active wave climate in the foreshore. By design the berm is expected to erode over a 3-4-year period. As sands are eroded from the berm by wave action, they would enter the littoral drift along with the ambient sediment load. This is not expected to increase turbidity significantly and would remain within the ambient range. Placement of the pipeline and mooring buoy would occur from the surface and the pipeline would be lowered to the sea floor. The weight of the pipeline is expected to prevent any significant shifting. Weighted collars would be used as necessary. Some very temporary and minimal turbidity may occur as the pipeline settles on the bottom, but none is expected from pipeline movement after placement. Effects of increased turbidity to biological resources are discussed in the biological resources section below. Because of the nature of material (i.e. sand) and short duration and temporary nature of the placement activities, the effects of the proposed action would be minor and not significant. Under the no action alternative, material would not be placed onshore at Ocean Beach, and current erosion impacts would continue. The no action alternative would have temporary and localized impacts to turbidity at the nearshore placement site, mainly involved with a temporary reduction in visibility that could impact fish and avian foraging. Turbidity impacts of nearshore placement are discussed in more detail in the Federal Navigation Channels EA/EIR.

(X) Substrate: Substrate of the aquatic ecosystems are defined in Section 404(b)(1) Guidelines (40 C.F.R. Part 230) as that which "… underlies open waters of the United States and constitutes the surface of wetlands. It consists of organic and inorganic solid materials and includes water and other liquids or gases that fill the spaces between solid particles." Sediment sampling by the USGS in 2010 shows that the existing substrate at ocean beach consists of medium grained sand (250µm-500µm). This sampling shows the existing substrate in the nearshore aquatic zone where the pipeline would transit and be anchored to pump material ashore consists of fine sand (125 µm -250 µm).

Ocean Beach has experienced both natural and man-induced modifications to its substrate characteristics and substrate at the site is in continuous flux in any given year. Over the years, a variety of rock and rubble have been placed in front of the bluff south of Sloat Boulevard for bluff protection. The rubble includes pieces of concrete, granite, marble, and bricks. During the construction of the LMWT and OWPCP in the late 1980s and early 1990s, approximately 400,000 yd3 of sand excavated by the project were placed on Ocean Beach, effectively covering up the rubble and widening the beach. In addition, sand from the northern area of Ocean Beach has periodically been placed along the bluff. Placement and shaping of material onshore at ocean beach under the proposed action would change the substrate shape temporarily by creating the proposed berm, but the physical characteristics of the sand would be generally the same. Operating construction equipment on the sand might cause temporary compaction of the substrate, but this would not change the characteristics of the substrate. Similarly, the laying of the pipe in nearshore waters is not expected to alter the substrate it would be laid upon. Due to the fact that the physical characteristics of the substrate would remain largely constant, the temporary nature of the pump ashore and onshore construction activities, the existing dynamic ocean beach conditions, and the temporary nature of the dune itself (which is expected to last 3-4 years before eroding), the effect of the proposed action on ocean beach and nearshore aquatic substrate would be less than significant. Under the no action alternative, there would be no pumping to, placement on, or shaping of material at Ocean Beach. There would thus be no change in existing substrate conditions within the action area.

(X) Surface water or drainages: The proposed action would involve placement of material onshore along a 3,000-linear foot segment of the shore at Ocean Beach. No surface water bodies or drainages would be affected by the proposed action. The no action alternative would involve no onshore placement and no change to surface water bodies or drainages.

(X) Currents, circulation or drainage patterns: Currents in the vicinity of Ocean Beach, which are primarily shore parallel, are tidal with maximum ebb and flood velocities of the order of three ft/s (Barnard et al. 2007). Current and wave patterns exhibited in the area are largely generated by the waves and tides interacting with the sandy bottom and adjacent shoreline features.

Under the proposed action, material from MSC would be placed onshore at Ocean Beach in a dune configuration. The USACE evaluated potential effects of beach nourishment (dune construction) on currents by conducting two separate one-month hydrodynamic model simulations using a coupled CMS Wave and CMS Flow model to estimate the current velocity at Ocean Beach. The first simulation predicted nearshore currents under the existing conditions at Ocean Beach. The second scenario estimated nearshore velocity after material, in the dune configuration, was placed. A comparison of both model simulations was made to predict the change in nearshore currents as a result of material placement. The model simulated a one-month period in January 2010. Based on the analysis, the Ocean Beach nourishment alternative would minimally change current and circulation patterns in the affected area of the Ocean Beach. The life of the dune is expected to be approximately five to six years, during which time the waves and currents would gradually wash away the dune sand. After the dune is eroded away, currents would be expected to return to existing patterns.

In terms of drainage, placement of material associated with the proposed action would occur inside of a temporary toe berm and decant water would be collected and guided to the south of the toe berm where it would drain to the ocean. This would result in a temporary change to drainage patterns in the action area. However, the change would be a minor re-direction of drainage and would cease at the completion of construction of the berm.

Given the minimal change in currents expected as a result of the proposed action and the fact that existing current patterns would return after the life of the berm, along with the minor, temporary changes to draining during berm construction, the proposed action would not have a significant effect on current, circulation, or drainage patterns. The no action alternative would involve no onshore placement or berm construction and therefore no change to existing current, circulation, or drainage patterns.

(X) Mixing zone A mixing zone is defined as a limited area in a water body where ambient concentrations may exceed acute or chronic surface water quality standards. Under the proposed action, the construction of a dune at Ocean Beach would involve a toe berm and decant water would be directed along the berm and guided south for return to the ocean. Given the sandy nature of the MSC dredged material, the return water would be expected to be largely free of sediment as the sand would settle out before the water returns to the ocean. Past sediment chemistry testing for the MSC has consistently been free of any significant contaminant levels. Therefore, the proposed action would not result in a mixing zone exceedance of acute or chronic water quality standards. The no action alternative would involve no placement of material onshore at Ocean Beach and no mixing zone changes.

( ) Flood control functions: N/A

(X) Storm, wave and erosion buffers: The proposed action would involve sand placement atop 3,000 feet of the beach for the purpose of reducing wave energy on the eroding part of Ocean Beach. The proposed beach nourishment would directly protect the eroding bluff south of Sloat Boulevard. Wave action would be absorbed by the sacrificial berm which would provide protection for approximately 3-4 years. Therefore, the proposed action would have a beneficial effect of buffering wave erosion of the bluffs that is currently occurring along this portion of Ocean Beach. This effect would be temporary and expected to last the life of the constructed berm. Conversely, under the no action alternative, no onshore placement or berm construction would occur and the existing bluffs in the area would continue to erode, threatening existing infrastructure and public safety.

(X) Erosion and accretion patterns: Newly placed sand at Ocean Beach under the proposed action, is expected to immediately start dispersing after placement. Consequently, placement of sand would change existing erosion and patterns along Ocean Beach. However, this is consistent with the purpose of the proposed action, which is to alleviate the beach and bluff erosion occurring along ocean beach. The changes to erosion patterns associated with the proposed action would be beneficial, but temporary, lasting the life of the berm. Under the no action alternative, no onshore placement or berm construction would occur and the existing beach and bluff erosion patterns would continue, threatening existing infrastructure and public safety.

( ) Aquifer recharge: N/A

( ) Base flow: N/A

( ) Water supplies, conservation: N/A

(X) Air Quality: An air pollution emissions analysis was prepared in October 2020 that considered the emissions of the equipment required to place and operate, maintain, and remove the dredged material pipeline and onshore equipment that would be required to manipulate the pipeline and shape the sand being placed. The analysis is provided in Appendix A. The analysis assumed offshore project activities would occur for about 18 consecutive days. The duration assumes that approximately 265,000 cubic yards of sand would be pumped onto the beach and that a hopper dredge can pump approximately 5,000 cubic yards per load. This equates to 53 total loads and it is anticipated that there would be 3 to 4 loads pumped per day. The analysis assumes transport of the pipeline to/from the project site with use of a tugboat as well as use of the tugboat to assist the dredge during rough weather. For onshore project activities, the analysis assumes the required equipment comprises two bulldozers, one excavator, one loader, and up to five small diesel-powered generators (for four portable lights and one office trailer). In addition to the earthmoving equipment, the analysis assumes that the onshore work would require six workers per shift, with two 12-hour shifts per day, for each day of onshore construction. Onshore activities are assumed to require 20 days with the equipment operating 18 hours per 24-hour day.

Emissions were estimated for onshore equipment using average fleet assumptions for the Bay Area, as well as using equipment with Tier4f engines. Emissions were also estimated for tugboat use during rough weather resulting in four scenarios. Estimated emissions of criteria pollutants were compared to the Bay Area Air Quality Management District's (BAAQMD) CEQA guidelines for operations, which are not exceeded for any of the four scenarios, and are shown in Table 1

Table 1: Project Emission Totals Summary (tons)

Scenario	ROG (tons)	NO_X (tons)	Exhaust PM_{10} (tons)	Exhaust $PM_{2.5}$ (tons)
Average Onshore Fleet with No Rough Weather	0.54	4.69	0.23	0.22
Tier 4f Onshore Fleet with No Rough Weather	0.49	4.10	0.20	0.20
Average Onshore Fleet with Rough Weather	0.57	4.88	0.24	0.23
Tier 4f Onshore Fleet with Rough Weather	0.52	4.29	0.21	0.20
BAAQMD CEQA Threshold Maximum Annual Emissions	10	10	15	10

NOTES:
a “Rough Weather” events were assumed to be 50% of the 18 days
SOURCE: Air Pollutant Emissions Analysis for South Ocean Beach Nourishment Project Memorandum, San Francisco, California December 02, 2020, Environmental Science Associates (ESA)

The analysis determined that the proposed action would not generate emissions exceeding the thresholds specified in the BAAQMD guidelines or CAA conformity de minimis thresholds. Therefore, since any increase in pollutants would be temporary, and would not exceed BAAQMD guidelines or CAA conformity deminimis thresholds, the proposed action would not have a significant effect on air quality. The no action alternative is part of the annual USACE operations and maintenance of the federal navigation channels and is considered part of the baseline for the airshed.

(X) Geology and Soils: Ocean Beach is within the San Francisco Littoral Cell, which stretches from the Golden Gate to Pedro Point. The cell, which comprises the features in and the morphodynamic processes that affect the beach, coastal bluff and dunes, and nearshore zone,[1] includes the ebb-tidal delta seaward of San Francisco Bay (the Bar), tidal exchange through the Golden Gate, incoming waves, and possibly the flood-tidal delta inside the Golden Gate and the beaches north of the Golden Gate.

According to the morphodynamic classification scheme of Wright and Short (1983, 1984), Ocean Beach is an intermediate beach characterized by a moderate swash-zone slope (1.5°–4.5°), a single well-defined offshore winter bar that moves onshore during the summer months, and a well-defined inter-tidal bar in some locations. Shoreward of the winter bar is a deep trough that can be as much as 10 ft lower than the crest of the bar (Barnard, Eshleman, Erikson, & Hanes, 2007). Longshore topographic variation is evident most of the year with mega-cusps often developing in the winter months that couple with persistent strong rip currents (Hansen, 2007).

Except for rock outcrops between the Golden Gate and the north end of Ocean Beach, south of Fort Funston, and at Pedro Point, the coast comprises sandy beaches backed by sand dunes or coastal cliffs and bluffs. Throughout the nearshore, the bottom is sandy with ripples created by waves and currents. The local offshore bathymetry is dominated by the San Francisco Bar, a large (~58 mi^2) ebb tidal delta located immediately west of the Golden Gate. This bathymetric feature causes considerable refraction and variable focusing of incident waves, leading to spatial variation in nearshore wave heights of as much as nearly a factor of 1.5 in some instances (Eshleman, Barnard, Erikson, & Hanes, 2007). Grain sizes throughout the area are discussed in sediment quality section.

Under the proposed action and no action alternatives, sands from the MSC would be placed directly on the beach or the nearshore area respectively. After placement the sands would behave as the existing substrate and would be seasonally transported on and off the beach as long as it remains in the littoral cell. Neither the proposed plan nor the no action plan would have a significant effect on the geology or soils in the region.

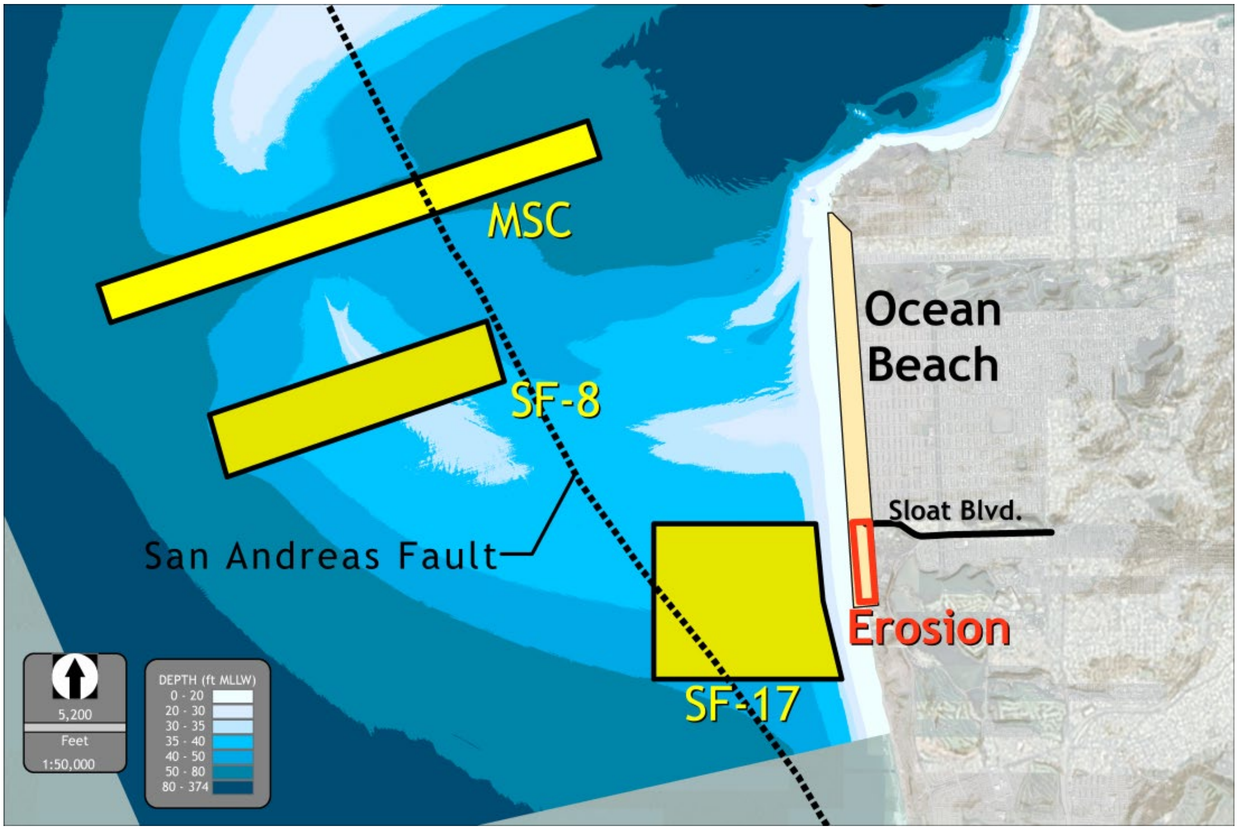

Figure 13: San Andreas Fault relative to Ocean Beach.

(X) Seismicity: The proposed action area is not within an Earthquake Fault Zone as defined by the Alquist-Priolo Earthquake Fault Zoning Act and no known fault or potentially active fault exists at the location. The closest mapped active fault to the project site is the San Andreas Fault located approximately 10 kilometers to the west. The project site is in a Seismic Hazards Study Zone designated by the California Division of Mines and Geology as an area subject to "heavy" to "moderate" damage from seismic ground shaking along both the Peninsula segment of the San Andreas Fault and the Northern segment of the Hayward fault. Neither the proposed action nor the no action alternative would affect seismicity.

(X) Sediment Quality: The proposed action would involve placement of material dredged from MSC onshore at ocean beach. The EPA and Regional Water Quality Control Board have historically determined that MSC sand is suitable for disposal at SF-8 and OBDS based on a Tier I exclusion from testing (subject to grain size testing every eight years to confirm conditions have not changed).

The physical characteristics of material from the MSC have been characterized over time in association with the O&M dredging of the channel and placement of the dredged material. The most recent sampling and testing of MSC material was conducted in 2018. The sampling and analysis report is included in Appendix A. Detailed grain size analysis was performed as part of the 2018 sampling and analysis in anticipation of using MSC material for beach nourishment. The sampling was more refined than usual in order to discern the distribution of sand grain size.

The sediment collected from MSC in 2018 ranged from 91.4% to 98.8% sand (Table 2), which is consistent with the historical results of 90% to 99% sand (Table 4). This material exceeds the typical physical composition goal for beach nourishment projects of greater than approximately 80% sand.

Another important constituent in dredged material is its organic-material content. Organic material generally contributes to suspended sediments and has the potential to cause stress to the receiving site biota (Wilber & Clarke, 2001). The 2018 testing results show as range of total organic carbon of 0.8% to 1.8% with a weighted average of 1.1% (Table 3). This is higher than the 2010 sampling where all the samples were below 0.35%. This is still considered low and suitable for beach nourishment. The results of 1994 MSC chemical testing are shown in Table 5. The results are what would be expected from clean sandy material with low levels of metals and PAHs and no pesticides PCBs or butyltins detected.

Table 2 2018 SFMS Channel Sieve and Hydrometer Analysis Data for Individual Locations and Weighted Average Results for the Composite Area.

Core Designation	Elevation (ft MLLW)		Gravel		Coarse Sand		Medium Sand				Fine Sand					Silt/Clay	% Sand[1] (DYA[2])	Copper T	
			Sieve No. / Sieve Size / % Passing																
	Top	Bottom	3/8 9.5mm[1]	4 4.75mm	7 2.80mm	10 2.00mm	14 1.40mm	18 1.00mm	25 0.71mm	35 0.50mm	45 0.355mm	60 0.25mm	80 0.18mm	120 0.125mm	170 0.09mm	200 0.075mm	230 0.063mm		% Sand[1]	S
SFMS-2018-1	-54.5	-56.5	100	100	99.9	99.9	99.8	99.6	99.5	99.3	98.8	95.9	67.1	14.7	9.3	8.6	8.0	91.4	93.8	5
SFMS-2018-2	53.5	-56.5	100	100	100	100	100	99.9	99.0	99.7	99.2	95.8	74.6	13.4	5.9	5.2	4.6	94.8	91.5	8
SFMS-2018-3	-54.5	-57	100	100	100	100	99.9	99.9	99.8	99.8	99.5	97.6	69.5	9.0	3.7	3.2	2.9	96.8	94.8	4
SFMS-2018-4	-52.5	-56	100	100	100	100	100	100	100	99.9	99.6	97.3	62.3	5.2	1.5	1.2	1.1	98.8	96.6	3
SFMS-2018-5	-54.5	-57	100	100	100	99.9	99.9	99.9	99.9	99.8	99.7	97.8	59.9	10.9	5.7	5.1	4.6	94.9	92.2	6
SFMS-2018-6	-52	-56.2	100	100	100	100	99.9	99.9	99.9	99.9	99.8	97.6	43.6	5.0	3.00	2.8	2.7	97.2	97.7	2
Weighted Average			100	100	100	100	99.9	99.9	99.8	99.8	99.5	97.1	61.4	9.0	4.4	3.9	3.6	96.1	94.8	4

[1]All material passed through sieve sizes greater than 9.5 mm.
[2]Percent sand based on passing through the #200 Sieve.
[3]Tested by Diaz Yourman and Associates.

Table 3 2018 SFMS Channel Sediments Organic Content and Percent Solids Data.

Analysis	Core Designations (SFMS-2018-)						Weighted Average
	1	2	3	4	5	6	
% Solids	64.5	64.3	68.4	71.0	66.6	69.1	67.7
% Organic Matter	1.3	1.2	1.0	0.8	1.8	0.9	1.1

Table 4: Historical Grain Size Results for the MSC

Year	Percent Sand (Average)
1970	90%
1979	96%
1980	98%
1981	98%
1983	90%
1985	98%
1987	90%
1994	99%
2002	98%
2010	98%

Table 5: Results of the 1994 MSC Chemical Testing (ToxScan, 1994)

Constituent		Range for 10 grab samples
Total Organic Carbon		<0.1 - 0.1
Percent Solids		70 - 80 %
Metals:	Arsenic	8.5 - 12 mg/kg
	Cadmium, Selenium, and Silver	<0.1 mg/kg
	Chromium	7.3 - 88 mg/kg
	Copper	3.0 - 6.8 mg/kg
	Lead	3.5 - 7.7 mg/kg
	Mercury	0.02 - 0.1 mg/kg
	Nickel	24 - 58 mg/kg
	Zinc	22 - 46 mg/kg
Total detected PAHs		0* - 1100 µg/kg
Total detected Pesticides, PCBs, and Butyltins		ND*

*ND = Not Detected at detection limits within typical ranges for individual analytes

The proposed action would place approximately 265,000 cubic yards of MSC sandy material (>90% sand) onshore at Ocean Beach. Any additional material dredged in maintaining the channel would be placed at SF-17. For beach-nourishment projects, the USACE and USEPA require general physical compatibility of sediment between source and receiving sites (USACE, 2004). Sediment sampling by the USGS in 2010 shows that the mean grain size in most of the San Francisco Bight falls in the fine-sand range (125 to 250 µm) with medium sand (250 to 500 µm) occurring along Ocean Beach and on the inner part of the Bar (Figure 14). Coarse sand (500 to 1,000 µm) was restricted to areas closest to the Golden Gate where strong tidal currents effectively winnow away finer sand.

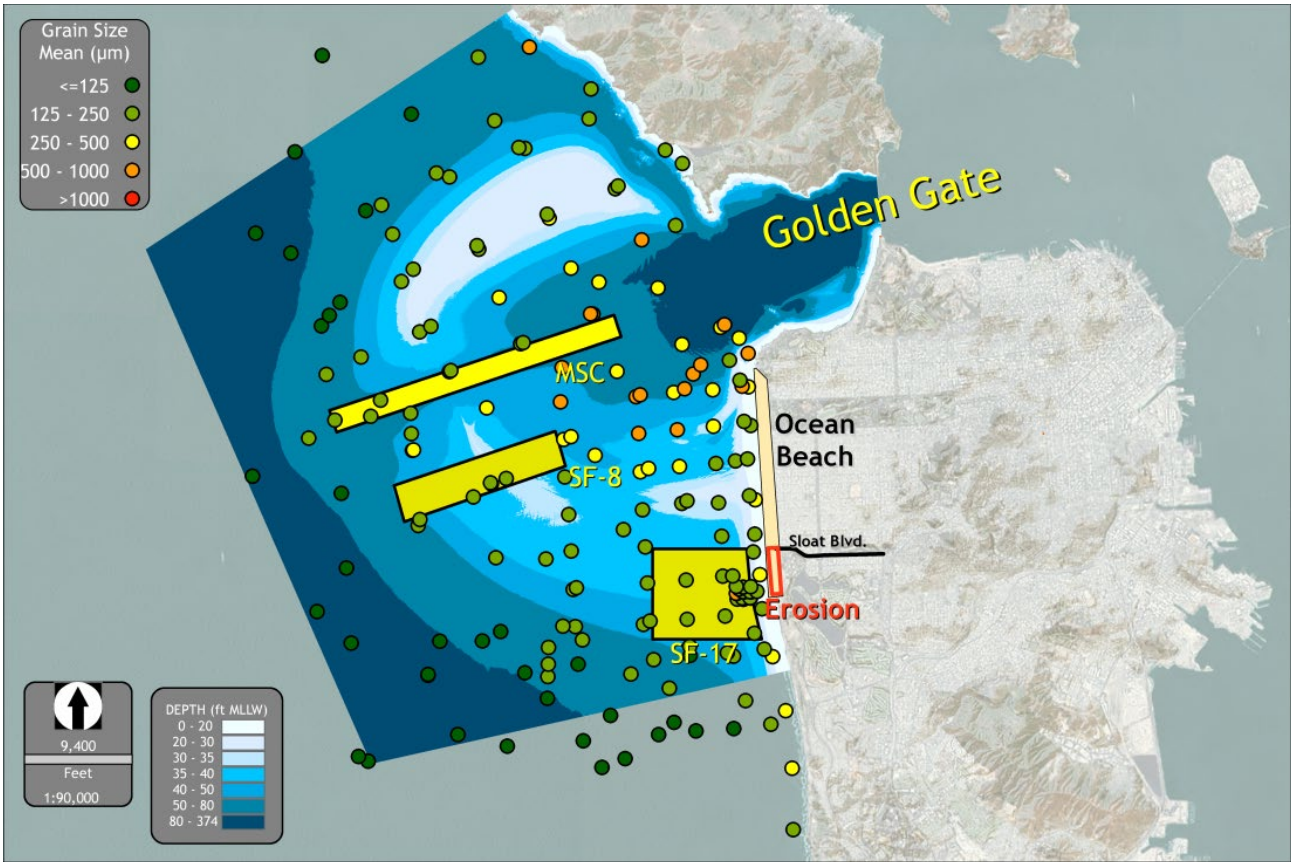

Figure 14: Grain-size distribution outside of the Golden Gate.

Based on the results of the 2018 sampling an analysis, the MSC material is generally consistent with or slightly finer than the grain-size range of material reported along Ocean Beach by the U.S. Geological Society (USGS). Existing grain size conditions at Ocean Beach are believed to be consistent with these results.

Based on the high-quality, sandy nature of the MSC material and its consistency with the material found at Ocean Beach, no significant adverse impacts from sediment quality are expected to occur as a result of placement at Ocean Beach under the proposed action. The no action alternative would result in no placement of material at Ocean Beach and therefore no change to sediment quality.

(X) **Mineral Resources:** There are no known mineral resources existing within the action area, and therefore neither the proposed action nor the no-action alternative would have any impact on mineral resources.

4.2 Biological Environment

The nearshore habitats of the Pacific Ocean off Ocean Beach with depths ranging from 20 – 50 ft MLLW consist of sandy bottomed subtidal habitat. The habitat along Ocean Beach consists of both aquatic/marine and terrestrial environments (i.e. sandy beach and cliff, as well as intertidal habitat). Potential effects to aquatic and terrestrial habitats and species are discussed in the subsequent sections, followed by a discussion of effects to special status species and their proposed or designated critical habitat.

(X) Aquatic Habitat and Species: The subtidal nearshore habitat and the intertidal and beach habitat of Ocean Beach support diverse communities of benthos (bottom-dwelling organisms), invertebrates, planktons (drifting organisms in the water column), fish, birds, marine mammals, and aquatic plants as described below.

Benthic and Invertebrate (infaunal) Community. In the shallower sand and mud bottom, the benthic fauna includes various assemblages of polychaete worms, crustaceans (amphipods, crabs, and ostracods), molluscs (pelecypods, gastropods, and scaphopods); echinoderms (starfish, brittle stars, heart urchins, sea cucumber, and sea pens). Other phyla which may be present include nematodes, coelenterates, echiurans, and rhynchocoels. Overall, the benthic community in the proposed action area is similar to those typically found in high energy environment along the coast of Northern California. Seasonal epibenthic surveys conducted in late winter and fall showed Arthropods dominated the intertidal and subtidal habitat, while Echinodermata, mainly sand dollar (*Dendraster exentricus*) was the dominant species in the benthic surveys (McCormick, 1992). The survey found the most characteristic infaunal species of the beach and intertidal habitat are the great beach hopper (*Orchistoidea corniculata*), the mole crab (*Emerita analoga*), the Pismo clam (*Tivela stultorum*), razor clam (*Siliqua patula*), short-spined starfish, a nephtyid polychaete worm (*Nephtys californensis*), and various species of jellyfish (McCormick 1992).

Among the infaunal community of the beach, the larger and mobile organisms have the ability to leave the area during onshore placement of material and berm construction associated with the proposed action, while the less mobile, sessile type of organisms are more likely to be buried by sand. Even organisms which are motile or those able to burrow out still have the potential to be buried by the overburden. Detrimental effects of dredged material placement on benthos along the beach and intertidal habitat of Ocean Beach include disturbance or disruption to species using these habitats by direct burial, crushing by heavy equipment shaping or pipeline anchoring activities, or removal of invertebrates.

Placement of dredged material onshore at Ocean Beach and the temporary anchoring of a pipeline in the nearshore environment would cause a temporary impact to the benthic community in the direct footprint of the pipeline and berm, however, both the nearshore and the shore environment along the coast of Ocean Beach are dynamic and high energy environments which experience rapid sediment flux and recolonization. The National Research Council's review of several studies on impacts of beach nourishment activities on the invertebrate community have shown the benthic community recovery at the beach, and intertidal habitat generally takes place in the order of few weeks to months (National Research Council, 1995). Nonetheless, adverse impacts to the beach and intertidal invertebrate community would occur. It is anticipated the entire footprint of the beach nourishment area (approximately 10.3 acres) would be temporarily impacted. Indirect effects of this temporary loss of intertidal community would also occur on marine and avian predators, including non-breeding shorebirds, for example due to temporary disruption to foraging patterns. Due to the size of the proposed beach nourishment (i.e. up to 3,000 ft long by 150 ft base on the beach), the fact that it is a one-time occurrence, and the recovery rates of invertebrate population, this potential disruption to the both the invertebrate community and their predators is expected to be less than significant. As described in the turbidity and suspended particulates section above, potential changes in turbidity levels from the proposed action are expected to remain generally within the ambient range of turbidity experience at Ocean Beach given the active wave climate in the foreshore, the sandy material, and the proposed toe berm. By design the berm is expected to erode over a 3-4-year period. As sands are eroded from the berm by wave action, they would enter the littoral drift along with the ambient sediment load. This is not expected to increase turbidity significantly and would remain within the ambient range. Because the MSC material is clean sand, most of it would settle out quickly and not create a turbidity plume. The mooring buoy and dredged material delivery pipeline would be lowered from tugs. It would be lowered to the sea floor and held in place on the by its own weight. Weighted collars would be used as necessary. Placement of the pipeline is not expected to cause turbidity above the ambient level. It is possible that some of the subtidal benthic flora would be crushed by the pipeline, but due to the small area (.31 acres), this is not considered significant. Therefore, turbidity effects on benthic invertebrates, would be minor. Given the abundance of this species assemblage along the San Francisco coast, the temporary and minor impacts expected from the proposed action, and the recovery rate of these communities, effects of the proposed action on benthic invertebrates are expected to be less than significant

Under the no action alternative, no material would be placed onshore at Ocean Beach and no pipeline would be temporarily anchored in the nearshore environment. No changes to the invertebrate community on the beach or intertidal zone would occur. Although placement at SF-17 would cause burial of the less mobile benthic community, the impact would be episodic and short term. Similar types of impacts to the benthic community and other communities currently occur with placing dredged sediment at SF-8 and the OBDS. Since the material is clean sand, most of it would settle out quickly and not create a turbidity plume. In a broader regional context of the San Francisco coast, impacts are considered less than significant because of the relatively small area of the placement site compared to the total area comprising the existing aquatic species communities.

Plankton Community. The plankton community is comprised of drifting unicellular to multicellular plants and animal species existing in the water column. As their names suggests, both phytoplankton and zooplankton drift with the tides and currents. Plankton constitute a substantial component of primary productivity. Phytoplankton, which rely on photosynthesis for energy generation, are vulnerable to light attenuation caused by turbidity plumes. In general, physical characteristics of dredged material determine the extent and duration of turbidity plume which in turn effects phytoplankton energy production. Zooplankton include diatoms, protozoans, and smaller crustaceans. Dredged material generated from maintaining the MSC would consist of >90% sandy material. Studies have shown turbidity generated from the aquatic release of sandy material generally dissipates in order of a few hundred seconds to less than 10 min (USACE 2003). Return water from the Proposed Action would generate far less turbidity, as the sediment settles out along the toe berm before the water flows back into the ocean. Potential impacts to the plankton community of the proposed action would therefore be less than significant. Under the no action alternative, no material would be placed onshore at Ocean Beach and no pipeline would be temporarily anchored in the nearshore environment. No changes to the plankton community would occur.

Fish Community. This area of the coast provides habitat to 50-100 species of fish. Fish sampling conducted 3–4 mi offshore of Ocean Beach show species such as sharks, skates, ratfish, midshipman, pipefish, poachers, sculpins, surfperch, goby, lingcod, snailfish, rockfish, halibut, sole, flounder, and turbot (City of San Francisco Clean Water Program 1990). Surveys conducted by McCormick (1992) found fish species such as speckled sanddab, spot fin surfperch, sand sole, English sole, shiner surfperch, and Pacific sanddab. Pelagic species such as anchovy and sardine spawn in the Southern California Bight and migrate into waters off Central and Northern California.

Under the proposed action, the dredged material delivery pipeline would temporarily rest on 0.31 acres of sandy bottom habitat during the construction action. It would be lowered to the sea floor and held in place under its own weight. Weighted collars would be used as necessary. The placement and operation of the pipeline is not anticipated to significantly affect the fish community. Return water from the proposed action would generate turbidity, as the sediment settles out along the toe berm before the water flows back into the ocean. Therefore, the effect of the proposed beach nourishment action on fish and shellfish would be minor, short-term, and not significant.

Under the no action alternative, the current practice of nearshore placement would continue. The temporary and localized turbidity impacts discussed in the Physical Environment section would continue Fish and shellfish are most sensitive to turbidity effects during early life-history stages, such as the egg and larval stages. Organisms during these stages have limited avoidance capabilities and depend on local hydrodynamic conditions for transport into and out of dredging areas. Demersal eggs (eggs sinking to the bottom) and sessile or non-motile life history stages are perceived as particularly susceptible because of their longer exposure to elevated suspended sediments or because smothering by increased sedimentation. Demersal fish eggs attached to structures within the vicinity of the plume could be affected by the particles settling on the eggs. Eggs and smolts are not expected to be present in the proposed SF-17 and its vicinity because of depth, the type of substrate in this area, and absence of structures.

Other impacts of dredged-material placement to fish and shellfish are determined to be minor and short-term.

(X) Special Aquatic Sites (Wetlands, Mudflats, Coral Reefs, Pool and Riffle Areas, Shallows, Sanctuaries and Refuges, Other): There are no wetlands, rocky shoreline, salt marshes, tidal marshes tidal flats, salt ponds, mudflats or other special aquatic sites, as defined by the Clean Water Act, within the proposed action area or the surrounding vicinity. Although Ocean Beach is in the proximity of Gulf of the Farallons and Monterey Bay National Marine Sanctuaries, however the closest boundary is approximately five miles away. Placement of sandy sediment is not expected to have detrimental effects on the resources of these sanctuaries. Therefore, there would be no detrimental impacts to special aquatic sites or sanctuaries with the proposed action or no action alternatives.

While not a designated special aquatic site, the Ocean Beach area is under the ownership of GGNRA and the GGNRA is a NEPA cooperating agency and partner for this proposed action. Before undertaking the proposed action, USACE will ensure compliance with all applicable GGNRA policies and, if appropriate, secure a Wetlands -Statement of Findings or waiver from GGNRA.

Per 404(b)(1) analysis requirements, Table 6 lists the impacts (including direct, indirect, permanent, and temporary) to waters of the United States and wetlands for each alternative considered.

Table 6 – Summary of Impacts to Waters of the U.S. including Wetlands

Alternative	**Non- Wetland WoUS (acres)**				**Wetlands (acres)**			
	Permanent		**Temporary**		**Permanent**		**Temporary**	
	Direct	**Indirect**	**Direct**	**Indirect**	**Direct**	**Indirect**	**Direct**	**Indirect**
Proposed Action	**0**	**0**	**10.61***	**0**	**0**	**0**	**0**	**0**
No Action	**0**	**0**	**2,111****	**0**	**0**	**0**	**0**	**0**

* The acreage was calculated based on the amount of fill from the toe of the cliff up to the High Tide Line, which is the geographic boundaries under Clean Water Act. The acreage includes the dredged material pipeline route (0.31 ac). High tide line estimated from highest high predicted tides for June-August in the years 2019 -2021 (7.18 ft MLLW).
** The acreage represents the SF-17 disposal site boundary, not all of which would be used in a given year's episode.

It should be noted that under the federal Clean Water Act, no portion of the Ocean Beach nourishment site qualifies as wetlands (nor does the SF-17 disposal site where MSC material would be expected to be placed under the no action alternative). While neither alternative would involve impacts to wetlands, both would involve effects to non-wetland waters of the U.S. Given the fact that the proposed action would involve a smaller acreage of material placement effects to non-wetland waters of the U.S., and in consideration of other relevant factors (see 404(b)(1) checklist in Appendix A), the USACE has determined that the proposed action is the least environmentally damaging practicable alternative (LEDPA).

(X)　Terrestrial Habitat and Species: The portion of Ocean Beach in the proposed action area is a thin sandy strand with steep cliffs leading to the fully urbanized City of San Francisco. The greater Ocean Beach areas are similarly abutted by steep sandy cliffs or dunes that continue to be eroded away by the wind, currents, and tides. Portions of the beach are covered by rock or rubble mounds placed mainly by human activity for protection of the cliffs and the infrastructure. Due to these human and natural disturbances, the majority of the dunes are sparsely vegetated and degraded. Vegetation on the dunes mainly consists of the introduced European beach grass (*Ammophila arenaria*), however, native dune vegetation may also be found on this portion of the dunes. Despite the disturbed nature of this area, Ocean Beach provides habitat to a number of terrestrial and avian species. Terrestrial mammals in the proposed action area of Ocean Beach are not diverse or abundant. The most common of these species include California ground squirrel, California gray squirrel, and house mouse. Reptiles such as western fence lizard, gopher snake, and common garter snake may also inhabit the area. These species would be limited to the top of the bluff above the placed riprap and along a 150 ft of the dune above the elevation of the placement area. These species may be temporarily impacted by the noise of the construction activity but would not come into contact with the construction equipment or material being placed. The impact from noise would be localized and temporary and therefore are not expected to be significant.

Both the open coastal waters of the Pacific Coast and the intertidal habitat along the beach serve as foraging habitat for shorebirds and waterbirds. Over 150 species of birds have been observed on the coast of Northern California at various times of the year. Commonly observed seabirds and shorebirds in the vicinity of Ocean Beach include brown pelicans and sea gulls, cormorants, murrelet and some species of terns. Beach areas are used by shorebirds and the species vary by season. In fall, winter, and spring loons and grebes may be observed, whereas, plovers may use the area for wintering. Other shorebirds using this area for foraging and cover may include sanderling and snowy plover. The upper intertidal zone is of special importance as a foraging area for shorebirds during the fall migration. The no action alternative would not affect any terrestrial habitat, as it would occur entirely offshore. The proposed action would primarily affect shorebirds due to temporary material placement and heavy equipment movement in the proposed action area which includes foraging habitat. However, the proposed action area involved is approximately 10 acres and intertidal foraging habitat is available for miles in either direction of the placement site. Some avian species may actually utilize the placed material as a food source depending on the invertebrates present in the dredged material. Effects to the benthic community (a food source for shorebirds) are described above and expected to be minor and temporary as well.

Given the short term nature of the onshore placement and shaping activities to construct the proposed berm, the disturbed nature of the existing terrestrial habitat, and the availability of abundant similar habitat in the immediate vicinity of the proposed action area, the effects of the proposed action to terrestrial species would be minor and short-term, therefore, not significant. Under the no action alternative, no material would be placed onshore at Ocean Beach and there would be no change to existing conditions for terrestrial habitats and species.

Effects on special status terrestrial species are discussed below.

(X) Special Status Species, Critical Habitat, Fishery Managed Species: Table 8 documents state and federally listed (or proposed) endangered or threatened species under the state and federal Endangered Species Acts (CESA and FESA); designated and proposed critical habitat under FESA; Essential Fish Habitat in accordance with Magnuson Stevens Fishery Conservation and Management Act (MSFCMA); marine mammals protected under the Marine Mammal Protection Act (MMPA); and avian species protected under the Migratory Bird Treaty Act (MBTA) with the potential to occur in the project action area. The USACE is currently consulting with NMFS and USFWS to avoid, minimize, or mitigate any impacts to all listed species and their proposed or designated critical habitat. USACE has determined that the proposed action may effect but is not likely to adversely affect any species or critical habitats under the purview of NMFS or USFWS. The correspondence letters are attached in Appendix A.

Table 7: Special Status Species and Critical Habitats potentially occurring in and adjacent to the proposed action area.

Scientific Name	Common Name	Status	Statutory Protection
Sterna antillarum browni	California least tern	Endangered	Federal Endangered Species Act (FESA)
Brachyramphus marmoratus	Marbled murrelet	Threatened	FESA
Charadrius nivosus nivosus	Western snowy plover	Threatened	FESA
Riparia riparia	Bank swallow	Threatened	California Endangered Species Act
Larus californicus	California Gull		Migratory Bird Treaty Act (MBTA)
Phalacrocorax auratus	Double-crested cormorant		MBTA
Acipenser medirostris	Green Sturgeon, Southern DPS	Threatened with Critical Habitat Present	FESA
Onchorhynchus mykiss	Steelhead, Central California Coast and Central Valley DPS	Threatened	FESA

Onchorhynchus tshawytscha	Chinook salmon, Central Valley Spring-Run ESU	Threatened	FESA
Onchorhynchus tshawytscha	Chinook salmon, Sacramento River Winter-Run ESU	Endangered	FESA
Onchorhynchus kisutch	Coho salmon, Central California Coast ESU	Endangered	FESA
Chelonia mydas	Green sea turtle	Threatened	FESA
Dermochelys coriacea	Leatherback turtle	Endangered with critical habitat present	FESA
Eumetopias jubatus	Steller sea lion, Western DPS	Endangered	FESA/ Marine Mammal Protection Act (MMPA)
Zalophus californianus	California Sea Lion		MMPA
Phoca vitulina	Pacific harbor seal		MMPA
Mirounga angustirostris	Northern elephant seal		MMPA
Eschrichtius robustus	Gray whale		MMPA
Megaptera novaeangliae	Humpback whale, Mexico DPS	Endangered with Proposed Critical Habitat present	FESA/MMPA
Orcinus orca	Killer Whale, Southern Resident DPS	Endangered with Proposed Critical Habitat present	FESA/MMPA
Haliotis cracherodii	Black abalone	Endangered with critical habitat present	FESA
	Pacific Groundfish Fisheries Management Plan (FMP)	Essential Fish Habitat	MSFCMA
	Coastal Pelagic FMP	Essential Fish Habitat	MSFCMA
	Pacific Salmon FMP	Essential Fish Habitat	MSFCMA

Fishes

Green sturgeon. The Southern Distinct Population Segment of green sturgeon was listed as a threatened species in April 2006. Spawning typically occurs in estuarine and fresh waters. The temporary anchoring of the pipeline to pump material ashore under the proposed action would not adversely affect this species due to the small spatial extent of the pipeline (approximately 0.31 acres) and mobility of the green sturgeon. Moreover, the pipeline would be lowered to the sea floor and held in place under its own weight. Weighted collars would be used as necessary. With respect to the onshore beach nourishment activities, material placement is not expected to cause adverse effects to Green sturgeon as no placement would occur in open waters.

Salmonids. The Sacramento River winter-run (endangered) and spring run (threatened) Chinook salmon may occasionally occur offshore of Ocean Beach in the vicinity of SF-17 during migration season (November to May). The threatened coastal steelhead (both Central Valley and Central California Coast ESUs) may be present once they out-migrate from the Bay. Coho salmon migrate through the San Francisco Bay during fall months. Because there are no coho, or steelhead spawning areas near or upstream of the coast, smolts are not expected to occur offshore of Ocean Beach during the proposed action. Moreover, the proposed action is expected to take place during the August-September timeframe and thus would not be during the months when these species would be most likely to occur offshore of Ocean Beach. With respect to the proposed beach nourishment, no placement would occur in open waters and the dredged material delivery pipeline would temporarily rest on only .31 acres of sandy bottom habitat. Moreover, the weight of the pipeline is expected to prevent it from shifting on the sea floor. Weighted collars would be used as necessary. Given this, the proposed action is not likely to adversely affect salmonid species.

Birds. The Federally listed as threatened marbled murrelet (*Brachyramphus marmoratus*) may be present in waters offshore of Ocean Beach during the non-breeding season. These murrelets are divers which forage for fish and invertebrates under water.

The California least tern (*Sterna antillarum browni*) is federally listed as endangered. While the area offshore of Ocean Beach is not a prime foraging location, these terns may occasionally visit the area for foraging when prey items are present. Least terns dive from the air to catch fish just below the surface. No least tern breeding locations are near the proposed action area.

Any potential impacts from material placement onshore at Ocean Beach to the marbled murrelet or least tern that forage in the water is expected to be less than that of the no action alternative which would involve continued placement of material from MSC in open waters at SF-17. In general, turbidity generated with placement of dredged material at SF-17 under the no action alternative could interfere with foraging of avian species. However, suitable dredged material for disposal at SF-17 is required to be greater than 90% sand. This material would generally settle in approximately 10-30 minutes following release so any impacts to foraging would be localized and temporary. Under the proposed action, the dredged material delivery pipeline would temporarily rest on .31 acres of sandy bottom habitat. It would be lowered in place and is expected . The placement and operation of the pipeline is not likely to adversely affect aquatic foraging efforts of these birds.

The endangered western snowy plover (Charadrius nivosus nivosus) utilizes many areas of Ocean Beach and may forage in the proposed action area. They forage along the water line and in dry sand. These birds nest from March 1 through September 30 in a variety of beach habitats above MHHW. None of the beach in the project footprint is at an elevation suitable as nesting habitat.

In 2008 the NPS, through formal rulemaking, established a Snowy Plover Protection Area on Ocean Beach in order to provide a protection zone for western snowy plovers overwintering on Ocean Beach (snowy plover nesting has not been documented on Ocean Beach). Western snowy plovers are present on Ocean Beach almost all year (from July to May), generally found north of the project site within the designated Snowy Plover Protection Area, located between Stairwell 21 to the north (across from the Beach Chalet) and Sloat Boulevard. No work would occur within this protection area and therefore no affect to snowy plover nesting is expected.

The proposed action would involve the placement of sand on approximately 10 acres of potential snowy plover foraging habitat. The impact to foraging would be the same as discussed above in the terrestrial habitat and species section for shorebirds in general. Plovers would likely avoid the placement area during construction due to the noise and physical disturbance. The impacts to the foraging area would be temporary with the recovery of many food items within a month. The project is adjacent to miles of additional intertidal foraging habitat in either direction down the beach. Therefore, the proposed action is not expected to adversely affect western snowy plover foraging.

The no action alternative would not affect snowy plovers in any way since entire operation would take place offshore.

The bank swallow (*Riparia riparia*) is a State-listed threatened species that establish burrows in beach bluffs in which to breed, nest, and rear young. An important nesting colony of bank swallows is present within the southern end of the project site and extending south into Fort Funston. The colony is referred to as the "Fort Funston colony" even though the full extent of the colony includes burrows within bluffs north of the Fort Funston boundary and within the project area. NPS biologists have been actively monitoring the swallows at Ocean Beach, as they have been using the bluff face above the rock revetment, as well as the bluffs to the south (add citation to NPS report). Bank swallows typically nest from April 1 to August 1, after which they migrate south for the winter. Based on NPS analysis of monitoring data from the past 21 years, the Fort Funston colony bank swallows have been present after July 15 in about half the years, have been present after August 1 in one third of the years with August 7 as the latest date observed in the breeding area, and were absent entirely from the project site and adjacent areas in 2020.[2]

The work window, project design, and nesting bird protocols for this project were selected in coordination with the NPS to avoid interference with nesting of the bank

[2] GGNRA, William Merkle, Staff Biologist, communication dated November 3, 2020.

swallow. For instance, the sand would be placed to cover the existing revetment, and not extend to the top of this bluff where the nests may occur. Beach placement activity would take place between July 15 and September 30. Work would include initial site surveys and mobilization, approximately 20 days of sand placement/earthmoving, and demobilization. As part of its bank swallow monitoring program, the NPS would provide monitoring data regarding the presence and location of bank swallow nests within and adjacent to the site prior to and during construction (if needed). If active (burrow) nests are identified, no construction activities would commence within 250 feet of active nests. In addition, if bank swallow nests are active, night lighting with amber colored bulbs must be used and located beyond the 250-foot buffer from work areas. Any lighting must be fully shielded and directed downward in active work areas in order to avoid light escape into surrounding areas, including adjacent bank swallow habitat and ocean waters. Because most work would be conducted when there are no active nests within the project site and construction activities would not be conducted within 250 feet of an active nest, there would be no impacts to bank swallow.

The No Action alternative would not affect bank swallows in any way since no material would be placed onshore at Ocean Beach.

The California gull and double-crested cormorant are migratory birds protected under the MBTA and which occur in the project area. Both species may forage at or near the proposed beach nourishment site. The foraging area for these protected species spans over a much greater portion of the coast and is not limited to proposed action area. There are no known nesting areas for these species in the proposed action area. There may be minor disturbances to the foraging activities of these birds resulting from operation of construction equipment and placement/shaping of material. These potential disturbances are considered to be temporary and minimal based on the small size of the proposed action area relative to the available foraging area in this region.

Marine Reptiles. Sea turtles are pelagic species but may forage in coastal waters. The green sea turtle (*Chelonia mydas*) has the potential to occur in the vicinity of the proposed action area, however, they are generally found in warmer waters. The leatherback turtle (*Dermochelys coriacea*) has the potential to occur near the proposed action area, though its occurrence is typically in deep waters (> 55 ft below MLLW). The nesting occurs in temperate waters, therefore, juveniles and eggs would not occur in the proposed action area vicinity. Adult leatherback sea turtle occurrence in the proposed action area is rare. Placement of sandy material onshore at Ocean Beach is not expected to affect the sea turtles species listed above as these species are not expected to occur at the proposed onshore placement site and the temporary pipeline in the nearshore zone would be anchored to the bottom and not effect sea turtle movement or foraging.

Marine Mammals. Species of marine mammals such as harbor seals (*Phoca vitulina*), northern elephant seals (*Mirounga angustirostris*), Steller sea lion, Western DPS (*Eumatopias jubatus*), California sea lions (*Zalophus californianus*), Pacific white-sided dolphins (*Lagenorhynchus obliquidens*), and harbor porpoise (*Phocoena Phocoena*) are present in the waters offshore of Ocean Beach and in the vicinity of the expected placement site under the no action alternative (SF-17). Humpback whales, and gray whales have been observed in the vicinity of the SF-17 in their migration route through the Gulf of the Farallones. Marine mammals typically can be affected by dredge material placement via noise generated from equipment operation, dredge plumes, and direct collision with disposal vessels. Beach nourishment activities associated with the proposed action would involve mooring of a hopper dredge offshore of Ocean Beach and pumping of dredge material onshore via submerged, anchored pipeline so would not generate a dredge plume. While a dredge vessel would be moored offshore, marine mammals in the area are highly mobile and expected to easily avoid the dredge vessel, especially when it is moored, and the pipeline anchored to the sea floor. These species forage throughout the region off the central California coast, so that any temporary reduction in food supply due to the avoidance of the dredge vessel or pipeline would be insignificant due to their ability to forage over a wider area. While the probability of marine mammal presence on the beach is very low, construction of the toe berm and fencing of the proposed action area onshore are expected to deter any amphibious marine mammals away from the construction area. Beach nourishment would also avoid placement in the primary feeding habitat of marine mammals that would occur under the no-action alternative, so would minimize effects. Given this, effects of the proposed action on marine mammals would be minimal, temporary, and less than significant. The no action alternative would be expected to involve placement of MSC material in the aquatic environment. The effects of this action are discussed in detail in the *Final Environmental Assessment/Environmental Impact Report for Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay Fiscal Years 2015-2024*. Relative to onshore placement, aquatic placement under the no action alternative would be expected to have more potential effects to marine mammals.

Invertebrates. The black abalone (*Haliotus cracherodii*) is listed as endangered. Black abalone are algal grazers that live in rocky habitat, which is required for all life stages. The rocks need to have holes and crevices that provide protection from predation and wave energy to smaller size abalone. Coralline algae must be present as a substrate for larvae to settle out and as a food resource for adults. The bottom substrate along the pipeline route and at the beach placement site is entirely sandy, so no black abalone are expected to occur in the proposed action area or nearby. The nearest rocky habitat that may be suitable is at Land's End and would not be affected by this project. Therefore, this project would have no effect on black abalone.

Critical Habitat

The proposed action area and its vicinity coincide with listed Critical Habitats for three species including the green sturgeon Southern Distinct Population Segment (DPS), black abalone, and leatherback turtle. The federal ESA prohibits destruction or adverse modification of a listed species proposed or designated critical habitat. Adverse changes to physical or biological features of habitat include modifications to water flow, water quality, migratory corridor, water depth, sediment quality, and food resources. All of these are important for preserving the species' critical habitat.

There is the potential for Critical Habitat to be designated for the humpback whale and killer whale in the near future. These species would only potentially occur rarely in the proposed action area. Impacts to foraging and vessel interactions are expected to be similar to the other marine mammals discussed above.

The potential indirect effects of the proposed action on critical habitat could include potential spills or leaks of fuel or material from the dredge vessel when moored offshore. Vessel best management practices would be followed to minimize the potential for material or fuel spills or leaks from the dredge at any time en route to or from the mooring site. Therefore, no adverse effects from marine vessels on critical habitat water quality are expected. Moreover, in comparison to the no-action alternative, the proposed action would reduce any aquatic turbidity impacts since the material would be placed on shore where the sand would settle out before the water returns to the surf zone.

The dredged material delivery pipeline would rest on .31 acres of sandy bottom habitat. It would be lowered in place. And held in place on the sea floor by its own weight. Weighted collars would be used as necessary. The temporary placement of the pipeline is not anticipated to adversely affect critical habitat for these species.

Due to the limited area involved and minimal impact and short duration of the proposed action, neither the proposed action nor no action alternatives would significantly affect any existing or proposed Critical Habitat.

ESA Determination

Based on the above analysis, USACE has determined that the proposed action, may affect but is not likely to adversely affect (NLAA) listed species or their critical habitats. USACE is undergoing Section 7 consultation with USFWS and NMFS prior to implementation of the proposed action and letters requesting concurrence from NMFS and USFWS with the USACE NLAA determination are included in appendix A.

Under the no-action alternative there would be no change in existing conditions. The temporary and localized turbidity impacts associated with nearshore placement would continue. However, there would be no potential for significant impacts or benefits to special status species and their critical habitat.

Essential Fish Habitat

The proposed project area is within the Essential Fish Habitat (EFH) for Pacific groundfish, Pacific salmon, coastal pelagic, and west coast highly migratory species Fisheries Management plans (FMP) (Table 7). An EFH consultation with NMFS is required for federal activities with the potential to affect EFH. The proposed action has the potential to affect EFH due to the temporary placement of a pipeline from the dredge vessel mooring site to Ocean Beach in order to pump material onshore. The USACE has determined that the project may affect EFH managed as part of the Pacific Groundfish, Pacific salmon, Pacific coastal pelagic species, and west coast highly migratory species FMPs. The EFH consultation letter is attached in appendix A. The USACE would consider any conservation recommendations made by NMFS to minimize effects to EFH.

4.3 Human Environment

(X) Noise: The ambient sources of noise in the vicinity of Ocean Beach are commercial and recreational navigational vessel traffic, breaking waves, general urban noise from vehicular traffic and noise generated by recreational users in the area. The proposed action would involve use of two dozers, a loader and an excavator to move the placement pipe and shape material on the beach. The Federal Highway Administration (FHA) Construction Noise Handbook states that these equipment types generate 79-82 decibels at 50 feet. (FHA, 2017). This is in line with the ambient surf noise, which generates about 78 decibels when the waves are two meters in height (Bolin, Abom, 2010).The great highway runs between the project area and any residential areas and the San Francisco Zoo. Highways generate noise levels of 70-80 decibels at 50 feet. This noise level is similar to the noise that would be generated by the proposed action. Overall, any noise generated during beach nourishment associated with the proposed action is expected to be minimal and similar to existing ambient noise levels. The closest residential properties are over 400 feet front the north end of the project area and none exist nearby to the east and south. The activities would generally take place in 20–30 days for the proposed beach placement Noise effects of the proposed action are expected to be temporary, minor, and less than significant. The no action alternative would involve no onshore placement and therefore no change to existing noise conditions in the action area.

(X) Recreation (boating, fisheries, other): Both onshore and offshore areas of Ocean Beach are extensively used for various recreational activities. The GGNRA includes Ocean Beach and is managed for its natural and cultural resources and values for the enjoyment of general public and the future generations. The proposed action was assessed in terms of any short-term or periodic disruption to resources or recreational activities; physical degradation of existing recreational resources; change in use of existing recreational resources, and any potential harm to the integrity of GGNRA's natural resources. Beach nourishment activities associated with the proposed action would affect the recreational use of an approximately 3,000 ft segment of Ocean Beach during construction. Fishing and beach walking could still occur on the beach below the toe berm at lower tides but would not be possible in the project footprint during most of the tide cycle. Surfers would need to avoid the pipeline, which would be marked with safety buoys. These minor temporary impacts would occur over a period of 20-30 days. The area surrounding construction activities would be fenced off and signed to inform and protect the public while construction occurs on the beach. There would be no permanent physical degradation of existing recreational resources, change in use of existing recreational resources, or harm to the integrity of GGNRA's natural resources under the proposed action. The proposed action would have a longer-term temporary benefit for future recreation along Ocean Beach by providing a wider beach area for access after the dune is constructed and for the life of the dune (approximately 3-4 years). Due to the temporary nature of any impacts to recreation at Ocean Beach during the proposed action, and the longer-term temporary benefits expected as a result, the proposed action would not result in significant adverse impacts to recreation. The no action alternative would result in no change to existing recreation conditions.

( ) **Land use classification: N/A**

(X) Transportation and traffic: No change in land transportation activities is expected to occur for the no action alternative. Under the proposed action, construction equipment would be stored in a portion of the North Parking Lot which would be closed to the public during construction. Beachgoers would have to park elsewhere for the brief duration of construction. Parking is available along Sloat Boulevard and on nearby surface streets. The public restroom at the north end of the parking lot would remain open. The U-shaped turnaround to the north of the parking lot would also remain open, allowing Muni buses to turn around as they do now. The contractor would develop a traffic control plan for when their vehicles enter and depart the proposed construction site. Given the temporary nature of the impacts to transportation and the availability of adequate parking and alternate transportation routes in the vicinity, the proposed action would have less than significant impacts on transportation and traffic. The no action alternative would not involve any storage of construction equipment or closure of parking lots and there would be no change to existing transportation and traffic.

(X) Navigation: waters of the Pacific Ocean along the coast of San Francisco Bay in the vicinity of the proposed action area are used for recreational and commercial boat transportation and activities. Recreational craft in the nearshore, would need to avoid the area of the pipeline, which would be marked with warning buoys. This effect would be temporary and cease at the end of material placement onshore. Given this, the proposed action would not significantly affect recreational or commercial navigation. The no action alternative would result in no change to existing navigation conditions.

( ) **Prime and unique farmland: N/A**

(X) Aesthetics/visual impact: Ocean Beach seaside is one of the natural open spaces in the City of San Francisco that attracts a large number of people for active and passive recreation. Within the project area there is a narrow sandy beach during lower tides with rock and rubble placed in front of the bluff for shoreline protection. Atop the bluff are a public parking lot, the Great Highway, and other public infrastructure. In several stretches, no beach remains except at lower tides. Thus, the project vicinity presents a mix of the open Pacific Ocean and a highly urbanized surrounding with a desirable visual quality. The proposed beach nourishment alternative is expected to mimic or improve the existing aesthetics and visual qualities of the greater Ocean Beach during the life of the dune as it would model the surrounding natural dunes over the existing condition of eroded cliffs with riprap.

Improper outdoor lighting can impede the view and visitor enjoyment of a natural dark night sky. The NPS has developed policy to prevent the loss of dark conditions and of natural night skies. The NPS is committed to minimize light that emanates from park facilities, and also seek the cooperation of park visitors, neighbors, and local government agencies to prevent or minimize the intrusion of artificial light into the night scene of the ecosystems of parks. The following restrictions will be implemented during night operations.

- restrict the use of artificial lighting in parks to those areas where security, basic human safety, and specific cultural resource requirements must be met;
- use minimal-impact lighting techniques;
- shield the use of artificial lighting where necessary to prevent the disruption of the night sky, natural cave processes, physiological processes of living organisms, and similar natural processes.

Temporary impacts to aesthetics in the immediate action area could occur due to the use of construction equipment, night-time lighting, the placement of slurry material on the site, and the mooring of a dredge vessel one-half mile offshore. However, these effects would be temporary and minor. Ample unaffected area of Ocean Beach would remain during construction for the enjoyment of existing aesthetics. Given the temporary, localized nature of any impacts to aesthetics and the expected aesthetic benefits of the constructed dunes, the proposed action would have less than significant impacts to aesthetics. The no action alternative would result in no change to aesthetics in the action area.

(X) Public facilities, utilities and services: Implementation of beach nourishment under the proposed action would directly benefit existing public facilities by providing additional protection to the eroding shoreline. These public facilities include the Lake Merced Tunnel and other wastewater infrastructure beneath the Great Highway, the Great Highway, a parking lot, and beach. Under the no action alternative, there would be no direct benefits to such facilities and existing erosion at the site would continue to threaten such facilities.

(X) Public health and safety: Ocean Beach is a popular recreational area for surfing and other recreational beach users. The bluff supports important infrastructure such as the portions of a storm sewage transport system that runs along the Great Highway, and a public parking lot. Ultimately, direct nourishment of the beach under the proposed action would substantially benefit public safety by contributing to the protection of the bluff and the important infrastructure under the Great Highway. Enhancement of the beach areas of Ocean Beach would also benefit the public safety for the beach users. The area where the berm is placed gets completely inundated up to the bluff at higher tides and large wave events. When completed the berm crest would provide a safer transit for beachgoers through the area during such events. The area of the beach proposed for beach nourishment would be fenced off and completely closed to the public to provide public safety during construction activities. Beachgoers would be able to transit the beach below the toe berm at lower tides. The pipeline delivering material to the beach would be marked at periodic intervals with buoys in appropriate areas to warn small craft users, surfers and bathers to avoid the pipeline. Given these best management practices during construction and the anticipated benefits of the completed berm, the proposed action would not significantly impact public safety. The no action alternative would not confer any benefits to public safety nor result in any change to existing public safety conditions.

(X) Hazardous and toxic materials: Placement of material onshore for beach nourishment would involve uncontaminated sandy material. There would be no hazardous or toxic materials utilized in this area. Both the source material (dredged sediment from MSC) and placement sites including areas along the beach consist of >90% sand and have been determined free of hazardous or toxic constituents (USACE, 2018). Appropriate best management practices (BMP) would be applied to prevent water-quality impacts from pollution due to debris, fuels, oils, lubricants, and other harmful materials (Appendix A). Therefore, the proposed action is not expected to have any significant hazardous or toxic materials impacts. The no action alternative would result in no change to hazardous and toxic material conditions.

( ) Energy consumption or generation: N/A

(X) Cultural and historical Resources: The information acquired from the literature and database reviews allows the tentative conclusion that there are *no historic properties within the APE, therefore no historic properties effected*. No historic properties were identified during the onshore beach-disposal area survey in June 2020.

The City and County of San Francisco Environmental Planning Division contracted with Environmental Science Associates (ESA) for the; *Ocean Beach Climate Change Adaptation Project Historic Resources Evaluation Report* prepared for the City and County of San Francisco and United States Department of the Interior National Park Service, October 2020 (ESA 2020). The report meets the federal requirements for Section 106 (36 C.F.R. § 800.11). It includes; (a) a detailed description of the undertaking, (b) the undertaking's Area of Potential Effects (including staging areas) (c) records search and survey of previous studies and recorded historic properties within the APE, (d) a discussion of the Historic Properties on shore at Ocean Beach and their eligibility pursuant to NHPA (36 C.F.R. §60.4), (e) a preliminary determination “no historic properties affected [36 C.F.R.§ 800.(d)(1)].” Consulting and interested parties including Native American tribes will be provided no historic properties affected information pursuant to 36 C.F.R. § 800.4(d)(1). Confidential information is on file at USACE.

(X) Historic monuments, parks, national seashores, wild and scenic rivers, wilderness area, research sites, etc: The proposed action lies within the Golden Gate National Recreational Area and would enhance the beach by reducing the threat to public safety and improving recreational uses. The proposed action would provide indirect benefits to GGNRA and its missions and mandates for enhancing its recreational resource. Temporary effects of the proposed action on the GGNRA are discussed in a number of sections above and are not expected to significantly negatively affect the GGNRA. The no action alternative would result in no changes to the areas of the GGNRA in or around the proposed action area.

(X) Archaeological sites: The USACE environmental reports from the past 30 years are silent regarding submerged cultural resources having been encountered during dredging and disposal operations. We therefore have no reason to believe that historic properties exist within the Ocean Beach offshore disposal area where the hopper dredge and delivery pipeline will anchor during pump ashore operations.

Shipwreck preservation is better in offshore areas because of low-energy as opposed to the destructive quality of the near-shore zone. The deeper-water areas are characterized as a sediment-starved environment. Since the placement of dredged sediment would only temporarily cover seafloor surfaces, given the dynamic factors operating in this ocean environment, any shipwreck remains that might exist there now would still be identifiable during future episodes. There fore the no action alternative would have no impact to any historic properties or archaeological resources.

The planning research for archaeological resources revealed evidence of submerged resources in the adjacent offshore areas. Submerged shipwreck sites have been discovered in the San Francisco Bay however, there are no known shipwrecks within one mile of the project APE. South Ocean Beach has been narrowed and eroded by wind and south moving swell. Any Beach or offshore resources would have been exposed. It is not likely that unrecorded resources are located within the APE.

The construction of the Great Highway and subsequent construction of the Oceanside Water Treatment Sewer Outfall and other property, resulted in significant deposits of dune sand being dumped onto Ocean Beach. The greatly modified conditions in the existing project area make it reasonable to conclude that there is little potential for historic properties to be within the APE. Referencing the negative findings of known shipwreck locations on South Ocean Beach, and the absence of archaeological resources on land within the APE, it is concluded that beach nourishment activities would have no effect on historic properties, and the determination, no historic properties affected.

(X) Socio-economic: The socio-economic environment around the project site would remain unchanged under the proposed action and no action alternatives.

(X) Environmental Justice: The environmental justice conditions in San Francisco City and County would remain unchanged under the No-action alternative. Under the proposed action a 3000-foot stretch of beach would be unavailable for fishing during onshore placement. Anyone depending on subsistence fishing would not be able to use the project area. Due to the small area of the placement site and the abundance of other areas to fish along Ocean Beach, the proposed action would not significantly change environmental justice conditions.

(X) Growth inducing impacts - community growth, regional growth: Neither the proposed action or no action alternatives is expected to result in changes to community structure or additional growth either regionally or locally.

(X) Conflict with other use plans, policies or controls: The proposed action falls within the jurisdiction of the California Coastal Commission (CCC), a state agency which implements the Coastal Zone Management Act (CZMA). The CZMA requires that federal action be consistent, to the maximum extent practicable, with the federally approved state coastal plans. The federally approved state coastal plan applicable to this location is the California Coastal Management Program (CCMP). In accordance with the Coastal Zone Management Act of 1972, as amended (16 U.S.C. §1451), a federal project proposing beach placement at Ocean Beach would submit a determination to the CCC. USACE will prepare and submit to CCC a Determination (Negative Determination or Consistency Determination) to ensure that the proposed action is consistent, to the maximum extent practicable, with the CCMP plan and policies. Use of the onshore placement site would not commence until a concurrence from CCC on the determination is received. Beach nourishment at Ocean Beach as proposed, is expected to be consistent with the CCMP plans and policies. The USACE currently holds a CD for dredging of material from MSC and placement of material at the near shore aquatic placement sites. The CCC has concurred with a negative determination in the past for placement of dredged material from the MSC on Ocean Beach in *Negative Determination ND-020-12 (Five-Year Maintenance Dredging Program (2012-2016 for San Francisco Main Ship Channel and Disposal at SF-17, SF-8, and or Ocean Beach, San Francisco)*

Long-Term Management Strategy (LTMS) Management Plan.
The San Francisco Bay LTMS consists of a consortium of federal and state agencies (USACE, USEPA, State Water Resources Control Board, State Lands Commission, SFBRWQCB, and BCDC) with jurisdiction over dredging and dredged material placement in the Bay including the MSC, SF-8, and the nearshore zone off Ocean Beach, as well as waters used by vessels en route to these sites. The goals of the LTMS Management Plan are to:

- Maintain in an economically and environmentally sound manner those channels necessary for navigation in San Francisco Bay and eliminate unnecessary dredging.
- Conduct dredged material placement in an environmentally sound manner. Maximize the use of dredged material as a resource.
- Maintain the cooperative permitting framework for dredging and placement applications.

Since implementation of the SF Bay LTMS in early 1990s, dredged material placement volumes in Bay have been reduced from 6×10^6 yd^3 to 2×10^6 yd^3 per year. This in-bay placement of dredged material is expected to decrease to a limit of 1.25×10^6 yd^3 per year. While reduction of in-bay placement is a key goal of the LTMS program, maximizing beneficial use of dredged sediment is even more paramount to the goals of this program. The LTMS program has supported restoration of approximately 3,000 acres of habitat through beneficial use of dredged material. An additional component of beneficial use of dredged sediment is use of dredged material for beneficial uses such as beach nourishment and storm damage reduction. Hence, the LTMS program has been strongly in support of placement of dredged sediment at the OBDS and beach nourishment. The proposed SF-17 as a beneficial use dredged material placement site fully supports and furthers the goals of the LTMS program. Similarly, the beach nourishment alternative is considered a beneficial use and generally supported by participating LTMS agencies, as one that furthers the goals of this program.

• **Golden Gate National Recreation Area (GGNRA) Plans**.
The basic purpose of the National Park Service (NPS), as set forth by the Organic Act of 1916 and General Authorities Act is to conserve park resources and values. The GGNRA is a cooperating agency under NEPA for this proposed action and it is important to ensure the proposed action is consistent with the NPS' approved plans and policies. The GGNRA GMP was updated in 2014. The GMP plan is based on preserving biological, cultural, and recreational integrities of these areas. The no action alternative (dredging and placement at SF-17) would not conflict with any plans, policies, or controls governing Ocean Beach and the GGNRA.

The proposed action would involve beach nourishment that would need to be in compliance with all applicable NPS policies including, but not limited to NPS Management Policies § 4.8.1; §4.1.5, and § 4.4.2.4 (2006). As the beach nourishment alternative would occur to restore this area from excessive past disturbances caused by human effects, this alternative is expected to be compatible with the NPS policies. Other applicable NPS policies include the Wetland Policy (NPS Management Policies § 4.6.5. (2006) and the related procedures in NPS Procedural Manual (P.M.) #77-1) requiring preparation of a Wetland Statement of Findings unless such action is waived by NPS as listed in Section 4.2 of P.M. #77-1. The USACE and CCSF will further coordinate with the NPS' GGNRA to obtain the necessary approvals or waiver for this activity.

Marine Safety Performance Plan, FY 2009-2014.
This Coast Guard Performance Plan sets forth goals to ensure the safety of U.S. mariners, passenger on ferries, and other vessels, and recreational boaters. The goals of the plan are to reduce risk of maritime causalities, facilitate commerce, improve program processes and management, and improve human resource capabilities.

The proposed action would be consistent with the goals of this plan by applying safeguards and best management practices to protect U.S. mariners and recreational boaters and the environment from oil spills and other harmful substances (Appendix B-1). The no action alternative would also be consistent with the goals of this plan during dredging and placement at SF-17.

(X) Irreversible changes, irretrievable commitment of resources: The use of the dredging vessel requires the use of fossil fuels and would be considered an irretrievable commitment of resources. However, use of fossil fuels would be limited, minor, and associated with the operations of the dredge. Placement of dredge material on the beach would not be considered an irreversible change or irretrievable commitment of resources as the berm would be temporary (lasting 3-4 years) and would erode over time.

(X) Other Cumulative effects not related to the proposed action:

1. Occurred on-site historically: The project area constitutes coastal waters of the Pacific Ocean and sandy beach and as such has been subject to navigational and recreational activities in the past. There are no structures in the project footprint with the exception of the SWOO, which is buried, and the NPS restroom adjacent to the proposed staging area. Activities occurring in the vicinity of the proposed site include placement of dredged material at SF-8 and the OBDS. This occurs during the regulatory agency-designated work windows and includes both federal and non-federal O&M dredged material. With regards to areas along the beach proposed for the beach nourishment alternative, activities have included construction of the Great Highway and the infrastructure along this road, numerous sand placement activities, and rubble and rock revetments to protect this area.

2. Likely to occur within the foreseeable future: The existing use of the area for navigational and recreational activities is anticipated to continue in the near future. Activities in the foreseeable future adjacent to the proposed project area include continued uses of the OBDS or SF-17 for beneficial reuse of dredged material from the MSC and other approved non-federal O&M dredging projects, and direct beach nourishment using the material from MSC. Sand is also periodically relocated by the SFPUC from northern Ocean beach to the project area to protect infrastructure from erosion. Direct beach nourishment may occur in lieu of or as part of the nearshore placement of dredged material for the purpose of storm damage reduction. Both actions listed above are expected to occur within the next 20 years. The SFPUC is currently analyzing alternatives for the long-term management of the Ocean Beach area. Periodic beach placement would reduce the frequency of disturbance from other beach placement activities.

3. Contextual relationship between the proposed action and (1) and (2) above: In consideration of historic occurrences on site and activities expected to occur in the reasonably foreseeable future, there might be periodic, but minimal and temporary impacts from the proposed placement onshore at Ocean Beach or use of the OBDS and SF-17 on aquatic habitat and water quality. Based on what has historically occurred in the vicinity of the project area including SF-8 and the OBDS, these effects are determined to be less than significant. There are no effects on noise, traffic, navigation, and utilities. There are expected to be cumulative beneficial effects resulting from the proposed use of the site on recreation, protection of existing infrastructure, and general safety from placement of material at SF-17, the OBDS, or direct beach nourishment. In consideration of the environmental changes that have occurred onsite historically and those foreseeable in the future, the actions associated with the proposed action are not expected to result in significant adverse cumulative changes to the physical, biological, or human environment.

4.4 Summary of indirect and cumulative effects from the proposed action.

The proposed action would not have significant adverse indirect or cumulative impacts on the physical, biological, and human environment. Temporary and minor adverse effects associated with the proposed and reasonably foreseeable future actions are expected to be short in duration, ending with the completion of the individual projects, and would be diminished to less than significant through avoidance measures and BMPs. Long-term impacts are anticipated to be less than significant or mitigated for and would not result in significant adverse cumulative impacts. In the context of magnitude, extent and duration, both indirect and cumulative effects of the proposed direct beach nourishment with inclusion of specific measures such as use of >90% sandy material, are determined to be less than significant. It is also determined that the proposed project would have less than significant beneficial cumulative effects to aesthetics, safety, and recreation.

5.0 Environmental Compliance

Table 8 provides a list of known potential compliance requirements Detailed compliance information, supporting reports, and environmental compliance history (e.g. Biological Assessment, Conformity Analysis, EFH Analysis, etc.) for this project can be found in Appendix A - Environmental Compliance.

Table 8: Summary of Environmental Compliance

Statute	Status of Compliance
National Environmental Policy Act (NEPA) of 1969 (42 USC 4321 *et seq*) Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the NEPA (40 CFR 1500-1508) dated July 1986	This EA has been prepared in compliance with NEPA and CEQ regulations. All agency and public comments will be considered and evaluated. If appropriate, a Finding of No Significant Impact (FONSI) will be signed with a conclusion of no significant impacts from this proposed action. A Draft FONSI is provided in Appendix B.
Clean Air Act, as amended (42 USC 7401 *et seq*)	An emissions inventory has been completed and the emissions are below the de minimis Threshold.
Clean Water Act, as amended (33 USC 1251 *et seq*)	The USACE is complying with Section 401 of the CWA by applying for water quality certification from the SFBRWQCB concurrently with this EA. This document serves as compliance with 404(b)(1) guidelines.
Rivers and Harbors Act of 1899 (33 USC 403)	See 33 CFR § 323.3
Executive Order 11990, Protection of Wetlands, (42 FR 26961, 1977)	No wetlands occur within the proposed project area.
National Oceanic and Atmospheric Administration Federal Consistency Regulation (15 CFR 930)	See CZMA
Coastal Zone Management Act of 1972 (16 USC 1451 *et seq*)	A negative determination has been prepared and will be coordinated with the CCC.
California Coastal Act of 1976	See CZMA

Endangered Species Act as amended (16 USC 1531 *et seq*)	A finding of not likely to adversely affect for any listed species has been prepared and submitted to NMFS and USFWS for their concurrence.
Magnuson-Stevens Fishery Conservation and Management Act - Fishery Conservation Amendments of 1996, (16 USC 1801 *et seq*) – Essential Fish Habitat (EFH)	The USACE, San Francisco District, has prepared an Essential Fish Habitat Assessment stating that the proposed action would have no significant impacts to any EFH, and has submitted it to NMFS for concurrence.
Migratory Bird Treaty Act (16 USC 703-711)	No impacts to migratory birds are expected from the proposed action. Surveys for bank swallows would be conducted prior to construction. No construction would be allowed within 900 feet of an active nest.
Marine Mammal Protection Act (16 USC 1361 *et seq)*	No impacts to marine mammals are expected from the proposed action.
National Marine Sanctuaries Act (16 USC 1431 *et seq*)	The proposed action would not take place in or near a national marine sanctuary.
Marine Protection Research and Sanctuaries Act of 1972 (33 USC 1401 *et seq*)	The proposed action will incorporate and adhere to restrictions relating to critical areas on the use of EPA designated SF-8 pursuant to section 102(c) of the MPRSA. Further, the proposed action will adhere to the conditions for transportation of dredged material pursuant to section 103 of the MPRSA
National Historic Preservation Act (16 USC 470 and 36 CFR 800): Protection of Historic Properties Executive Order 11593: Protection and Enhancement of the Cultural Environment Archaeological and Historic Preservation Act of 1974, (16 USC 469 *et seq*)	The proposed action would not affect any historical and cultural resources as none occur within the proposed action area. See Above See Above
Federal Water Project Recreation Act (16 USC 4601 *et seq)*	A public notice of availability of this EA will be sent to the National Park Service and Office of Statewide Planning, result in compliance with this Act.
Abandoned Shipwreck Act of 1987, (43 USC 2101 *et seq*)	None occur on the site.
Submerged Lands Act, (Public Law 82-3167; 43 USC 1301 *et seq*)	USACE will further coordinate with NPS GGNRA to ensure compliance with its plans and policies including obtaining a Wetland Statement of Findings or a waiver thereof.

6.0 Agencies Consulted and Public Notification

The following federal, state, and local agencies, and various interested local individuals have been notified of the availability of this Environmental Assessment for review and comment. A complete list of notified agencies can be found in Appendix B. A Public Notice of Availability of the EA will be provided to other interested agencies, groups, and individuals. A list of these entities is also provided in Appendix B

A. Federal agencies:

1) U.S. Environmental Protection Agency (USEPA Region 9)
2) U.S. Fish and Wildlife Service (USFWS), Sacramento Office
3) National Marine Fisheries Service (NMFS), Santa Rosa Office
4) Advisory Council – Historic Preservation
5) National Park Service (NPS)-Golden Gate National Recreation Area
6) U.S. Coast Guard

B. State and local agencies:
1) California Coastal Commission (CCC)
2) California Department of Fish and Wildlife (CDFW), Northern Region Office
3) California State Historic Preservation Officer (SHPO)
4) California State Lands Commission (CSLC)
5) San Francisco Bay Regional Water Quality Control Board (SFRWQCB)
6) City and County of San Francisco – Department of Public Works
7) City and County of San Francisco – Public Utilities Commission
8) San Francisco Planning Department

C. Other organizations and individuals:
1) City and County of San Francisco Public Library
2) San Francisco Planning + Urban Research Association

6.1 Summary of comments (See Appendix B for comments and responses)
A complete list of comments will be provided in appendix B once the comment period closes. summary will be provided here.

6.2 Evaluation and incorporation of comments
A complete list of comments will be provided in appendix B once the comment period closes a summary will be provided here.

7.0 Mitigation Measures
Avoidance and minimization measures for potential impacts associated with the proposed action are generally described with the relevant resources in Section 5 and specifically listed in Appendix B. Additionally, various BMPs as described in Appendix A would be implemented during the proposed action to prevent any impacts from occurring. With implementation of these BMPs and measures, no significant adverse impacts to environmental resources are expected to result from the Agency-preferred alternative.

8.0 Determinations and Statement of Findings
No significant direct, indirect, or cumulative adverse impacts to the physical, biological, or human environment are expected from either the proposed action alternative or the no-action alternative. The No-action alternative would result in no change to the existing condition of environmental resources in and around the action area. Conversely, the proposed action alternative is expected to benefit beach users and the adjacent infrastructure.

A Finding of No Significant Impact (FONSI) will be made after agency and individual comments are solicited during the public comment period and incorporated into this EA. A draft FONSI is included with this document .

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FINDING OF NO SIGNIFICANT IMPACT

OCEAN BEACH STORM DAMAGE REDUCTION BEACH NOURISHMENT PROJECT SAN FRANCISCO COUNTY, CALIFORNIA

The U.S. Army Corps of Engineers, San Francisco District (Corps) has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The final Environmental Assessment (EA) for Ocean Beach Storm Damage Reduction Beach Nourishment Project dated **DATE** ,addresses the placement of Dredged material from the San Francisco Main Ship Channel Operations and Maintenance Dredging onto Ocean Beach, San Francisco, San Francisco County, California under the authority of Section 2037 of the Water Resources Development Act of 2007.

The EA, incorporated herein by reference, evaluated various alternatives that would protect the eroding bluff and wastewater infrastructure along Ocean Beach, south of Sloat Boulevard. The recommended plan is the "National Economic Development (NED) Plan" which includes:

- The placement of up to 285,000 cubic yards of annual maintenance dredged material from the San Francisco Main Ship Channel directly onto Ocean Beach against the existing bluff, which would be shaped into a 30 foot (MLLW) high berm with a 60-foot crest and 4:1 slope. The berm would stretch from Sloat Boulevard 3000 feet southward to Fort Funston.

In addition to the proposed action, a no action alternative was evaluated.[3] The alternatives included the input of resource agencies, the public, and local tribes in identifying potential effects.

For both alternatives, the potential effects were evaluated, as appropriate. A summary assessment of the potential effects of the recommended plan are listed in Table 1:

Table 1: Summary of Potential Effects of the Recommended Plan

	Insignificant effects	Insignificant effects as a result of mitigation*	Resource unaffected by action
Recreation and Aesthetics	☒	☐	☐
Air quality	☒	☐	☐
Aquatic resources/wetlands	☐	☐	☒
Invasive species	☒	☐	☐
Fish and wildlife habitat	☒	☐	☐
Threatened/Endangered species/critical habitat	☒	☐	☐
Historic properties	☐	☐	☒
Other cultural resources	☐	☐	☒
Floodplains	☐	☐	☒
Hazardous, toxic & radioactive waste	☐	☐	☒
Hydrology	☒	☐	☐
Land use	☐	☐	☒
Navigation	☐	☐	☒
Noise levels	☒	☐	☐
Public infrastructure	☒	☐	☐
Socio-economics	☐	☐	☒
Environmental justice	☒	☐	☐
Geology, Topography, Soils	☒	☐	☐
Tribal trust resources	☐	☐	☒
Water quality	☒	☐	☐
Climate change	☐	☐	☒
Transportation	☒	☐	☐
Safety	☒	☐	☐

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the recommended plan. Best management practices (BMPs) as detailed in the EA will be implemented, if appropriate, to minimize impacts.

No compensatory mitigation is required as part of the recommended plan.

Public review of the draft EA and FONSI was completed on **DATE DRAFT EA AND FONSI REVIEW PERIOD ENDED**. All comments submitted during the public review period were responded to in the Final EA and FONSI. A 30-day state and agency review of the Final EA was completed on **DATE SAR PERIOD ENDED**. **PICK OPTION BASED ON RESULTS OF STATE AND AGENCY REVIEW**.

Pursuant to section 7 of the Endangered Species Act of 1973, as amended, the U.S. Army Corps of Engineers determined that the recommended plan may affect but is not likely to adversely affect the following federally listed species or their designated critical habitat: California least tern, marbled murrelet, western snowy plover, coho Salmon, chinook salmon, steelhead, green sturgeon, leatherback turtle, black abalone.

Pursuant to section 106 of the National Historic Preservation Act of 1966, as amended, the U.S. Army Corps of Engineers determined that historic properties would not be adversely affected by the recommended plan. The **ENTER THE APPROPRIATE SHPO OR THPO** concurred with the determination on **DATE OF CONCURRENCE LETTER.**

Pursuant to the Clean Water Act of 1972, as amended, the discharge of dredged or fill material associated with the recommended plan has been found to be compliant with section 404(b)(1) Guidelines (40 CFR 230). The Clean Water Act Section 404(b)(1) Guidelines evaluation is found in Appendix a of the EA

A water quality certification pursuant to section 401 of the Clean Water Act will obtained from the San Francisco Bay Regional Water Quality Control Board. All conditions of the water quality certification would be implemented in order to minimize adverse impacts to water quality.

A determination of consistency with the California Coastal Zone Management program pursuant to the Coastal Zone Management Act of 1972 will be obtained from the California Coastal Commission prior to construction. All conditions of the consistency determination shall be implemented in order to minimize adverse impacts to the coastal zone. The BMPs include:

- Well-maintained equipment would be used to perform the work, and except in the case of a failure or breakdown, maintenance would be performed off site. Equipment would be inspected daily by the operator for leaks or spills. If leaks or spills are encountered, the source of the leak would be identified, the leak would be cleaned up, and the cleaning materials would be collected and would be properly disposed.
- Fueling of marine-based equipment would occur at designated off-site safe locations. Fueling of land-based equipment would occur in a staging area or over pavement, and the location would be inspected after fueling to document that no spills have occurred. Spills would be cleaned up immediately using spill response equipment.
- Offsite fueling would occur at locations covered under the Regional Water Quality Control Boards National Pollutant Discharge Elimination System (NPDES) industrial storm water permit (SIC Code 4493).
- Idling times for construction equipment (including vehicles) shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 30 seconds.
- Secondary containment, such as a drain pan, to catch spills or leaks would be used when removing or changing fluids. Fluids would be stored in appropriate containers with covers and properly recycled or disposed of offsite.
- Hold a preconstruction meeting to inform contractor about sensitive areas, including natural and cultural resources.

- Preconstruction meeting would also include NPS law enforcement rangers and/or beach rescue personnel to coordinate administrative and emergency access through the work zone during pumping operations.
- If necessary, all servicing of equipment done at the job site would be conducted in a designated, protected area to reduce threats to water quality from vehicle fluid spills. Designated areas would not directly connect to the ground, surface water, or storm drain systems. The service area would be clearly designated with sandbags or other barriers
- If bank swallow nests are active, night lighting with amber colored bulbs must be used and located beyond a 250-foot buffer area from work areas.
- The pipeline delivering material to the beach would be marked at periodic intervals with buoys in appropriate areas to warn small craft users, surfers and bathers to avoid the pipeline.
- A Spill Prevention Control and Countermeasure (SPCC) plan would be prepared to address the emergency cleanup of any hazardous material and would be available on site.
- A project specific EPP is incorporated into the SPCC, hazardous waste BMPs, and emergency planning requirements to ensure that operations would not adversely affect water quality. The federal hopper dredges *Essayons* and *Yaquina* each have this; contract hopper dredges would be required to have an EPP and SPCC

All applicable environmental laws have been considered and coordination with appropriate agencies and officials has been completed.

Technical, environmental, economic, and cost effectiveness criteria used in the formulation of alternative plans were those specified in the Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives.[4] Based on this report, the reviews by other Federal, State and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the recommended plan would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.[5]

____
Date

____
Travis J. Rayfield
LTC, EN, Corps of Engineers
District Commander

[4] 40 CFR 1505.2(B) requires identification of relevant factors including any essential to national policy which were balanced in the agency decision.
[5] 40 CFR 1508.13 stated the FONSI shall include an EA or a summary of it and shall note any other environmental documents related to it. If an assessment is included, the FONSI need not repeat any of the discussion in the assessment but may incorporate by reference.

Appendix A - Environmental Compliance

A-1 Endangered Species Act (ESA) Magnuson-Stevens Fishery Conservation and Management Act

List of Threatened and Endangered Species

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

San Francisco County, California

Local office

Sacramento Fish And Wildlife Office

(916) 414-6600
(916) 414-6713

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

Salt Marsh Harvest Mouse Reithrodontomys raviventris No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/613	Endangered
Southern Sea Otter Enhydra lutris nereis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8560	Threatened Marine mammal

Birds

NAME	STATUS
California Clapper Rail Rallus longirostris obsoletus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4240	Endangered
California Least Tern Sterna antillarum browni No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8104	Endangered
Marbled Murrelet Brachyramphus marmoratus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/4467	Threatened
Short-tailed Albatross Phoebastria (=Diomedea) albatrus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/433	Endangered
Western Snowy Plover Charadrius nivosus nivosus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/8035	Threatened

Reptiles

NAME	STATUS
Green Sea Turtle Chelonia mydas No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6199	Threatened
San Francisco Garter Snake Thamnophis sirtalis tetrataenia No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5956	Endangered

Amphibians

NAME	STATUS
California Red-legged Frog Rana draytonii There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2891	Threatened

Fishes

NAME	STATUS
Delta Smelt Hypomesus transpacificus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/321	Threatened
Tidewater Goby Eucyclogobius newberryi There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/57	Endangered

Insects

NAME	STATUS
Bay Checkerspot Butterfly Euphydryas editha bayensis There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2320	Threatened
Callippe Silverspot Butterfly Speyeria callippe callippe There is **proposed** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/3779	Endangered
Mission Blue Butterfly Icaricia icarioides missionensis There is **proposed** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/6928	Endangered
Myrtle's Silverspot Butterfly Speyeria zerene myrtleae No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6929	Endangered
San Bruno Elfin Butterfly Callophrys mossii bayensis There is **proposed** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/3394	Endangered

Flowering Plants

NAME	STATUS
Franciscan Manzanita Arctostaphylos franciscana There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/5350	Endangered
Presidio Manzanita Arctostaphylos hookeri var. ravenii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7216	Endangered
Robust Spineflower Chorizanthe robusta var. robusta There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/9287	Endangered
San Francisco Lessingia Lessingia germanorum (=L.g. var. germanorum) No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8174	Endangered
Showy Indian Clover Trifolium amoenum No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6459	Endangered
White-rayed Pentachaeta Pentachaeta bellidiflora No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7782	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

MIGRATORY BIRD INFORMATION IS NOT AVAILABLE AT THIS TIME

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

Marine mammals

Marine mammals are protected under the Marine Mammal Protection Act. Some are also protected under the Endangered Species Act[1] and the Convention on International Trade in Endangered Species of Wild Fauna and Flora[2].

The responsibilities for the protection, conservation, and management of marine mammals are shared by the U.S. Fish and Wildlife Service [responsible for otters, walruses, polar bears, manatees, and dugongs] and NOAA Fisheries[3] [responsible for seals, sea lions, whales, dolphins, and porpoises]. Marine mammals under the responsibility of NOAA Fisheries are **not** shown on this list; for additional information on those species please visit the Marine Mammals page of the NOAA Fisheries website.

The Marine Mammal Protection Act prohibits the take (to harass, hunt, capture, kill, or attempt to harass, hunt, capture or kill) of marine mammals and further coordination may be necessary for project evaluation. Please contact the U.S. Fish and Wildlife Service Field Office shown.

1. The Endangered Species Act (ESA) of 1973.
2. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a treaty to ensure that international trade in plants and animals does not threaten their survival in the wild.
3. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following marine mammals under the responsibility of the U.S. Fish and Wildlife Service are potentially affected by activities in this location:

NAME

Southern Sea Otter *Enhydra lutris nereis*
https://ecos.fws.gov/ecp/species/8560

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Biological Assessment

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
450 GOLDEN GATE AVE.
SAN FRANCISCO, CA 94102

October 20, 2020

SUBJECT: USACE Ocean Beach Storm Damage Reduction Beach Nourishment Project

Ryan Olah
Coast Bay Division Chief
U.S. Fish and Wildlife Service
Sacramento Fish and Wildlife Office
2800 Cottage Way
Sacramento, CA 95825

Dear Mr. Olah:

Pursuant to Section 7(a)(2) of the Endangered Species Act of 1973, as amended (ESA; 50 C.F.R. Part 402), the U.S. Army Corps of Engineers, San Francisco District (USACE) is requesting concurrence from the U.S. Fish and Wildlife Service (USFWS) with our determination that the proposed Ocean Beach Storm Damage Reduction Beach Nourishment project is not likely to adversely affect the endangered California least tern (*Sternula antillarum browni*), threatened Pacific Coast distinct population segment (DPS) of the western snowy plover (*Charadrius nivosus nivosus*), and threatened marbled murrelet (*Brachyramphus marmoratus marmoratus*). No designated critical habitat for any of these species occurs in the project area.

The proposed action involves the placement of dredged material from the operations and maintenance (O&M) dredging of the San Francisco Main Ship Channel (MSC) onto a portion of Ocean Beach in the City and County of San Francisco (CCSF) for beach nourishment (Figure 1).

The O&M dredging activities of the MSC are conducted under separate authorizations and are separate projects. The MSC would provide the source material for placement on Ocean Beach for the proposed action; however, the MSC is maintenance dredged every year and would occur independently of the proposed action. The Federal Base Plan for maintenance dredging of the MSC, as practiced for the past several decades, is dredging by a hopper dredge with placement in the designated nearshore placement sites off Ocean Beach—SF-8 or the Ocean Beach Demonstration Site (OBDS; encompassed by the proposed placement site SF-17). The evaluation of the potential impacts associated with the O&M dredging of the MSC is presented in the Final Environmental Assessment (EA)/Environmental Impact Report for Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay Fiscal Years 2015-2024 (USACE 2015).

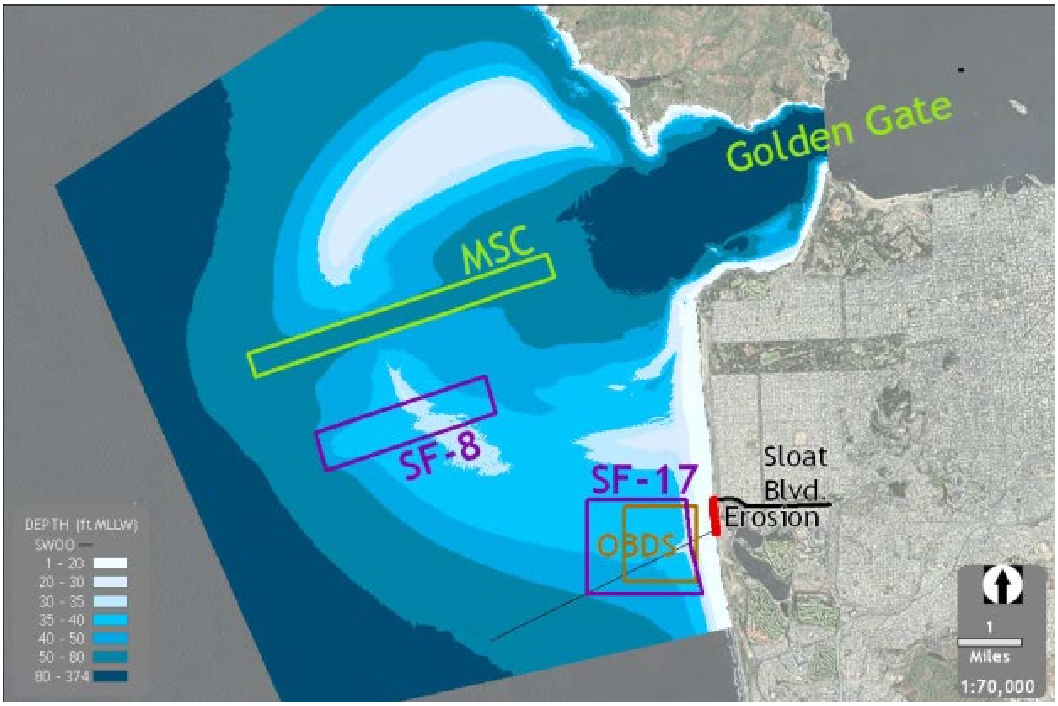

Figure 1. Location of the project area (shown in red) on Ocean Beach (San Francisco City and County) relative to the MSC, SF-8, SF-17, and OBDS.

Project Description

The proposed action would involve the beneficial reuse of approximately 250,000 - 285,000 cubic yards (CY) of sediment from MSC O&M dredging for direct beach nourishment on Ocean Beach between Sloat Boulevard and Fort Funston (Figure 2). Throughout most of the 3,000-ft project area south of Sloat Boulevard, there is an existing coastal bluff that is approximately 30 ft high. Much of the bluff is fronted by rock, and a significant stretch of the beach is completely inundated during higher tidal stages.

Grain size and organic content testing of sediment collected from MSC most recently occurred in 2018, and found that the material ranged from 91.4% to 98.8% sand, which is consistent with the historical results of 90% to 99% sand. This material exceeds the typical physical composition goal for beach nourishment projects of greater than approximately 80% sand. Total Organic Carbon levels ranged from 0.8% to 1.8%. This is considered to be low and within the highly suitable range for beneficial use in the littoral zone. Chemical testing occurred in 2010 with acceptable results.

Figure 2. Proposed project footprint.

Placement of the dredge material would occur from August 15 to September 30, 2021. The material would be pumped onto Ocean Beach for beach nourishment by a hopper dredge with pump-off capability; the dredge would anchor offshore of the intersection of Sloat Boulevard and the Great Highway in water approximately 35 ft deep. A 28-30-inch in diameter pipeline would be placed perpendicular to the beach, beginning at a point that is approximately 30 ft seaward of the bluff, cross the beach, and run along the ocean bottom to a mooring station located where the hopper dredge would anchor. The pipeline would need to extend approximately 2700 ft offshore in order to reach the required 35-ft depth. The terminal end of the pipeline would be fixed to a floating platform that would be secured to the seafloor by an anchor. Once the hopper is anchored, the pipeline connection would be made. The pipeline would be anchored to the ocean bottom every 100 ft to prevent the pipeline from being disturbed by wave action.

Placement of dredged material would begin at the northern end of the project site and progress southward while constructing a protective, sacrificial dune seaward of the bluff (Figure 3). Initially, a toe berm would be constructed on the beach during low tides using the available sand within the existing footprint of the proposed action. This would allow for work during high tides and contain the activities to the beach nourishment footprint. The purpose of the toe berm is to contain the sand slurry as it comes out of the end of the pipeline and to minimize the loss of sand while it dewaters. The toe berm would collect the decanted water and guide it south to the end of the toe berm structure where it would then return to the ocean. The toe berm would be located parallel to and approximately 100 ft west of the bluff.

The toe berm would be constructed using bulldozers to push beach sand into a berm-shaped structure of uncompacted sand that is approximately 10-ft high at the crest and 20-to-30-ft wide at the base. Material to construct the dune will be placed behind this toe berm and shaped. There would always be a sufficient length of toe berm in place ahead of the dredged material placement area to ensure that all of the placed material settles out before the decant water is returned to the surf zone. A diffuser would be attached to the end of the pipe to control the deposition of the dredged material and to prevent the slurry water from scouring the surrounding area. As the dredged material is pumped into the area behind the toe berm, it would be piled higher than the toe berm and then shaped to the dimensions shown below in figure 3. The dune footprint (toe to top of the bluff) would be approximately 10.1 acres.

It is estimated that two bulldozers, an excavator and a loader would operate 18 to 24 hrs per day each. As each 100-foot section of dune structure is completed, additional lengths of pipeline would be attached so the construction area can move southward.

The hopper dredge would have a daily production rate of approximately 15,000 to 20,000 CY per day, including dredging, hauling, and pump ashore operations. The hopper has a bin capacity of approximately 3,500 CY, and pumpout takes approximately 1.5 hr to complete. Based on a 24-hour work day, it is estimated that the hopper will make up to eight trips per day between the MSC and the pumpout anchorage. Therefore, placement of the required amount of dredge material on the beach footprint is expected to take approximately 20 to 30 days. Based on the amount of dredge material available, the entire dune structure is expected to be completed in one construction season. Any additional sand in excess of what is needed to construct the dune would be placed at an approved aquatic placement site for MSC material. However, it should be noted that while unlikely, there is the possibility of delays in dredging or onshore placement due to equipment malfunction, weather, or other factors and such delays could necessitate construction of the dune over multiple seasons.

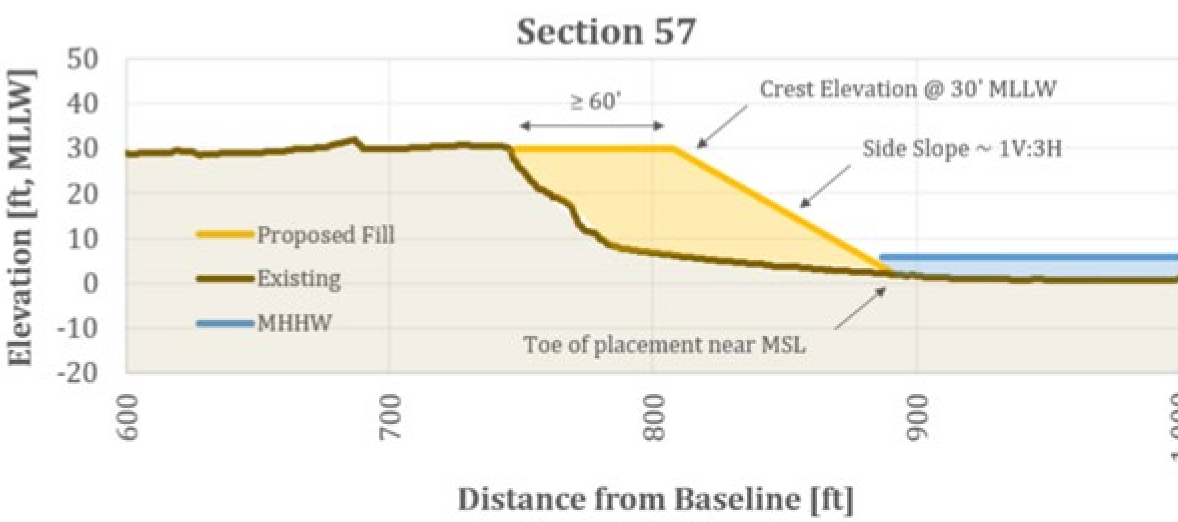

Figure 3. Example cross-section of the proposed project.

Potential Project Impacts

Potential impacts of the proposed action to sensitive species on or near Ocean Beach generally are associated with the following factors:

- Disturbance to and ultimately covering approximately 10.1 acres of Ocean Beach with dredge material;
- Creation of a temporary and localized turbidity plume from dredge material decant water as it drains around the toe berm into the nearshore environment;
- Temporary and localized disruption of the aquatic environment from dredge pumpout activities; and
- Disturbance to approximately 0.31 ac of benthic habitat from the pumpout pipe placed on the nearshore substrate.

Beach Disturbance and Covering, and Turbidity Plume. In general, this beach nourishment project is viewed as desirable because dredge material will be used to build up a portion of Ocean Beach that has undergone severe erosion to the extent that nearby sewage treatment infrastructure and the Great Highway are under great threat. The project will lessen the human-caused shortage of sand in the nearshore environment that contributes to the severe erosion. In contrast, if the beach nourishment did not occur, the dredge material would be placed in the aquatic environment at one of the approved placement sites, which would create a larger turbidity plume and cause other impacts discussed in the EA for maintenance dredging (USACE 2015).

The proposed project is expected to cause disturbance of approximately 3000 ft of Ocean Beach for 20-30 days during the period from August 15 to September 30, 2021. Approximately 10.1 ac of beach habitat will be buried and the abutting bluff face will be covered as well until re-exposed by future erosion, which could take several years. Consequently, the project could potentially cause harassment, injury, or mortality to nesting or feeding birds or their invertebrate food. Nearshore fish could encounter the small turbidity plume, which potentially could alter their physiology or behavior and affect the food supply of listed birds.

Aquatic Environment Disruption. The hopper dredge will enter and leave the anchorage located approximately 2700 ft offshore and in 35 ft of water up to 8 times per 24-hr day during project implementation. Activities such as anchoring or attaching to a mooring, and attaching and detaching the pipeline would cause small, intermittent, and localized disturbance involving movement, noise, and lights at night. If beach nourishment did not occur, disturbance would occur from placement of dredge material in the aquatic environment at one of the designated placement sites MSC material is suitable for.

Benthic Habitat Disturbance. Placement of the pipe on the nearshore substrate will cause disruption of the benthos during mobilization and de-mobilization of the project, and will cover approximately 0.31 ac of benthic habitat for the duration of the project. Invertebrates in this localized area will not be available as food organisms for feeding fish or birds for a period of 20-30 days.

Proposed Conservation Measures

1. The August 15 to September 30 work window is intended to avoid or minimize impacts to nesting bank swallows and migrating shorebirds;
2. The staging area for construction equipment will be located in an existing parking lot adjacent to the north end of the project in order to minimize damage to vegetation and compaction of terrain;
3. Construction equipment (i.e., bulldozers) will be examined daily and maintained to ensure there are no leaks of hydraulic fluid, oil, or other contaminants;
4. At least 75 ft of toe berm will be in place ahead of the dredge material placement area to contain the dredge material and minimize the turbidity plume.

Effects Determination

California least tern breeding colonies do not occur in or near the proposed project area. Although the area offshore of Ocean Beach is not a prime foraging location, these terns may occasionally visit the area for foraging when prey items are present. Least terns dive from the air to catch fish just below the surface.

Marbled murrelet breed in inland areas (e.g., old growth forest), but may be present in waters of the proposed action area during the non-breeding season. These murrelets are divers which forage for fish and invertebrates under water.

Turbidity caused by the proposed project as the beach nourishment sediment dewaters will occur primarily at the end of the toe berm, and is expected to be minor, localized, and temporary. The dredged material delivery pipeline will rest on 0.31 acres of sandy bottom habitat. It will be lowered and anchored in place with weighted collars to prevent it from shifting. Proposed action impacts to feeding California least tern and marbled murrelet are expected to be insignificant because similar habitat is widely available along other areas of Ocean Beach and areas to the north and south. Disturbance from project activities and impacts to fish and benthic food organisms in the project area will be minor, temporary, and localized. Feeding birds are expected to simply avoid the project area and activities and feed in nearby areas.

Western snowy plover utilizes many areas of Ocean Beach and may occur in the proposed action area. Nesting occurs from March 1 through September 30 in a variety of beach habitats above MHHW. None of the beach in the proposed project footprint is at an elevation suitable as nesting habitat. These birds forage along the water line and in dry sand.

The proposed project would involve the placement of dredged material on 10.1 acres of potential foraging habitat for western snowy plover. The impacts to the foraging area would be temporary with the recovery of many food items in the lower intertidal area occurring within a month. Project impacts to feeding western snowy plover are expected to be insignificant because miles of additional intertidal foraging habitat is present in either direction on the beach. Feeding birds are expected to simply avoid the project area and feed in nearby locations.

Based on the effects analysis above, we are requesting your written concurrence with our determination that the proposed project is not likely to adversely affect the California least tern, Pacific Coast DPS of the western snowy plover, or marbled murrelet. If you have any questions or require additional information, please contact Eric Jolliffe of my staff at eric.f.jolliffe@usace.army.mil, or at (415) 503-6869 regarding this consultation request.

Sincerely,

Dr. Tessa Beach
Chief, Environmental Sections A&B

EFH Analysis

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
450 GOLDEN GATE AVENUE
SAN FRANCISCO, CALIFORNIA 94102-3661

October 20, 2020

REPLY TO
ATTENTION OF
ENVIRONMENTAL SECTION B

Subject: Ocean Beach Storm Damage Reduction Beach Nourishment Project– Request for Concurrence with Endangered Species Act Determination and for Essential Fish Habitat Consultation under the Magnuson-Stevens Fishery Conservation and Management Act

Mr. Barry A. Thom
Regional Administrator
National Marine Fisheries Service, West Coast Region
c/o Mr. Gary Stern
North Central Coast Regional Office
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404-4731

Dear Mr. Thom:

Pursuant to Section 7(a)(2) of the Endangered Species Act of 1973, as amended (ESA; 50 C.F.R. Part 402), the U.S. Army Corps of Engineers, San Francisco District (USACE) is requesting informal consultation and concurrence from the National Marine Fisheries Service (NMFS) with our determination that the proposed Ocean Beach Pump Ashore project is not likely to adversely affect the following ESA-listed species and designated critical habitats:

- Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*; endangered)
- Central California Coast coho salmon (*O. kisutch*; endangered)
- California Central Valley spring-run Chinook salmon (*O. tshawytscha*; threatened)
- California Central Valley distinct population segment (DPS) of steelhead (*O. mykiss*; threatened)
- Central California Coast DPS of steelhead (*O. mykiss*; threatened)
- Southern DPS of North American green sturgeon (*Acipenser medirostris*; threatened)
- Southern DPS of North American green sturgeon critical habitat

- Leatherback turtle (*Dermochelys coriacea*; endangered)
- Leatherback turtle critical habitat
- Green sea turtle (*Chelonia mydas*; threatened)

- Mexico DPS of humpback whale (*Megaptera novaeangliae*; threatened)
- Southern resident DPS of killer whale (*Orcinus orca*; endangered)

- Black abalone (*Haliotis cracherodii*; endangered)
- Black abalone critical habitat

The USACE also is requesting consultation under the Magnuson-Stevens Fisheries Conservation and Management Act (Magnuson-Stevens Act; 50 C.F.R 600.920(e)). We have determined that the proposed action may affect essential fish habitat (EFH) managed as part of the Pacific Groundfish Fishery Management Plan (FMP), Pacific Salmon FMP, Pacific Coastal Pelagic Species FMP, and West Coast Highly Migratory Species FMP.

The proposed action involves the placement of dredged material from the operations and maintenance (O&M) dredging of the San Francisco Main Ship Channel (MSC) onto a portion of Ocean Beach in the City and County of San Francisco (CCSF) for beach nourishment (Figure 1).

The O&M dredging activities of the MSC are conducted under separate authorizations and are separate projects. The MSC would provide the source material for placement on Ocean Beach for the proposed action; however, the MSC is maintenance dredged every year and would occur independently of the proposed action. The Federal Base Plan for maintenance dredging of the MSC, as practiced for the past several decades, is dredging by a hopper dredge with placement in the designated nearshore placement sites off Ocean Beach—SF-8 or the Ocean Beach Demonstration Site (OBDS; encompassed by the proposed placement site SF-17). The evaluation of the potential impacts associated with the O&M dredging of the MSC is presented in the Final Environmental Assessment (EA)/Environmental Impact Report for Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay Fiscal Years 2015-2024 (USACE 2015).

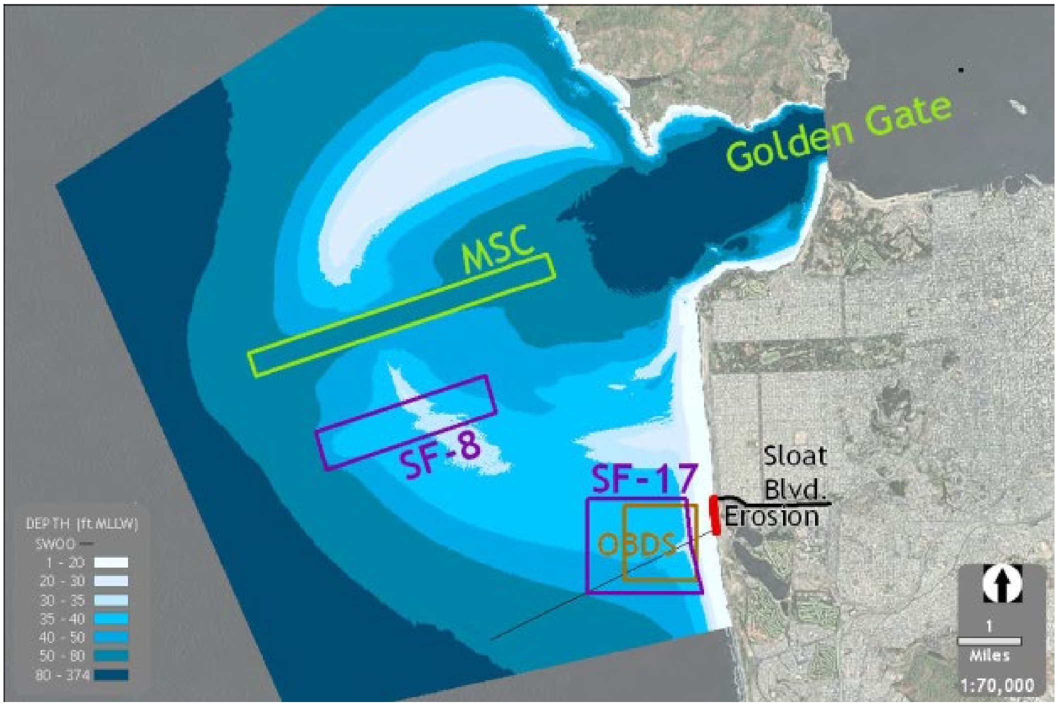

Figure 1. Location of the project area (shown in red) on Ocean Beach (San Francisco City and County) relative to the MSC, SF-8, SF-17, and OBDS.

Project Description

The proposed action would involve the beneficial reuse of approximately 250,000 - 285,000 cubic yards (CY) of sediment from MSC O&M dredging for direct beach nourishment on Ocean Beach between Sloat Boulevard and Fort Funston (Figure 2). Throughout most of the 3,000-ft project area south of Sloat Boulevard, there is an existing coastal bluff that is approximately 30 ft high. Much of the bluff is fronted by rock, and a significant stretch of the beach is completely inundated during higher tidal stages.

Grain size and organic content testing of sediment collected from MSC most recently occurred in 2018, and found that the material ranged from 91.4% to 98.8% sand, which is consistent with the historical results of 90% to 99% sand. This material exceeds the typical physical composition goal for beach nourishment projects of greater than approximately 80% sand. Total Organic Carbon levels ranged from 0.8% to 1.8%. This is considered to be low and within the highly suitable range for beneficial use in the littoral zone. Chemical testing occurred in 2010 with acceptable results.

Figure 2. Proposed project footprint.

Placement of the dredge material would occur from August 15 to September 30, 2021. The material would be pumped onto Ocean Beach for beach nourishment by a hopper dredge with pump-off capability; the dredge would anchor offshore of the intersection of Sloat Boulevard and the Great Highway in water approximately 35 ft deep. A 28-30-inch in diameter pipeline would be placed perpendicular to the beach, beginning at a point that is approximately 30 ft seaward of the bluff, cross the beach, and run along the ocean bottom to a mooring station located where the hopper dredge would anchor. The pipeline would need to extend approximately 2700 ft offshore in order to reach the required 35-ft depth. The terminal end of the pipeline would be fixed to a floating platform that would be secured to the seafloor by an anchor. Once the hopper is anchored, the pipeline connection would be made. The pipeline would be anchored to the ocean bottom every 100 ft to prevent the pipeline from being disturbed by wave action.

Placement of dredged material would begin at the northern end of the project site and progress southward while constructing a protective, sacrificial dune seaward of the bluff (Figure 3). Initially, a toe berm would be constructed on the beach during low tides using the available sand within the existing footprint of the proposed action. This would allow for work during high tides and contain the activities to the beach nourishment footprint. The purpose of the toe berm is to contain the sand slurry as it comes out of the end of the pipeline and to minimize the loss of sand while it dewaters. The toe berm would collect the decanted water and guide it south to the end of the toe berm structure where it would then return to the ocean. The toe berm would be located parallel to and approximately 100 ft west of the bluff.

The toe berm would be constructed using bulldozers to push beach sand into a berm-shaped structure of uncompacted sand that is approximately 10-ft high at the crest and 20-to-30-ft wide at the base. Material to construct the dune will be placed behind this toe berm and shaped. There would always be a sufficient length of toe berm in place ahead of the dredged material placement area to ensure that all of the placed material settles out before the decant water is returned to the surf zone. A diffuser would be attached to the end of the pipe to control the deposition of the dredged material and to prevent the slurry water from scouring the surrounding area. As the dredged material is pumped into the area behind the toe berm, it would be piled higher than the toe berm and then shaped to the dimensions shown below in figure 3. The dune footprint (toe to top of the bluff) would be approximately 10.1 acres.

It is estimated that two bulldozers, an excavator and a loader would operate 18 to 24 hrs per day each. As each 100-foot section of dune structure is completed, additional lengths of pipeline would be attached so the construction area can move southward.

The hopper dredge would have a daily production rate of approximately 15,000 to 20,000 CY per day, including dredging, hauling, and pump ashore operations. The hopper has a bin capacity of approximately 3,500 CY, and pumpout takes approximately 1.5 hr to complete. Based on a 24-hour work day, it is estimated that the hopper will make up to eight trips per day between the MSC and the pumpout anchorage. Therefore, placement of the required amount of dredge material on the beach footprint is expected to take approximately 20 to 30 days. Based on the amount of dredge material available, the entire dune structure is expected to be completed in one construction season. Any additional sand in excess of what is needed to construct the dune would be placed at an approved aquatic placement site for MSC material. However, it should be noted that while unlikely, there is the possibility of delays in dredging or onshore placement due to equipment malfunction, weather, or other factors and such delays could necessitate construction of the dune over multiple seasons.

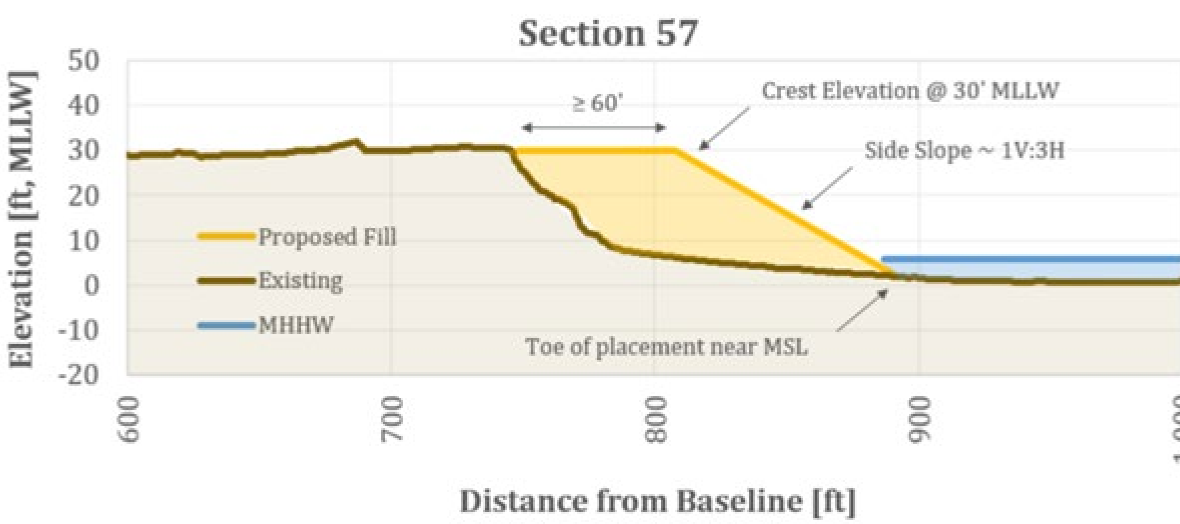

Figure 3. Example cross-section of the proposed project.

Potential Project Impacts

Potential impacts of the proposed project to sensitive species on or near Ocean Beach generally are associated with the following factors:

- Disturbance to and ultimately covering approximately 10.1 acres of Ocean Beach with dredge material;

- Creation of a temporary and localized turbidity plume from dredge material decant water as it drains around the toe berm into the nearshore environment;
- Temporary and localized disruption of the aquatic environment from dredge pumpoff activities; and
- Disturbance to approximately 0.31 ac of benthic habitat from the pumpoff pipe placed on the nearshore substrate.

Beach Disturbance and Covering, and Turbidity Plume. In general, this beach nourishment project is viewed as desirable because dredge material will be used to build up a portion of Ocean Beach that has undergone severe erosion to the extent that nearby sewage treatment infrastructure and the Great Highway are under great threat. The project will lessen the human-caused shortage of sand in the nearshore environment that contributes to the severe erosion. In contrast, if the beach nourishment did not occur, the dredge material would be placed in the aquatic environment at a designated placement site the MSC material is suitable for, which would create a larger turbidity plume and cause other impacts discussed in the EA for maintenance dredging (USACE, 2015).

The proposed project will cause disturbance of approximately 3000 ft of Ocean Beach for 20-30 days during the period from August 15 to September 30, 2021. Approximately 10.1 ac of beach habitat will be buried and the abutting bluff face will be covered as well until re-exposed by future erosion, which could take several years. Nearshore fish could encounter the small turbidity plume, which potentially could alter their physiology or behavior and affect the food supply of their predators.

Aquatic Environment Disruption. The hopper dredge will enter and leave the anchorage located approximately 2700 ft offshore and in 35 ft of water up to 8times per 24-hr day during project implementation. Activities such as anchoring or attaching to a mooring, and attaching and detaching the pipeline would cause minor, intermittent, and localized disturbance involving movement, noise, and lights at night. If beach nourishment did not occur, disturbance would occur from placement of dredge material at in the aquatic environment.

Benthic Habitat Disturbance. Placement of the pipe on the nearshore substrate will cause disruption of the benthos during mobilization and de-mobilization of the project, and will cover approximately 0.31 ac of benthic habitat for the duration of the project. Invertebrates in this area will not be available as food organisms for feeding fish or other animals for a period of 20-30 days.

Proposed Conservation Measures

1. The August 15 to September 30 work window is intended to avoid impacts to nesting birds, but also will avoid or minimize impacts to salmonid adults during their spawning migrations, salmonid smolts outmigrating from San Francisco Bay, and killer whales;
2. The staging area for construction equipment will be located in an existing parking lot adjacent to the north end of the project in order to minimize damage to vegetation and compaction of terrain;
3. Construction equipment (i.e., bulldozers) will be examined daily and maintained to ensure there are no leaks of hydraulic fluid, oil, or other contaminants;
4. At least 75 ft of toe berm will be in place ahead of the dredge material placement area to contain the dredge material and minimize the turbidity plume.

Endangered Species Act Consultation

Salmonids. Chinook salmon adults and Central Valley steelhead adults may occasionally occur in the project area during their upstream spawning migration through the Golden Gate, generally from November to May (i.e., outside of August 15-September 30 project work window). Salmonid smolts outmigrate from San Francisco Bay during a similar time period. Some Coho salmon and Central California Coast steelhead also may occasionally be present as they migrate into the smaller watersheds of San Francisco Bay, but no coastal spawning streams are near the project area. Ocean-rearing juvenile and yearling or older salmonids may be present in nearshore areas. However, trawling conducted in September and October in 2000 and 2002 detected no yearling Chinook salmon or juvenile coho salmon south of the Golden Gate, although yearling Chinook salmon were detected in June of these years (Fisher et al. 2007). In general, few salmonids are expected to encounter the project during implementation.

For the salmonids that are present during project implementation, impacts would be limited to exposure to the small turbidity plume exiting the beach at the end of the toe berm during sediment dewatering, and the minor, intermittent aquatic disturbance from the hopper dredge activities. Turbidity can affect fish physiology or behavior due to clogging gills with sediment, limiting vision etc., which may increase energy requirements and reduce foraging efficiency. Disturbance from project activities may cause avoidance (e.g., from noise) or attraction (e.g., from lights at night) to the project area, resulting in reduced feeding efficiency or greater vulnerability to predators. However, these impacts are expected to be minor, temporary, and localized. Salmonids are strong swimmers and generally would be expected to simply avoid the impact areas and feed or continue migrating in adjacent locations. Attraction to lights at night is expected to be limited as lights will not be directed toward the water except for anchoring or mooring. Overall, project impacts are not likely to adversely affect ESA-listed salmonids.

Green sturgeon. Green sturgeon enter San Francisco Bay between February and May (i.e., outside of August 15-September 30 project work window) to access their freshwater spawning streams. However, rearing and maturing fish may be present in the proposed project area. As with salmonids, green sturgeon would be exposed to the small turbidity plume at the end of the toe berm and to hopper dredge activities. They also may be impacted by the dredged material delivery pipeline, which will rest on 0.31 acres of sandy bottom habitat after it is lowered and anchored in place with weighted collars.

The proposed project is very small relative to the vast amount of sandy bottom, open water habitat available to rearing and maturing green sturgeon. Project impacts will last only 20-30 days, and will be minor, temporary, and localized. Green sturgeon likely will simply avoid the project area during implementation, and continue feeding, rearing, and maturing in nearby locations. The proposed project is not likely to adversely affect green sturgeon.

Marine Reptiles. Sea turtles are pelagic species but may forage in coastal waters. The green sea turtle is not expected to occur in the project area because it prefers warmer waters (e.g., near San Diego), and so is not likely to be adversely affected by proposed project activities. The leatherback turtle nests in the tropics; in the eastern Pacific Ocean, nesting occurs along the coast of Central America. Therefore, juveniles and eggs would not occur in the project vicinity. Foraging adult leatherback turtles have the potential to occur near the project area, although they are the most pelagic sea turtle species and typically occur in deep water (> 55 ft MLLW). Their primary food is jellyfish, and their occurrence in the project area is expected to be rare. Due to their temporary and localized impacts of the proposed project, leatherback sea turtle is not likely to be adversely affected by proposed project activities.

Marine Mammals. In Northern California, humpback whales are most likely to be observed May-November, whereas orcas are most likely to be observed December-May. Humpback whales have been observed in the project vicinity as they migrate through the Gulf of the Farallones, filter-feeding on krill and other invertebrates, and small fish. Most killer whale sitings in California are of “transient” individuals that feed primarily on marine mammals. These killer whales are not part of the Southern Resident DPS and hence are not ESA-listed. The primary range of Southern Resident killer whales includes the inland waterways of Washington State and British Columbia where they feed primarily on salmon, although they have been observed as far south as central California during the winter. Hence, Southern Resident killer whales are not likely to encounter the proposed project during the implementation period of August 15-September 30.

Potential project impacts on marine mammals include disorientation from noise generated by vessel and equipment operation, encountering the small turbidity plume, and direct collision with disposal vessels. However, the effects of noise and turbidity associated with the project either on whales directly or their food supply will be minor, temporary, and localized. No activities such as impact pile driving are associated with this project, so no interruption or interference with whale communication is anticipated. Collisions are unlikely as the hopper dredge speed while full will be relatively low (i.e., 10-15 knots; Kleinfelder et al. 2002), and the NOAA’s Greater Farallones National Marine Sanctuary has established methods for communicating with mariners to reduce vessel strikes in the San Francisco Bay area. Also, the number of vessel trips traversing the area would not change if the beach nourishment did not occur and the dredge material instead was placed in the aquatic environment. Both humpback whales and killer whales forage throughout the region off the central California coast, and individuals encountering project activities likely would simply avoid the project area and feed nearby. Therefore, the proposed project is not likely to adversely affect these species.

Black abalone. Black abalone is an algal grazing snail that lives in rocky intertidal and subtidal habitat, which is required for all life stages. The rocks need to have holes and crevices that provide protection from predation and wave energy to smaller size abalone. Coralline algae must be present as a substrate for larvae to settle out and as a food resource for adults. The project area is entirely sandy, so no black abalone are expected to be in the project footprint or nearby. The nearest rocky habitat that may be suitable is at Land's End, and will not be affected by project activities. Therefore, this project is not likely to adversely black abalone.

Critical habitat. The proposed project site and its vicinity coincide with designated critical habitat for green sturgeon, leatherback turtle, and black abalone. Critical habitat includes "specific areas within the geographical area occupied by the species…that contain physical or biological features essential to conservation of the species." As no rocky intertidal or subtidal habitat required by black abalone occurs in the project area, the proposed project is not likely to adversely affect black abalone critical habitat.

Potential project impacts causing adverse impacts to physical or biological features of green sturgeon critical habitat include modifications to water quality and food resources, and general disruption or disturbance from project activities. In the ocean, green sturgeon feed on benthic crustaceans and small fish, and the project pumpoff pipeline for dredge material would cover and make 0.31 ac of benthic habitat unavailable to green sturgeon for feeding. However, this reduction in habitat would be minor given the huge amount of sandy feeding habitat available along the coast. The impact also would be temporary and localized as it would occur for only a period of 20-30 days, as would the impacts from the small turbidity plume expected to occur near the beach. Disturbance from pumpoff activities would be minor, temporary and localized as well, and would occur only during the intermittent presence of the hopper dredge and possibly near the beach nourishment site. Overall, the proposed project is not likely to adversely affect green sturgeon critical habitat.

Similar to green sturgeon, potential project impacts causing adverse impacts to physical or biological features of leatherback turtle critical habitat include modifications to water quality and food resources. In addition to general disruption from project activities, increased boat traffic may cause the quality of leatherback turtle habitat to decline due to the increase risk of vessel strikes. As stated above, proposed project effects on water quality and the primary food item of leatherback turtle, jellyfish, will be minor, temporary, and localized, as will the general disturbance to the habitat. Also, the number of vessel trips traversing the area would not change compared to the dredge material instead being placed at SF-17 or other suitable designated aquatic placement site. The change of the hopper dredge destination from SF-17 to nearer to Ocean Beach may improve the quality of leatherback turtle habitat by decreasing the likelihood of vessel strikes in deeper water, where leatherback turtles are more likely to occur. The proposed project is not likely to adversely affect leatherback turtle critical habitat.

Magnuson-Stevens Fisheries Conservation and Management Act (Essential Fish Habitat) Consultation
The proposed project area consists of sandy beach, coastal water habitat under full tidal influence, and sandy seafloor benthic habitat located below the open water. There are no mudflat or marsh habitats present, nor is eelgrass present.

The proposed project has been reviewed for potential impacts to EFH, and is expected to temporarily cover 0.31 ac of benthic habitat with the project pumpoff pipeline for dredge material, create a small turbidity plume, and generate a minor disturbance in the project area due to dredge material pumpoff activities and dune construction on the beach. As stated elsewhere, these adverse effects would be minor, temporary, and localized due to the nature of the project, and its small size relative to the huge amount of habitat adjacent to the project area. Adverse impacts would occur only for the 20-30 day project duration, and the turbidity plume created from dredge material de-watering is expected to be small. The presence and activity of the hopper dredge will occur intermittently and create only a minor disturbance. The USACE has determined that the project may affect EFH managed as part of the Pacific Groundfish, Pacific Salmon, Pacific Coastal Pelagic Species, and West Coast Highly Migratory Species fishery management plans.

We are requesting your written concurrence with our determination that the proposed project may affect but is not likely to adversely affect the ESA-listed species identified above, or critical habitat for green sturgeon, leatherback turtle, and black abalone, and also a response regarding EFH. If you have questions or require additional information, please contact Beth Campbell of my staff at elizabeth.a.campbell@usace.army.mil, or at (415) 503-6845 regarding this consultation request.

Sincerely,

Dr. Tessa Beach
Chief, Environmental Sections A&B

Reference:

Fisher, J., and 11 coauthors. 2007. Comparisons of the coastal distributions and abundances of juvenile Pacific salmon from central California to the northern Gulf of Alaska. American Fisheries Society Symposium 57:31–80.

Kleinfelder, Inc. and 6 coauthors. 2002. The case for the federal hopper dredge fleet on the Pacific Coast. May 31, 2002. 97 pages plus appendices.

Avoidance and Minimization Measures

Avoidance and Minimization Measures
In addition to the overall site use limitations listed in Section 9, the following standard BMPs would be applied to prevent water quality impacts from pollution due to debris, fuels, oils, lubricants, and other harmful materials. Vessels and equipment that are used during the course of a project would be fueled and serviced in a manner that would not affect water quality.

Equipment and Fueling

- Well-maintained equipment would be used to perform the work, and except in the case of a failure or breakdown, maintenance would be performed off site. Equipment would be inspected daily by the operator for leaks or spills. If leaks or spills are encountered, the source of the leak would be identified, the leak would be cleaned up, and the cleaning materials would be collected and would be properly disposed.
- Fueling of marine-based equipment would occur at designated off-site safe locations. Fueling of land-based equipment would occur in a staging area or over pavement, and the location would be inspected after fueling to document that no spills have occurred. Spills would be cleaned up immediately using spill response equipment.
- Offsite fueling would occur at locations covered under the Regional Water Quality Control Boards National Pollutant Discharge Elimination System (NPDES) industrial storm water permit (SIC Code 4493).
- Idling times for construction equipment (including vehicles) shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 30 seconds.
- Secondary containment, such as a drain pan, to catch spills or leaks would be used when removing or changing fluids. Fluids would be stored in appropriate containers with covers and properly recycled or disposed of offsite.
- Hold a preconstruction meeting to inform contractor about sensitive areas, including natural and cultural resources.
- Preconstruction meeting would also include NPS law enforcement rangers and/or beach rescue personnel to coordinate administrative and emergency access through the work zone during pumping operations.
- If necessary, all servicing of equipment done at the job site would be conducted in a designated, protected area to reduce threats to water quality from vehicle fluid spills. Designated areas would not directly connect to the ground, surface water, or storm drain systems. The service area would be clearly designated with sandbags or other barriers
- If bank swallow nests are active, night lighting with amber colored bulbs must be used and located beyond a 250-foot buffer area from work areas.
- The pipeline delivering material to the beach would be marked at periodic intervals with buoys in appropriate areas to warn small craft users, surfers and bathers to avoid the pipeline.
-

Hazardous Materials

- A Spill Prevention Control and Countermeasure (SPCC) plan would be prepared to address the emergency cleanup of any hazardous material and would be available on site.

Environmental Protection Plan (EPP)

- A project-specific EPP is incorporated into the SPCC, hazardous waste BMPs, and emergency planning requirements to ensure that operations would not adversely affect water quality. The federal hopper dredges *Essayons* and *Yaquina* each have this; contract hopper dredges would be required to have an EPP and SPCC.

A-2 Clean Water Act (CWA)

Sec 404 (b)(1) Analysis

Section 404(b)(1) Guidelines
Summary Evaluation

1. Summary of Technical Evaluation Factors (Subparts C-F).
A detailed evaluation is provided in the main body of this report

	N/A	Not Significant	Significant*
a. Potential Impacts on Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C) (Sec. 230.20-230.25)			
1) Substrate		X	
2) Suspended particulates/turbidity		X	
3) Water		X	
4) Current patterns and water circulation		X	
5) Normal water fluctuations		X	
6) Salinity gradients		X	
b. Potential Impacts on Biological Characteristics of the Aquatic Ecosystem (Subpart D)(Sec. 230.30-230.32)			
1) Threatened and endangered species		X	
2) Fish, crustaceans, mollusks and other aquatic organisms in the food web		X	
3) Other wildlife		X	
c. Potential Impacts on Special Aquatic Sites (Subpart E)(Sec. 230.40-230.45)			
1) Sanctuaries and refuges	N/A		
2) Wetlands	N/A		
3) Mud flats	N/A		
4) Vegetated shallows	N/A		
5) Coral reefs	N/A		
6) Riffle and pool complexes	N/A		
d. Potential Effects on Human Use Characteristics (Subpart F)(Sec 230.50-230.55)			
1) Municipal and private water supplies		X	
2) Recreational and commercial fisheries		X	
3) Water-related recreation		X	
4) Aesthetics		X	
5) Parks, national and historic monuments, national seashores, wilderness areas, research sites, and similar preserves		X	

2. Evaluation and Testing (Subpart G) (Sec. 230.60-230.61)

a. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material. (Check only those appropriate.)

1)	Physical characteristics	| X |
2)	Hydro-geography in relation to known or anticipated sources of contaminants	| |
3)	Results from previous testing of the material or similar material in the vicinity of the project	| X |
4)	Known, significant sources of persistent pesticides from land runoff or percolation	| |
5)	Spill records for petroleum products or designated hazardous substances (Section 311 of CWA)	| |
6)	Public records of significant introduction of contaminants from industries, municipalities, or other sources	| |
7)	Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge activities	| |
8)	Other sources (specify)	| |

References

USACE SF-District. 2017. San Francisco Main Ship Channel, 2018 Maintenance Dredging Sampling and Analysis Plan (SAP) for Grain Size Verification & Tier III Evaluation. USACE SF-District. November 2017

USACE SF District 2018. San Francisco Main Ship Channel 2018 Maintenance Dredging Sampling and Analysis Report. USACE San Francisco District. April 2018.

b. An evaluation of the appropriate information in 3a above indicates that there is reason to believe the proposed dredge or fill material is not a carrier of contaminants, or that levels of contaminants are substantively similar at extraction and disposal sites and not likely to require constraints. The material meets the testing exclusion criteria.

| X |	|__|
YES	NO

3. Disposal Site Delineation (Section 230.11(f)).

a. The following factors, as appropriate, have been considered in evaluating the disposal site.

1)	Depth of water at disposal site	| |
2)	Current velocity, direction, and variability at the disposal site	| |
3)	Degree of turbulence	| X |
4)	Water column stratification	| |
5)	Discharge vessel speed and direction	| |
6)	Rate of discharge	| X |
7)	Dredged material characteristics (Constituents, amount, and type of material, settling velocities)	| X |
8)	Number of discharges per unit of time	| X |
9)	Other factors affecting rates and patterns of mixing (specify)	| |

b. An evaluation of the appropriate factors in 4a above indicates that the disposal site and/or size of mixing zone are acceptable

| X | YES | | | NO

4. <u>Actions To Minimize Adverse Effects (Subpart H)(Sec. 230.70-230.77)</u>.

All appropriate and practicable steps have been taken, through application of recommendation of Section 230.70-230.77 to ensure minimal adverse effects of the proposed discharge.

| X | YES | | | NO

5. <u>Factual Determination (Section 230.11)</u>.

A review of appropriate information as identified in items 2 - 5 above indicates that there is minimal potential for short or long term environmental effects of the proposed discharge as related to:

a. Physical substrate
(review sections 2a, 3, 4, and 5 above). YES | X | NO | |

b. Water circulation, fluctuation and salinity
(review sections 2a, 3, 4, and 5) YES | X | NO | |

c. Suspended particulates/turbidity
(review sections 2a, 3, 4, and 5). YES | X | NO | |

d. Contaminant availability (review sections 2a, 3, and 4) YES | X | NO | |

e. Aquatic ecosystem structure, function and organisms(review sections 2b and c, 3, and 5) YES | X | NO | |

f. Proposed disposal site (review sections 2, 4, and 5) YES | X | NO | |

g. Cumulative effects on the aquatic ecosystem YES | X | NO | |

h. Secondary effects on the aquatic ecosystem YES | X | NO | |

6. Review of Compliance (Section 230.10(a)-(d)).

a. The discharge represents the least environmentally damaging practicable alternative and if in a special aquatic site, the activity associated with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose. |X| YES |__| NO

b. The activity does not appear to: 1) violate applicable state water quality standards or effluent standards prohibited under Section 307 of the CWA; 2) jeopardize the existence of Federally listed threatened and endangered species or their critical habitat; and 3) violate requirements of any Federally designated marine sanctuary |X| YES |__| NO

c. The activity would not cause or contribute to significant degradation of waters of the U.S. including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values |X| YES |__| NO

d. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem |X| YES |__| NO

7. Findings of Compliance or non-compliance. (Sec. 230.12)

   The proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines ... YES | X | NO | |

____________________ ______________________________

DATE District Commander

Note: The DE should sign this at the time of signing the FONSI.

A-3 Clean Air Act (CAA)

Air Emissions Inventory

1425 N. McDowell Boulevard
Suite 200
Petaluma, CA 94954
707.795.0900 phone
707.795.0902 fax

esassoc.com

memorandum

date	December 2, 2020
to	Julie Moore (SF Planning Department)
cc	Karen Frye (SF Public Utilities Commission)
from	Sarah Patterson, Elijah Davidian
subject	Air Pollutant Emissions Analysis for South Ocean Beach Nourishment Project, San Francisco, California

Introduction

The U.S. Army Corps of Engineers (USACE), in coordination with the City and County of San Francisco (the city) and the National Park Service (NPS), is planning a project involving the *beneficial use* of dredged sand in a manner that could help nourish an eroding segment of Ocean Beach in San Francisco, California. The beneficial use project would rely upon existing USACE maintenance dredging operations for sand sourcing and transport, but would involve additional work for sand placement and shaping into a berm along the shoreline. This memorandum provides an overview of the project background and location, a summary of project components, and an analysis of air pollutant emissions that could result from project implementation.

Project Background

Ocean Beach is a 3.5-mile stretch of sandy shoreline along San Francisco's Pacific Ocean coast. The beach is the visible portion of a much larger coastal sand and sediment system, known as the San Francisco Littoral Cell. The littoral cell is bounded by a large, semi-circular sandbar (the San Francisco Bar) which extends from the Marin Headlands in the north to Ocean Beach in the south. Within this area, sand circulates with the currents and tides, and by turns erodes and nourishes adjacent beaches. This complex sediment system has resulted in the accumulation of sand (i.e., *accretion*) along the northern portion of Ocean Beach (referred to generally as North Ocean Beach); while also causing the removal of sand, or erosion, along the southern portion of the beach (referred to generally as South Ocean Beach).[1]

1 South Ocean Beach refers to the portion of Ocean Beach extending south from Sloat Boulevard approximately 3,000 feet to the northern-most extent of the Fort Funston bluffs.

Ocean vessels access San Francisco Bay through the Golden Gate after passing through the Main Ship Channel, which is cut through the San Francisco Bar. USACE annually dredges the Main Ship Channel, the effects of which are analyzed in an Environmental Assessment/Environmental Impact Report (EA/EIR).[2] The EA/EIR discusses continued dredging and disposal operations, including that for the Main Ship Channel, as well as beneficial use of the dredged sand in a manner that could help nourish eroding segments of shoreline. Specifically, the EA/EIR explains that sand dredged from the Main Ship Channel would be placed within the San Francisco Bar Channel Disposal Site (ocean site) SF-8 and the Ocean Beach nearshore placement site SF-17 (**Figure 1**).[3]

SF-17 spans an area of approximately 3.3 square miles, and its eastern boundary is located approximately 0.35 mile offshore of Ocean Beach. A portion of SF-17 near the shoreline was selected as a beneficial use demonstration site because of its proximity to South Ocean Beach. The hypothesis for this selection was that waves and tidal currents would move the placed sand towards the beach and help nourish this eroding segment of shoreline. The EA/EIR also identifies the potential for onshore placement at South Ocean Beach; however, the document notes that additional environmental review would be required.[4]

Periodic erosion along South Ocean Beach threatens important city public infrastructure and restricts public beach access. The beach is owned by the NPS and managed by the NPS as part of the Golden Gate National Recreation Area (GGNRA) unit of the National Park System. An approximately 30-foot-tall bluff comprised of unconsolidated sand and construction debris abuts the backshore, the area beyond the limit of high tide that is dry under normal circumstances. The Great Highway runs atop this bluff, with the 14-foot-diameter Lake Merced Transport Tunnel (a wastewater conveyance and storage facility) buried within it. Additional city infrastructure on the bluff includes several other components of the wastewater management system (a pump station, the Oceanside Water Pollution Control Plant, and the Southwest Ocean Outfall), as well as the San Francisco Zoo.

The city, in coordination with the NPS, USACE, and other agencies, is currently in the planning stages of the Ocean Beach Climate Adaptation Project (also known as the “long-term project”), whose implementation would provide a long-term structural solution to the city’s erosion challenges, while also improving shoreline access and ecology. Because construction of that project would not begin until 2023, the city has implemented its Short-term Coastal Erosion Management Measures Project (also known as the “short-term project”), consisting of a robust erosion management program that is designed to monitor annual shoreline change, gauge infrastructure vulnerability, and respond with temporary “soft” engineering solutions (e.g., sandbags and beach nourishment, referred to as *sand backpassing*, a process of trucking large quantities of sand from North Ocean Beach to South Ocean Beach). In October 2015, the San Francisco Planning Department issued a determination that the short-term project activities are categorically exempt from the California Environmental Quality Act. The city began implementing the short-term project in early 2016, and it is expected to continue until December 2021.[5]

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2 URS, 2015. Final Environmental Assessment/Environmental Impact Report Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay Fiscal Years 2015-2024. April 2015

3 From 1971–2004, SF-8 was the primary disposal site for Main Ship Channel dredging. However, use of the site has been reduced in recent years. This is because dispersion of the placed sand has occurred slower than initially expected, and the resultant shoaling of the dumped sand has impaired the dredge’s safe maneuverability.

4 URS, 2015. Final Environmental Assessment/Environmental Impact Report Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay Fiscal Years 2015-2024. April 2015

5 San Francisco Planning Department, 2015. Categorical Exemption Form, SFPUC – South Ocean Beach Short-Term Erosion Projection Project, Case Number 2015-031754ENV. October 30, 2015.

Path: U:\GIS\GIS\Projects\12xxxx\D120468.22 South Ocean Beach Nourishment Project\03_MXDs_Projects\Figure 2_Project Location.mxd, rteitel 9/7/2020

SOURCE: ESA, 2020; ESRI, 2020

South Ocean Beach Nourishment Project

Figure 1
Project Location

ESA

In keeping with the short-term project's erosion management objectives, USACE, in coordination with the city and NPS, is planning the large-scale beach nourishment project that is the subject of this memo. The project would be undertaken by and made possible through USACE's Continuing Authorities Program's section 204 (Water Resources Development Act of 1992, as amended).[6] The Section 204 program provides for the beneficial use of sand obtained from authorized federal water resources projects (e.g., the dredging of the Main Ship Channel) for reducing storm damage to property (e.g., storm-generated beach retreat and erosion at South Ocean Beach).

Project Location

Figure 1 displays the regional location of the onshore and offshore portions of the project area, as well as the Main Ship Channel and SF-17. The onshore portion of the project would occur along an approximately 3,000-foot segment of Ocean Beach, south of Sloat Boulevard (South Ocean Beach). The offshore portion of the project would occur primarily within the Pacific Ocean, within approximately 0.5-mile of South Ocean Beach.

Project Components

As noted previously, USACE presently dredges the Main Ship Channel and transports the dredged material to a nearshore location near the project site (SF-17) where the material is dumped from the dredge's hull into the ocean. This would continue independent of the proposed beneficial use project, and therefore is not considered a component of the project for purposes of this air pollutant emissions analysis. Under the proposed beneficial use project, rather than disposing of the dredged material at the nearshore site, the dredge would anchor approximately 0.5 mile offshore (within the boundaries of SF-17) and pump approximately 265,000 cubic yards (beach fill is designed for 225,000 cubic yards and 15% is estimated for placement loss) of sand in a slurry onto the beach. Completing the proposed project would therefore require two main components. The first is the offshore work operating the hopper dredge pumps to accommodate transport of the dredged material to the shore, rather than releasing it into the ocean. The second is the onshore work required to shape the sand into a dune structure along the shoreline. Additional project description details relevant to the air pollutant emissions analysis are presented in the following subsections.

Data Inputs and Sources

Offshore Activities

Marine Vessel Specifications

USACE has explained the specific dredge to be used is not yet known, but would be determined through the contracting process. The agency has indicated that one of the following dredges would likely be used: Terrapin Island, Liberty Island, Stuyvesant, Glenn Edwards, Magdalen or Dodge Island. For comparison, presented in **Table 1** are the six ships and their specifications.

6 Water Resources Development Act (WRDA) of 1992, Public Law Number 106-580, section 204, as amended by WRDA of 2007, Public Law Number 110-114, section 2037.

TABLE 1
POTENTIAL DREDGE VESSELS AND SPECIFICATIONS

Dredge	Model Year	Engine Type	Engine Size (hp)	Number of Engines	Hopper Capacity (CY)
Terrapin Island	1979	Main	1099	2	6400
		Auxiliary	1005	2	
Liberty Island	2000	Main	4891	2	6540
		Auxiliary	2547	2	
Stuyvesant	1981	Main	6900	2	11,065
		Auxiliary	965	2	
Glenn Edwards	2005	Main	2260	3	12,033
		Auxiliary	1298	3	
Magdalen	2012	Main	5683	2	11,120
		Auxiliary	5065	2	
Dodge Island	1979	Main	2120	2	3600
		Auxiliary	804	2	

SOURCE: ICF, 2020[7]

Since the specific dredge equipment is not yet known, considering the project size and nature, the Liberty Island has been selected as a surrogate for purposes of the emissions calculations.[8] The emissions analysis assumes the engines identified for the Liberty Island and uses the emissions factors from the 2013 Port of Long Beach inventory.[9] Emission factors used in this analysis are presented in **Attachment AQ-1**.

Similar to the dredge, USACE does not have specific vessel information for the tug. For this analysis, it is assumed that the tug would have similar specifications as the Terri L. Brusco.[10] **Table 2** presents the dredge and tug engine specifications used for calculating emissions.

As presented in Table 2, the hopper dredge equipment is divided into two engine types: (1) the main engine, which powers pumping for loading/unloading and propulsion; and (2) the ship auxiliary engine, which runs at an active load during loading and unloading (for reasons previously described, this analysis is concerned only with unloading). USACE has explained there are three main activities for the tugboat: Operation 1 – moving the slurry pipe from a port location inside the San Francisco Bay (the Bay) to the project area and reversing the process at the end of the work; Operation 2 – helping the dredge attach the pipe on site; and Operation 3 – assisting the hopper dredge in the case of rough weather. Vessel operations are discussed further in the next section.

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7 ICF, 2020. Memorandum: Offshore Equipment Details and Assumptions for Air Emissions Analysis of Beneficial Use of Sand Dredged from the San Francisco Main Ship Channel for Storm-Damage Reduction at Ocean Beach, San Francisco, California. March 2020.

8 The project requires approximately 225,000 cubic yards of sand to be pumped onto the beach. To accomplish this, a medium class hopper dredge with a pumping capacity of 5,000 cubic yards per load is required. The Liberty Island is of comparable type, size and capability.

9 Starcrest Consulting Group LLC, 2014. Port of Long Beach Air Emission Inventory – 2013. July 2014. Available at https://thehelm.polb.com/download/14/emissions-inventory/6572/2013-air-emissions-inventory.pdf

10 USACE does not have specific vessel information for the tug. The Bay Area Air Quality Management District does not have a marine vessel emissions calculator. Therefore, the emissions analysis assumes a tug comparable to that in the Sacramento Metropolitan Air Quality Management District's Harborcraft, Dredge and Barge Emission Factor Calculator default for a tugboat with one engine, with a project year of 2021. The Terri L. Brusco is of a comparable size.

TABLE 2
OFFSHORE EQUIPMENT SPECIFICATIONS

Vessel	Activity	Engine Type	Engine Size (hp)	Number of Engines	Load Factor	Model Year	Vessel Assumptions
Dredge	Pumping	Main engine	4891[a]	2	0.7	2017	Both propulsion and auxiliary engines would be replaced with Tier III engines by 2017.[b]
		Auxiliary Engines	2547	2	0.6	2017	
Tugboat	(1) Pipe to Site	Main engine	596	2	0.5	2009	Terri L. Brusco: propulsion and auxiliary engines would be replaced with Tier II engines by 2009.[b]
		Auxiliary Engines	50	2	0.31		
Tugboat	(2) Pipe to Hopper	Main engine	596	2	0.5/0.0[c]	2009	
		Auxiliary Engines	50	2	0.31		
Tugboat	(3) Rough Weather	Main engine	596	2	0.5/0.0[c]	2009	
		Auxiliary Engines	50	2	0.31		

NOTES:
[a] Only 4100 horsepower per engine is available for pipeline pumping.
[b] Required under the California Air Resources Board's Harborcraft Engine Replacement Rule[11]
[c] Load factor of 0.5 for propulsion and 0.0 for idling.

Schedule of Operations

For this assessment, it is assumed offshore project activities would occur for about 15 consecutive days. The project duration is based on the assumption that approximately 265,000 cubic yards of sand would be pumped onto the beach and that a hopper dredge can pump approximately 5,000 cubic yards per load. This equates to 53 total loads and it is anticipated that there would be 3 to 4 loads pumped per day. The schedule of operations for the dredge are presented in **Table 3**. As the table shows, the analysis assumes a pumpoff duration of one-and-a-half hours per load, or about five hours per day.

TABLE 3
SCHEDULE OF DREDGE PUMP-OFF OPERATIONS

Scenario	Loads per Day	Hour per load	Hour/day	Total Days
Max	4	1.5	6	13
Min	3	1.5	4.5	18
Average	3.5	1.5	5.3	15

As noted, there are three primary activities for the tug, the details of which are summarized in **Table 4**. As the table indicates, the analysis assumes approximately nine hours of operation related to transporting the slurry pipe to/from the project site (Operation 1), 11 hours of operation related to assisting the dredge attach the slurry pipe (Operation 2), and up to 29 hours of operation aiding the dredge during pump ashore during each day of rough

[11] State of California, 2008. 17 CCR § 93118.5 Airborne Toxic Control Measure for Commercial Harbor Craft. October 2008. Available at: https://govt.westlaw.com/calregs/Document/I0FD137A0A3C111E0BACCB30E82542E24?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=%28sc.Default%29

weather (Operation 3). In the latter case (Operation 3), for a given rough weather event, a tug would be called out and spend about an hour nearshore every six or seven hours. The remainder of the time, it would idle offshore, returning to the Bay when the weather improves.

TABLE 4
SCHEDULE OF TUG OPERATIONS

Operation		Load Factor	Trips/ Occurrences	Distance (miles)[a]	Speed (mph)	hours/trip	Total Hours
(1)	Active-1	0.5	4	20	9.2	2.2	8.7
(2)	Active-2	0.5	4	1	9.2	0.1	2.3
	Idling	0.1	2	NA	NA	4.5	9.0
(3)[b]	Active-1	0.5	2	20	9.2	2.2	4.3
	Active-2	0.5	6	1	9.2	0.1	0.7
	Idling[c]	0.1	3	NA	NA	7.8	23.3

NOTES:
[a] Distance for Active-1 assumed from Port of Oakland to Ocean Beach. Distance for Active-2 assumed from Ocean Beach to Hopper Dredge
[b] Activity assumed per day of “rough weather”
[c] Idling time for Operation 3 includes idling to assist the dredge and the idling near the shoreline

SOURCE: USACE, Email from John Dingler (USACE) to Julie More (SFEP), dated December 30, 2019

The analysis assumes transport of the pipe to/from the project site under Operation 1 would require a tugboat to travel from the Bay to the project site at the beginning of the project and then the same activity at the end of the project, resulting in four one-way trips to and from the Bay. For Operation 2, the tugboat would be required to assist the dredge-pipe attachment. It is assumed that, prior to commencement of project pumping, a tug boat would transport the assembled pipe between the onshore project site and the offshore area of connection with the dredge, and then reverse this action following completion of project pumping. During the project, the pipe would remain stretched between the onshore and offshore project areas. For Operation 3, the amount of tugboat activity required would be dependent upon weather. A rough weather event that would require tug assistance for the dredge is defined as waves larger than 6 feet in 35 feet of water. Table 4 presents the anticipated operating schedule during a given day of rough weather. The analysis assumes for each such day that a tugboat would travel from the Bay to the project site, and would idle for one hour near the onshore end of the pipeline (approximately 1,000 feet or farther from the shoreline) for every six to seven hours it idles to assist the dredge at the offshore end of the pipeline. At the end of the event, it is assumed that the tugboat would travel back to the Bay. As described further in the section below, the analysis assumes two tug operating scenarios – one with no rough weather and one with up to half of the pumpoff operations occurring during rough weather.

Onshore Activities

For onshore sand placement activities, the analysis assumes the required equipment comprises 2 bulldozers, 1 excavator, and 1 loader. For onshore sand *grooming*[12] activities, the analysis assumes the required equipment comprises of 1 excavator and 1 bulldozer. The tier of the engines is unknown so two scenarios are considered.

12 Sand grooming is intended to restore and maintain the slope of the placed sand after initial wave exposure and erosion. It is estimated that sand grooming would occur for two months after the sand placement and would require four hours of work per week over that period.

The first is the default fleet mix specific to the area under the jurisdiction of the BAAQMD considering a project year of 2021. The second scenario considered assumes the use of equipment with U.S. Environmental Protection Agency-certified Tier 4 final (Tier 4f) for onshore placement and maintenance activities. Tier 4f engines greatly reduce emissions through fuel efficiency and emissions controls and are now widely available and used throughout California. Engine specifications for on-shore equipment are presented in **Table 5**.

TABLE 5
ONSHORE EQUIPMENT SPECIFICATIONS

Activity	Onshore Equipment	Engine Size (hp)	Number of Equipment	Load Factor	Engine Size and Emission Factor Data Source
Sand Placement	Bulldozer	247	2	0.4	CalEEMod Defaults
	Excavator	158	1	0.38	
	Loader	97	1	0.37	
	Generator Sets	10	5	0.74	Engine size estimated for use of lights. Load factor is a CalEEMod Default
Sand Grooming	Bulldozer	247	1	0.4	CalEEMod Defaults
	Excavator	158	1	0.38	

SOURCE: CARB, 2016[13]

In addition to the onshore equipment estimates, the analysis assumes that the project's onshore sand placement work would require six workers per shift, with two 12-hour shifts per day, for each day of onshore placement activity. Worker trips to and from the site are included in the estimates and are presented in **Table 6**. Onshore sand placement is assumed to require 20 days with the equipment operating 18 hours per 24-hour day. For sand grooming work, worker trips were evaluated using CalEEMod defaults.

TABLE 6
ONSHORE SAND PLACEMENT WORKFORCE CALEEMOD INPUTS

Workers	Workers per shift[a]	Workers per day
Operators	4	8
Laborer	1	2
Supervisor	1	2
Total	6	12

NOTES:
[a] Twelve hour worker shifts

13 California Emissions Estimator Model (CalEEMod). 2016. California Emissions Estimator Model, version 2016.3.2. Available: http://www.caleemod.com/.

Calculation Methodology

Offshore Activities

The emission factors for the hopper dredge were obtained from the 2013 Port of Long Beach inventory[14] and adjusted to reflect California Air Resources Board's Harborcraft Engine Replacement Rule.[15] Emission factors for both the hopper dredge and tugboat are presented in **Table 7**.

TABLE 7
OFFSHORE EQUIPMENT EMISSION FACTORS

Vessel	Engine Type	ROG (g/hp-hr)	NO_X (g/hp-hr)	PM_{10} (g/hp-hr)	$PM_{2.5}$ (g/hp-hr)
Dredge	Main engine	0.54	4.91	0.25	0.24
	Auxiliary Engines	0.63	4.87	0.24	0.23
Tugboat	Main engine	0.53	5.04	0.14	0.13
	Auxiliary Engines	1.69	5.10	0.19	0.18

SOURCE: ICF, 2020[16]

To adjust the emission factors to engine activity and specifications presented under *Data Inputs and Sources*, the following equation was used to estimate emissions per marine vessel:

$$E_{offshore\ Vessel} = \sum_i (Activity_i * EF_i * LF_i * n_i * HP_i) * Conv$$

Where:

$E_{offshore\ Vessel}$	=	Total exhaust emissions for the offshore vessel, lbs/day
Activity	=	Equipment activity, hours/day
EF	=	Engine emissions factor, g/hp-h
LF	=	Engine load factor, unitless
n	=	number of engines, unitless
HP	=	Engine horsepower, hp
Conv	=	Conversion factor, 0.002205 lbs/g
i	=	Engine type

Complete calculations are presented in Attachment AQ-1.

14 Starcrest Consulting Group LLC. 2014. Port of Long Beach Air Emission Inventory - 2013, July 2014. Available at https://thehelm.polb.com/download/14/emissions-inventory/6572/2013-air-emissions-inventory.pdf

15 State of California, 2008. 17 CCR § 93118.5 Airborne Toxic Control Measure for Commercial Harbor Craft. October 2008. Available at: https://govt.westlaw.com/calregs/Document/I0FD137A0A3C111E0BACCB30E82542E24?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=%28sc.Default%29

16 ICF, 2020. Memorandum: Offshore Equipment Details and Assumptions for Air Emissions Analysis of Beneficial Use of Sand Dredged from the San Francisco Main Ship Channel for Storm-Damage Reduction at Ocean Beach, San Francisco, California. March 2020.

Onshore Activities

Potential air emissions were assessed by modeling the estimated daily emissions generated by onshore equipment required for sand placement and maintenance using the California Emissions Estimator Model (CalEEMod), version 2016.3.2. Default emission factors within CalEEMod were based on a project year of 2021.

Results

Total project emissions for the operations of the hopper dredge and tug boat are presented in **Table 8**. The results reflect the total emissions under the assumptions presented in *Data Inputs and Sources*, and include a range. As noted in the prior section, the amount of tugboat activity required for Operation 3 would depend upon weather. Thus, the analysis considers the emissions that could result if offshore operations were to occur with no rough weather, and that which could result if half of the offshore operations were to occur during rough weather.

TABLE 8
OFFSHORE EQUIPMENT EMISSION TOTALS

Offshore Equipment	Activity	ROG (lbs)	NO_X (lbs)	Exhaust PM_{10} (lbs)	Exhaust $PM_{2.5}$ (lbs)
Dredge	Pumping	938.2	7988.1	398.2	386.2
Tugboat	(1) Pipe to Site	7.1	60.6	1.7	1.6
Tugboat	(2) Pipe to Hopper	1.4	6.2	0.2	0.2
Tugboat	(3) Rough Weather[a]	6.8	43.0	1.3	1.2
Total Emissions with no "Rough Weather"		946.7	8054.9	400.0	388.0
Total Emissions with "Rough Weather"[b]		1006.6	8434.6	411.1	398.8

NOTES:
[a] Emission totals represents one day of "rough weather"
[b] "Rough Weather" events were assumed to be 50% of the 18 days

SOURCE: See *Appendix AQ-1*

Table 9 presents the total project emissions from the onshore equipment and worker trips. The results are from the CalEEMod outputs summarized in Attachment AQ-2. The uncontrolled scenario results are the average fleet mix as specified by BAAQMD and for project year 2021. The controlled scenario results are for onshore equipment engines greater than 25 hp which are assumed to be Tier 4f.

The emissions for the total project, for four sand placement scenarios, are shown in **Table 10**. The conditions with the least impacts would have all onshore equipment with Tier 4f engines and avoid work on rough weather days. **Table 11** provides a summary of these emissions, by scenario, in tons.

TABLE 9
ONSHORE EQUIPMENT EMISSION TOTALS

Onshore Equipment	Activity	Engine Types	ROG (lbs)	NO_X (lbs)	Exhaust PM_{10} (lbs)	Exhaust $PM_{2.5}$ (lbs)
2 Bulldozers, 1 Excavator,1 Loader, and 5 Generator Sets	Beach Restoration	Average Fleet[a]	126.00	1257.00	61.60	57.00
		Tier 4f[b]	27.20	148.00	5.82	5.82
1 Bulldozer, 1 Excavator	Sand Grooming	Average Fleet[a]	5.88	59.10	2.86	2.64
		Tier 4f[b]	0.90	3.38	0.10	0.10

NOTES:
[a] Average fleet mix within the BAAQMD jurisdiction
[b] Tier4 final engines for all engines >25 hp

SOURCE: See *Appendix AQ-2*

TABLE 10
PROJECT EMISSION TOTALS

Scenario	ROG (lbs)	NO_X (lbs)	Exhaust PM_{10} (lbs)	Exhaust $PM_{2.5}$ (lbs)
Average Onshore Fleet & No Rough Weather				
Average Fleet Onshore Equipment	132.0	1316.2	64.4	59.6
Offshore Equipment with No Rough Weather	946.7	8054.9	400.0	388.0
Total Scenario Emissions	*1078.7*	*9371.1*	*464.4*	*447.6*
Tier 4f Onshore Fleet & No Rough Weather				
Tier 4f Onshore Equipment	28.0	151.4	5.9	5.9
Offshore Equipment with No Rough Weather	946.7	8054.9	400.0	388.0
Total Scenario Emissions	*974.7*	*8206.3*	*406.0*	*394.0*
Average Onshore Fleet with Rough Weather[a]				
Average Fleet Onshore Equipment	132.0	1316.2	64.4	59.6
Offshore Equipment with Rough Weather	1006.6	8434.6	411.1	398.8
Total Scenario Emissions	*1138.6*	*9750.8*	*475.5*	*458.4*
Tier 4f Onshore Fleet with Rough Weather[a]				
Tier 4f Onshore Equipment	28.0	151.4	5.9	5.9
Offshore Equipment with Rough Weather	1006.6	8434.6	411.1	398.8
Total Scenario Emissions	*1034.6*	*8586.0*	*417.1*	*404.7*

NOTES:
[a] "Rough Weather" events were assumed to be 50% of the 18 days

SOURCE: See *Appendix AQ-1* and *Appendix AQ-2*

TABLE 11
PROJECT EMISSION TOTALS SUMMARY (TONS)

Scenario	ROG (tons)	NO_X (tons)	Exhaust PM_{10} (tons)	Exhaust $PM_{2.5}$ (tons)
Average Onshore Fleet & No Rough Weather	0.54	4.69	0.23	0.22
Tier 4f Onshore Fleet & No Rough Weather	0.49	4.10	0.20	0.20
Average Onshore Fleet with Rough Weather[a]	0.57	4.88	0.24	0.23
Tier 4f Onshore Fleet with Rough Weather[a]	0.52	4.29	0.21	0.20

NOTES:
[a] "Rough Weather" events were assumed to be 50% of the 18 days

SOURCE: See *Appendix AQ-1* and *Appendix AQ-2*

Attachment AQ

Air Quality Calculations

ESA

AQ-1 Offshore Equipment Calculations

South Ocean Beach Nourishment Project

Hopper Dredge Emission Calculations

Dredge Hopper Specifications

Dredge Equipment Specifications						
Dredge Equipment Type	**Activity**	**Engine Type**	**Engine Size (hp)**	**Number of Engines**	**Capacity (CY)**	**Model Year[1]**
Hopper (Liberty Island)	Pumping	Main engine	4891	2	6,540	2017
		Ship service	2547	2		2017

1. Under the California Air Resources Board's Harborcraft Engine Replacement Rule , all Tier 0 engines must be replaced with Tier 2 or 3 engines, that operate in California Regulated Waters. For the dredge, both propulsion and auxiliary engines would be replaced with Tier III engines by 2017.

Corrected Emission Rates 2021 (g/hp-hr)

	Engine	ROG	CO	NOx	Exhaust PM_{10}	Exhaust $PM_{2.5}$	SO2	CO_2	N_2O	CH_4
Dredge	ME	0.54	3.95	4.91	0.25	0.24	0.01	486.33	0.02	0.00
	AE	0.63	3.93	4.87	0.24	0.23	0.01	486.33	0.02	0.00

Schedule/Operations

Scenario	Loads per Day	Hour per load	Hour/day	Total Days
Max	4	1.5	6	13
Min	3	1.5	4.5	18
Average	3.5	1.5	5.3	15

Source: OceanBeachSec204_Information and Data Needs (26 Nov 2019).pdf

Load Size	5000	cy
Total removal*	265,000	cy
	53	loads

*Beach fill is designed for 225,000 cubic yards, 15% is estimated for placement loss

Dredge Hopper Activity and Emissions

Dredge Equipment Type	**Activity**	**Engine Type**	**Engine Size (hp)**	**Number of Engines**	**Load Factor**	**Total Hours**
Hopper (Liberty Island)	Pumping	Main engine*	4100.00	2.00	0.70	80
		Auxiliary engine	2547.00	2.00	0.70	80

*USACE: Only 8200 hp availible for pumping

Dredge Equipment Type	**Activity**	**Engine Type**	**ROG**	**NO_x**	**Exhaust PM_{10}**	**Exhaust $PM_{2.5}$**	**CO_2**	**N_2O**	**CH_4**
			grams	**grams**	**grams**	**grams**	**grams**	**grams**	**grams**
Hopper (Liberty Island)	Pumping	Main engine	2.47E+05	2.24E+06	1.13E+05	1.09E+05	2.22E+08	1.00E+04	1.23E+03
		Auxiliary engine	1.79E+05	1.38E+06	6.81E+04	6.60E+04	1.38E+08	6.21E+03	7.61E+02

Dredge Equipment Type	**Activity**	**Engine Type**	**ROG**	**NO_x**	**Exhaust PM_{10}**	**Exhaust $PM_{2.5}$**	**CO_2**	**N_2O**	**CH_4**
			Lbs	**Lbs**	**Lbs**	**Lbs**	**MT CO_2e**	**MT CO_2e**	**MT CO_2e**
Hopper (Liberty Island)	Pumping	Main engine	543.55	4944.21	248.07	240.63	221.89	2.98	0.03
		Auxiliary engine	394.64	3043.89	150.11	145.60	137.84	1.85	0.02
		Total	938.19	7988.10	398.18	386.23	364.61		

South Ocean Beach Nourishment Project

Tugboat Emission Calculations

A tugboat will be used to (1) move the slurry pipe from inside SF Bay to the project area and reverse the process at the end of the work, and (2) sometimes help the dredge attach the pipe on site. Typically, the pipe will be assembled at a staging area in the Bay and towed to the site before a high tide in good weather. Then, during 4-5 hours around the high tide, it will push it ashore. At the end, a tug will pull the pipe off the beach and tow it back to the staging area in the Bay. If two pipes are necessary (one at each end of the project area), double the time. (3) During pump ashore, the dredge should only need a tug in rough weather. In those cases, a tug would be called out, spending about on hour nearshore every six or seven hours. The rest of the time, it will idle offshore, returning to the Bay when the weather improves.
per email dated December 30, 2019 from J. Dingler CIV USARMY CEHQ

Tug Boat Specifications and Schedule

For the tugboat, the main engine should be at 0.5 when operating, 0.0 when idle. The main engines are turned off when stopped, only the auxiliaries run

	Engine Year	Operation		Engine	Engine HP	Number of Engines	Load Factor	Trips/occurrences	Distance (miles)	Speed (mph)	hours/trip	Total Hours
Tugboat	2009	(1)	Active-1	Main	596	2	0.5	4	20	9.2	2.2	8.7
				Auxilary	50	2	0.31	4	20	9.2	2.2	8.7
		(2)	Active-2	Main	596	2	0.5	4	1	9.2	0.1	0.4
				Auxilary	50	2	0.31	4	1	9.2	0.1	0.4
			Idling	Main	596	2	0.0	2	NA	NA	4.5	9.0
				Auxilary	50	2	0.31	2	NA	NA	4.5	9.0
		(3)	Active-1	Main	596	2	0.5	2	20	9.2	2.2	4.3
				Auxilary	50	2	0.31	2	20	9.2	2.2	4.3
			Active-2	Main	596	2	0.5	6	1	9.2	0.1	0.7
				Auxilary	50	2	0.31	6	1	9.2	0.1	0.7
			Idling	Main	596	2	0.0	3	NA	NA	7.8	23.3
				Auxilary	50	2	0.31	3	NA	NA	7.8	23.3

Emission Rates (g/hp-hr)

		ROG	CO	NOx	PM10	PM2.5	SO2	CO2	CH4	N2O
tug boat	ME	0.53	3.92	5.04	0.14	0.13	0.01	486.33	0.02	0.01
	AE	1.69	4.03	5.10	0.19	0.18	0.01	486.33	0.02	0.02

Source: SMAQMD Harborcraft, Dredge and Barge Emission Factor Calculator
Distance for Active-1 assumed from Port of Oakland to Ocean Beach
Distance for Active-2 assumed from Ocean Beach to Hopper Dredge
Activity for (c) is per day of rough weather. One hour near shore for every 7 hours offshore. For a entire day of rough weather, [24 hour/day] / [8 hour / cycle] = [3 cycle/ trip]

Port of Oakland Emission Inventory, 2016
Speed = 8 knots

Tug Boat Activity and Emissions

Days of Operations	18
% of "rough weather" days	50%

Emissions (grams)

	Engine Year	Operation		PM10	PM2.5	NOx	ROG	CO	SO2	CO2	CH4	N2O
				grams	**grams**	**grams**	**grams**	**grams**	**grams**	**grams**	**grams**	**grams**
Tugboat	2009	(1)	Active-1	756	734	27489	3218	21383	30	2649741	119	55
			total	**756**	**734**	**27489**	**3218**	**21383**	**30**	**2649741**	**119**	**55**
		(2)	Active-2	38	37	1374	161	1069	1	132487	6	3
			Idling	52	50	1423	473	1123	2	135685	6	5
			total	**90**	**87**	**2798**	**634**	**2192**	**3**	**268172**	**12**	**8**
		(3)	Active-1	378	367	13745	1609	10691	15	1324871	60	27
			Active-2	57	55	2062	241	1604	2	198731	9	4
			Idling	135	131	3693	1226	2913	4	352002	16	12
			total	**570**	**553**	**19499**	**3077**	**15208**	**21**	**1875603**	**85**	**44**
Total for Project (including "rough weather" assur				5879.9	5703.5	202527.5	31030.7	157916.2	218.5	19485736.8	878.3	449.9

	Engine Year	Operation		PM10	PM2.5	NOx	ROG	CO	SO2	CO2	CH4	N2O
				Lbs	**Lbs**	**Lbs**	**Lbs**	**Lbs**	**Lbs**	**MT CO_2e**	**MT CO_2e**	**MT CO_2e**
Tugboat	2009	(1)	Active-1	1.7	1.6	60.6	7.1	47.1	0.1	2.6	0.0	0.0
			total	**1.7**	**1.6**	**60.6**	**7.1**	**47.1**	**0.1**	**2.6**	**0.0**	**0.0**
		(2)	Active-2	0.1	0.1	3.0	0.4	2.4	0.0	0.1	0.0	0.0
			Idling	0.1	0.1	3.1	1.0	2.5	0.0	0.1	0.0	0.0
			total	**0.2**	**0.2**	**6.2**	**1.4**	**4.8**	**0.0**	**0.3**	**0.0**	**0.0**
		(3)	Active-1	0.8	0.8	30.3	3.5	23.6	0.0	1.3	0.0	0.0
			Active-2	0.1	0.1	4.5	0.5	3.5	0.0	0.2	0.0	0.0
			Idling	0.3	0.3	8.1	2.7	6.4	0.0	0.4	0.0	0.0
			total	**1.3**	**1.2**	**43.0**	**6.8**	**33.5**	**0.0**	**1.9**	**0.0**	**0.0**
Total for Project (including "rough weather" assur				13.0	12.6	446.5	68.4	348.1	0.5	19.5	0.3	0.0

South Ocean Beach Nourishment Project

Emission Totals

Project Duration	20	days

Dredge Equipment Type	Activity	Engine Type	ROG	NO_X	Exhaust PM_{10}	Exhaust $PM_{2.5}$	
Hopper (Liberty Island)	Pumping	Main	543.6	4944.2	248.1	240.6	lbs (total)
		Auxilary	394.6	3043.9	150.1	145.6	lbs (total)
			938.2	7988.1	398.2	386.2	lbs (total)

Tug Boat	Activity		ROG	NO_X	Exhaust PM_{10}	Exhaust $PM_{2.5}$	
Tug Boat	(1)	See Tug Boat Calcs for Detail	7.1	60.6	1.7	1.6	lbs (total)
	(2)		1.4	6.2	0.2	0.2	lbs (total)
	(3)		6.8	43.0	1.3	1.2	lbs (total)
			8.49	66.77	1.87	1.81	

On-Shore Work	From CalEEmod	ROG	NO_X	Exhaust PM_{10}	Exhaust $PM_{2.5}$	
Uncontrolled	Bulldozers, Hydraulic Excavators, Loader, and worker trips	132.0	1316.2	64.4	59.6	lbs (total)
Controlled		28.0	151.4	5.9	5.9	lbs (total)

Total Emission w/ no "Rough Weather" Events

	ROG	NO_X	Exhaust PM_{10}	Exhaust $PM_{2.5}$	
Offshore	946.7	8054.9	400.0	388.0	
Onshore	132.0	1316.2	64.4	59.6	
Total Emissions, uncontrolled	1078.7	9371.1	464.4	447.6	lbs (total)
Offshore	946.7	8054.9	400.0	388.0	
Onshore	28.0	151.4	5.9	5.9	
Total Emissions, controlled	974.7	8206.3	406.0	394.0	lbs (total)

Total Emission w/ "Rough Weather" Events (see assumptions on Tug Boat Calcs)

	ROG	NO_X	Exhaust PM_{10}	Exhaust $PM_{2.5}$	
Offshore	1006.6	8434.6	411.1	398.8	
Onshore	132.0	1316.2	64.4	59.6	
Total Emissions, uncontrolled	1138.6	9750.8	475.5	458.4	lbs (total)
Offshore	1006.6	8434.6	411.1	398.8	
Onshore	28.0	151.4	5.9	5.9	
Total Emissions, controlled	1034.6	8586.0	417.1	404.7	lbs (total)

Total Emission w/ no "Rough Weather" Events

	ROG	NO_X	Exhaust PM_{10}	Exhaust $PM_{2.5}$	
Total Emissions, uncontrolled	0.54	4.69	0.23	0.22	tons (total)
Total Emissions, controlled	0.49	4.10	0.20	0.20	tons (total)

Total Emission w/ "Rough Weather" Events (see assumptions on Tug Boat Calcs)

	ROG	NO_X	Exhaust PM_{10}	Exhaust $PM_{2.5}$	
Total Emissions, uncontrolled	0.57	4.88	0.24	0.23	tons (total)
Total Emissions, controlled	0.52	4.29	0.21	0.20	tons (total)

AQ-2 Onshore Equipment Calculations

South Ocean Beach Nourishment Project

Bay Area AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	0.50	Acre	0.50	21,780.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2021
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Construction activity only, exact project start date unknown.

Land Use - Land use type does not exist. Project is sand movement from ocean floor restoration. Acreage unknown and does not effect results.

Construction Phase - Sand Grooming would be once a week for two months. Since 1 Day/Week is not an option, the phase period was adjusted so that the total workdays were the same.

Off-road Equipment - project specific

Off-road Equipment - a bulldozer + excavator operating for 4 hours, once a week, for two months

Trips and VMT - project specific worker/day for sand placement. CalEEMod default for 'grooming'

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Construction Off-road Equipment Mitigation - Mitigation with T4f

Fleet Mix -

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	2.00	20.00
tblConstructionPhase	NumDays	2.00	9.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblOffRoadEquipment	HorsePower	84.00	10.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Sand Grooming
tblOffRoadEquipment	UsageHours	1.00	18.00
tblOffRoadEquipment	UsageHours	1.00	4.00
tblOffRoadEquipment	UsageHours	6.00	18.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	23.00	12.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0660	0.6581	0.3604	6.9000e-004	0.2857	0.0322	0.3179	0.1567	0.0298	0.1865	0.0000	58.8350	58.8350	0.0176	0.0000	59.2754
Maximum	**0.0660**	**0.6581**	**0.3604**	**6.9000e-004**	**0.2857**	**0.0322**	**0.3179**	**0.1567**	**0.0298**	**0.1865**	**0.0000**	**58.8350**	**58.8350**	**0.0176**	**0.0000**	**59.2754**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0140	0.0757	0.3686	6.9000e-004	0.2857	2.9600e-003	0.2886	0.1567	2.9600e-003	0.1597	0.0000	58.8349	58.8349	0.0176	0.0000	59.2753
Maximum	**0.0140**	**0.0757**	**0.3686**	**6.9000e-004**	**0.2857**	**2.9600e-003**	**0.2886**	**0.1567**	**2.9600e-003**	**0.1597**	**0.0000**	**58.8349**	**58.8349**	**0.0176**	**0.0000**	**59.2753**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**78.76**	**88.50**	**-2.27**	**0.00**	**0.00**	**90.82**	**9.21**	**0.00**	**90.07**	**14.40**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	6-1-2021	8-31-2021	0.7199	0.0894
		Highest	0.7199	0.0894

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.1000e-004	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0000e-005	1.0000e-005	0.0000	0.0000	1.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	9.6000e-004	4.6800e-003	0.0111	4.0000e-005	3.2100e-003	4.0000e-005	3.2400e-003	8.6000e-004	3.0000e-005	8.9000e-004	0.0000	3.4871	3.4871	1.3000e-004	0.0000	3.4904
Waste						0.0000	0.0000		0.0000	0.0000	8.1200e-003	0.0000	8.1200e-003	4.8000e-004	0.0000	0.0201
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.6066	0.6066	3.0000e-005	1.0000e-005	0.6090
Total	**1.1700e-003**	**4.6800e-003**	**0.0111**	**4.0000e-005**	**3.2100e-003**	**4.0000e-005**	**3.2400e-003**	**8.6000e-004**	**3.0000e-005**	**8.9000e-004**	**8.1200e-003**	**4.0937**	**4.1018**	**6.4000e-004**	**1.0000e-005**	**4.1195**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.1000e-004	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0000e-005	1.0000e-005	0.0000	0.0000	1.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	9.6000e-004	4.6800e-003	0.0111	4.0000e-005	3.2100e-003	4.0000e-005	3.2400e-003	8.6000e-004	3.0000e-005	8.9000e-004	0.0000	3.4871	3.4871	1.3000e-004	0.0000	3.4904
Waste						0.0000	0.0000		0.0000	0.0000	8.1200e-003	0.0000	8.1200e-003	4.8000e-004	0.0000	0.0201
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.6066	0.6066	3.0000e-005	1.0000e-005	0.6090
Total	**1.1700e-003**	**4.6800e-003**	**0.0111**	**4.0000e-005**	**3.2100e-003**	**4.0000e-005**	**3.2400e-003**	**8.6000e-004**	**3.0000e-005**	**8.9000e-004**	**8.1200e-003**	**4.0937**	**4.1018**	**6.4000e-004**	**1.0000e-005**	**4.1195**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	6/1/2021	6/20/2021	7	20	
2	Sand Grooming	Grading	6/28/2021	7/8/2021	5	9	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Concrete/Industrial Saws	0	8.00	81	0.73
Grading	Excavators	1	18.00	158	0.38
Grading	Generator Sets	5	12.00	10	0.74
Grading	Rubber Tired Dozers	2	18.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	18.00	97	0.37
Sand Grooming	Excavators	1	4.00	158	0.38
Sand Grooming	Rubber Tired Dozers	1	4.00	247	0.40

<u>Trips and VMT</u>

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	9	12.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Sand Grooming	2	5.00	0.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0627	0.6283	0.3407	6.5000e-004		0.0308	0.0308		0.0285	0.0285	0.0000	55.1734	55.1734	0.0167	0.0000	55.5913
Total	**0.0627**	**0.6283**	**0.3407**	**6.5000e-004**	**0.2710**	**0.0308**	**0.3018**	**0.1490**	**0.0285**	**0.1775**	**0.0000**	**55.1734**	**55.1734**	**0.0167**	**0.0000**	**55.5913**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.7000e-004	2.5000e-004	2.6900e-003	1.0000e-005	9.5000e-004	1.0000e-005	9.5000e-004	2.5000e-004	1.0000e-005	2.6000e-004	0.0000	0.8016	0.8016	2.0000e-005	0.0000	0.8020
Total	**3.7000e-004**	**2.5000e-004**	**2.6900e-003**	**1.0000e-005**	**9.5000e-004**	**1.0000e-005**	**9.5000e-004**	**2.5000e-004**	**1.0000e-005**	**2.6000e-004**	**0.0000**	**0.8016**	**0.8016**	**2.0000e-005**	**0.0000**	**0.8020**

3.2 Grading - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0132	0.0738	0.3479	6.5000e-004		2.9000e-003	2.9000e-003		2.9000e-003	2.9000e-003	0.0000	55.1733	55.1733	0.0167	0.0000	55.5913
Total	**0.0132**	**0.0738**	**0.3479**	**6.5000e-004**	**0.2710**	**2.9000e-003**	**0.2739**	**0.1490**	**2.9000e-003**	**0.1519**	**0.0000**	**55.1733**	**55.1733**	**0.0167**	**0.0000**	**55.5913**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.7000e-004	2.5000e-004	2.6900e-003	1.0000e-005	9.5000e-004	1.0000e-005	9.5000e-004	2.5000e-004	1.0000e-005	2.6000e-004	0.0000	0.8016	0.8016	2.0000e-005	0.0000	0.8020
Total	**3.7000e-004**	**2.5000e-004**	**2.6900e-003**	**1.0000e-005**	**9.5000e-004**	**1.0000e-005**	**9.5000e-004**	**2.5000e-004**	**1.0000e-005**	**2.6000e-004**	**0.0000**	**0.8016**	**0.8016**	**2.0000e-005**	**0.0000**	**0.8020**

3.3 Sand Grooming - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0136	0.0000	0.0136	7.4500e-003	0.0000	7.4500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.8700e-003	0.0295	0.0165	3.0000e-005		1.4300e-003	1.4300e-003		1.3200e-003	1.3200e-003	0.0000	2.7097	2.7097	8.8000e-004	0.0000	2.7317
Total	**2.8700e-003**	**0.0295**	**0.0165**	**3.0000e-005**	**0.0136**	**1.4300e-003**	**0.0150**	**7.4500e-003**	**1.3200e-003**	**8.7700e-003**	**0.0000**	**2.7097**	**2.7097**	**8.8000e-004**	**0.0000**	**2.7317**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.0000e-005	5.0000e-005	5.0000e-004	0.0000	1.8000e-004	0.0000	1.8000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1503	0.1503	0.0000	0.0000	0.1504
Total	**7.0000e-005**	**5.0000e-005**	**5.0000e-004**	**0.0000**	**1.8000e-004**	**0.0000**	**1.8000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.1503**	**0.1503**	**0.0000**	**0.0000**	**0.1504**

3.3 Sand Grooming - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0136	0.0000	0.0136	7.4500e-003	0.0000	7.4500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.8000e-004	1.6400e-003	0.0174	3.0000e-005		5.0000e-005	5.0000e-005		5.0000e-005	5.0000e-005	0.0000	2.7097	2.7097	8.8000e-004	0.0000	2.7316
Total	**3.8000e-004**	**1.6400e-003**	**0.0174**	**3.0000e-005**	**0.0136**	**5.0000e-005**	**0.0136**	**7.4500e-003**	**5.0000e-005**	**7.5000e-003**	**0.0000**	**2.7097**	**2.7097**	**8.8000e-004**	**0.0000**	**2.7316**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.0000e-005	5.0000e-005	5.0000e-004	0.0000	1.8000e-004	0.0000	1.8000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1503	0.1503	0.0000	0.0000	0.1504
Total	**7.0000e-005**	**5.0000e-005**	**5.0000e-004**	**0.0000**	**1.8000e-004**	**0.0000**	**1.8000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.1503**	**0.1503**	**0.0000**	**0.0000**	**0.1504**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	9.6000e-004	4.6800e-003	0.0111	4.0000e-005	3.2100e-003	4.0000e-005	3.2400e-003	8.6000e-004	3.0000e-005	8.9000e-004	0.0000	3.4871	3.4871	1.3000e-004	0.0000	3.4904
Unmitigated	9.6000e-004	4.6800e-003	0.0111	4.0000e-005	3.2100e-003	4.0000e-005	3.2400e-003	8.6000e-004	3.0000e-005	8.9000e-004	0.0000	3.4871	3.4871	1.3000e-004	0.0000	3.4904

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	0.95	11.38	8.37	8,621	8,621
Total	0.95	11.38	8.37	8,621	8,621

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	14.70	6.60	6.60	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.575198	0.040076	0.193827	0.113296	0.016988	0.005361	0.017552	0.025197	0.002581	0.002349	0.005904	0.000881	0.000789

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.1000e-004	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0000e-005	1.0000e-005	0.0000	0.0000	1.0000e-005
Unmitigated	2.1000e-004	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0000e-005	1.0000e-005	0.0000	0.0000	1.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.0000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0000e-005	1.0000e-005	0.0000	0.0000	1.0000e-005
Total	**2.0000e-004**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**0.0000**	**1.0000e-005**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.0000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0000e-005	1.0000e-005	0.0000	0.0000	1.0000e-005
Total	**2.0000e-004**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**0.0000**	**1.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.6066	3.0000e-005	1.0000e-005	0.6090
Unmitigated	0.6066	3.0000e-005	1.0000e-005	0.6090

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 0.595741	0.6066	3.0000e-005	1.0000e-005	0.6090
Total		**0.6066**	**3.0000e-005**	**1.0000e-005**	**0.6090**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 0.595741	0.6066	3.0000e-005	1.0000e-005	0.6090
Total		**0.6066**	**3.0000e-005**	**1.0000e-005**	**0.6090**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	8.1200e-003	4.8000e-004	0.0000	0.0201
Unmitigated	8.1200e-003	4.8000e-004	0.0000	0.0201

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.04	8.1200e-003	4.8000e-004	0.0000	0.0201
Total		**8.1200e-003**	**4.8000e-004**	**0.0000**	**0.0201**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.04	8.1200e-003	4.8000e-004	0.0000	0.0201
Total		**8.1200e-003**	**4.8000e-004**	**0.0000**	**0.0201**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

A-4 Coastal Zone Management Act (CZMA)

Consistency Determination

Negative Determination

Ocean Beach Pump Ashore Project, San Francisco

San Francisco County, California

November 2020

1. AUTHORITY

The United States Army Corps of Engineers (USACE), San Francisco District, is submitting this Negative Determination for the deposit of sediments at Ocean Beach, San Francisco County, California for beach nourishment in accordance with the federal Coastal Zone Management Act of 1972, 16 U.S.C. § 1456, as amended, section 307c(1).

2. DETERMINATION

Pursuant to the Federal Coastal Zone Management Act (CZMA) of 1972, as amended, the USACE has evaluated the Ocean Beach Storm Damage Reduction Beach Nourishment Project with placement onshore at Ocean Beach and determined that the project is consistent to the maximum extent possible with the California Coastal Management Program (CCMP), pursuant to the requirements of the CZMA and the California Coastal Act (CCA) of 1976, as amended. The Environmental Assessment, included with this Negative Determination, provides the basis for the USACE's findings and can be referenced for more detailed information.

3. PROJECT AREAS AND ACTIVITIES SUBJECT TO CONSISTENCY DETERMINATION

Section 304(1) CZMA defines the coastal zone as "the coastal waters (including lands therein and there under), strongly influenced by each other and in proximity to the shorelines of the several coastal states, and includes islands, transitional and intertidal areas, salt marshes, wetlands, and beaches."

The coastal zone is further defined by Section 30103(a) of the CCA as ". . . land and water area of the State of California from the Oregon border to the border of the Republic of Mexico. . . tending seaward to the state's outer limit of jurisdiction, including all offshore islands, and extending inland generally 1,000 yards from the mean high tide line of the sea. In significant coastal estuarine, habitat, and recreational areas it extends inland to the first major ridgeline paralleling the sea or five miles from the mean high tide line of the sea, whichever is less, and in developed urban areas the zone generally extends inland less than 1,000 yards."

The San Francisco County coastline is a part of the San Francisco Bay Region though this Negative Determination is being processed by the Central Coast Region for convenience.

The proposed project is located in the city of San Francisco, at Ocean Beach, between Sloat Boulevard and Fort Funston. Material from the Operation & Maintenance (O&M) dredging of the Main Ship Channel (MSC) would be pumped onto Ocean Beach for beach nourishment by a hopper dredge with pump-off capability. The Federal Base Plan for maintenance dredging of the MSC, as practiced for the past several decades, is dredging by a hopper dredge, such as the Essayons, with placement in the designated nearshore placement sites located off of Ocean Beach—SF-8 or the OBDS (encompassed by the proposed placement site SF-17). The evaluation of the potential impacts associated with the O&M dredging of the MSC is presented in the *Final Environmental Assessment/Environmental Impact Report for Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay Fiscal Years 2015-2024*. CZMA compliance for O&M Dredging of the MSC can be found in the San Francisco Bay Programmatic Consistency Determination and Letter of Agreement for Consistency Determination No. C2019.004.00.

SF-17 is a designated placement site located in the waters of the Pacific Ocean adjacent to the stretch of Ocean Beach south of Sloat Boulevard. The landward boundary, which lies approximately 0.25 mi offshore of the mean sea level (MSL) line, stretches from Sloat Blvd south to the San Mateo County line (~1.5 mi). SF-17 is outside of the southern lobe of the San Francisco Bar (Bar), which is a gigantic ebb-tidal delta (>39 mi^2) that contains relic sand and is fed by sediment flushed out of San Francisco Bay. The Bar is shaped by strong tidal currents associated with the Bay and waves originating from much of the Pacific (Barnard, 2005). The center of SF-17 is 4 mi southeast of the designated ocean disposal site, SF-8, which is on the southern lobe of the Bar just south of the MSC. A portion of the SF-17 footprint, the OBDS, has been used since 2005 for the near-shore placing of sand from MSC in this area.

The proposed material placement location would be located within areas defined as *Coastal Zone* by Section 304(1) of the CZMA and Section 30103(a) of the CCA.

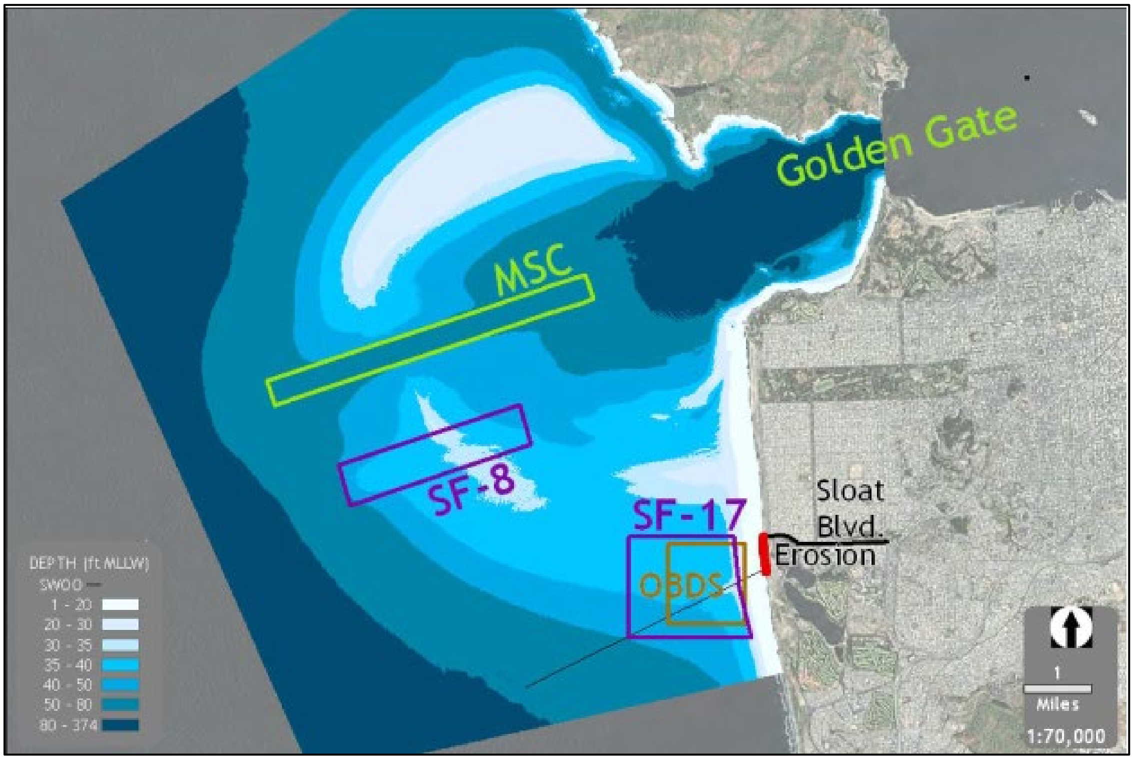


Figure 1: Main Ship Channel Dredging Location and Designated Placement Areas

<u>Ocean Beach</u>

The Pacific Ocean coast of the City and County of San Francisco (CCSF) (Figure 1 and Figure 2) stretches southward approximately 8.5 miles (mi) from the Golden Gate to the San Mateo county line. A rocky shoreline with pocket beaches constitutes the northern 3.6 mi, and a sandy beach constitutes the rest. Ocean Beach (Figure 2), which starts at the southern terminus of the rocky shoreline, extends approximately 3.5 mi southward. Throughout most of the 3,000-foot (ft) proposed project area south of Sloat Boulevard, there is a coastal bluff that is approximately 30 feet (ft) high. Much of the bluff is fronted by rock, and a significant stretch of the beach is completely inundated during higher tidal stages. Despite periods of inundation, Ocean Beach is a popular recreational destination, and has a recreational trail for pedestrians and bicyclists, and parking lots for public use. Surfing and other aquatic sports are common to the breakwaters of Ocean Beach.

Figure 2: Ocean Beach (inside the red box); San Francisco Planning and Research Association [SPUR], 2011).

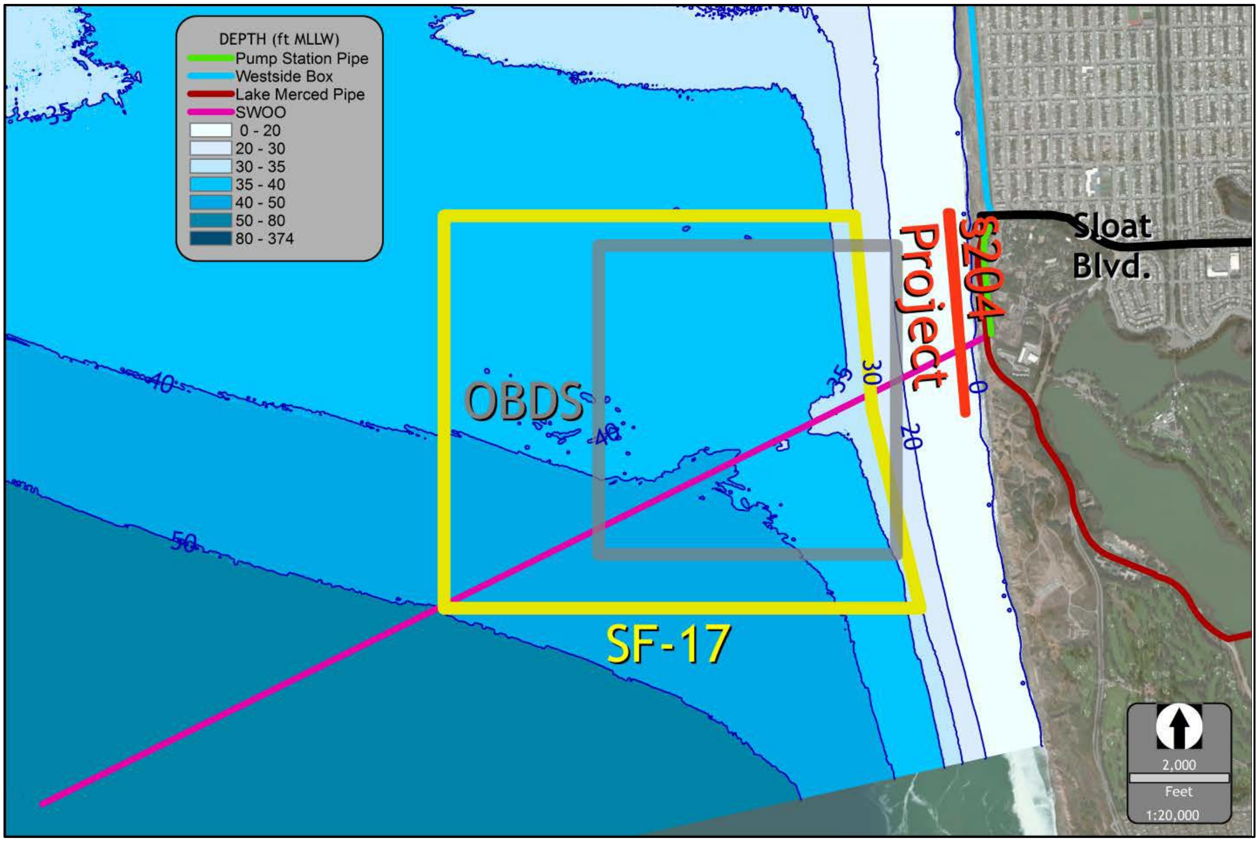


Figure 3: Ocean Beach Demonstration Site- Location of the §204 storm damage reduction project relative to the wastewater infrastructure (Westside Transport Box (WST), Lake Merced Water Treatment Tunnel (LMWT), and Southwest Ocean Outfall (SWOO), Ocean Beach Demonstration Site (OBDS), and SF-17). The Great Highway runs above the WST and LMWT.

4. PROJECT PURPOSE

The project purpose is to lessen the severe erosion along Ocean Beach from Sloat Boulevard to Fort Funston where wave action threatens infrastructure and public safety. The proposed project is considered a water dependent activity.

5. PROJECT DESCRIPTION

The proposed action is to provide direct beach nourishment in the stretch of Ocean beach between Sloat Boulevard and Fort Funston, using a hopper dredge with pumpoff capability. Sediment placed for the proposed action would be obtained from MSC O&M dredging as a beneficial use of sediment. Placement of material on the beach is contingent upon availability of funds; and the availability of appropriate dredging equipment.

<u>Beach Nourishment Quantity</u>

The amount of beach nourishment needed was found by analyzing a cross-section of land inland from the current beach elevation to find the amount of vertical relief caused by erosion and mass wasting. The proposed design would be to match the elevation of the existing bluff at approximately 30 ft above the mean low lower water (MLLW) datum. The design template for the beach fill consists of a crest with an elevation of 30 ft MLLW and 60-foot width. Example cross-sections are shown on Figures 4 through 6 and the cross-section locations are shown on Figure 7. Side slopes are assumed to have a slope of 1V:4H. Fill would extend up to 3,000 ft parallel to the shoreline and the beach and cliff footprint of the berm (toe to top of the bluff) is expected to be approximately 10.3 acres (Figure 8). Imposed on the existing topography (2015/2016 data), this template would require roughly 250 kcy to 285 kcy of material from MSC. Based on this design, a dune crest width of 60 ft results in a toe of the dune terminating between MLLW and slightly below MSL, depending on the transect location, leaving it exposed to erosional forces of the waves and currents. This dune, which is expected to last 5 to 6 years, is expected to be constructed during one dredging cycle. However, while unlikely, there is the possibility of delays in dredging or onshore placement due to equipment malfunction, weather, or other factors and such delays could necessitate construction of the dune over multiple seasons.

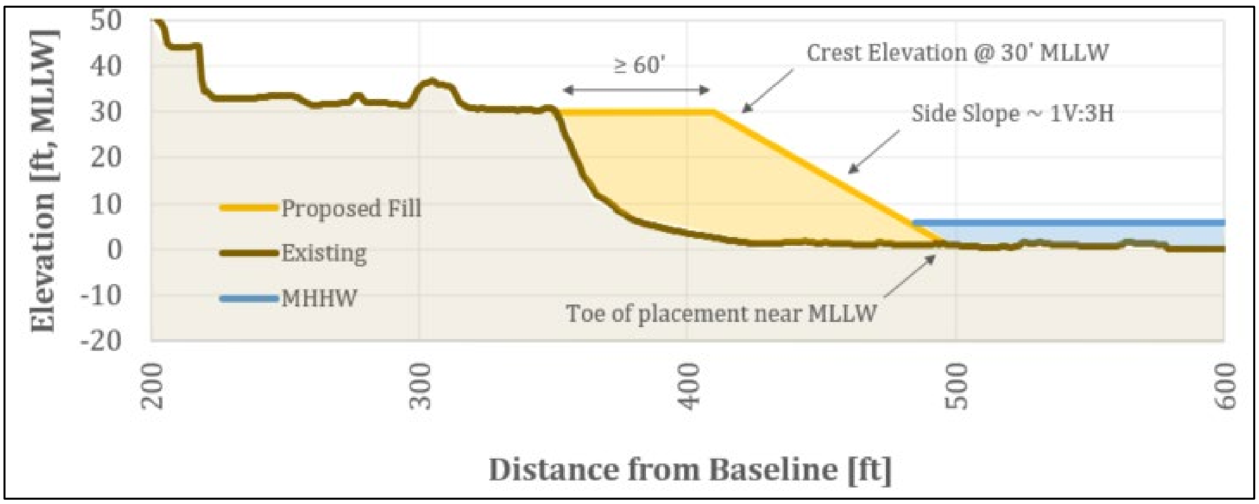


Figure 4. Example Cross-Section 27. (Plan View location shown in Figure 7)

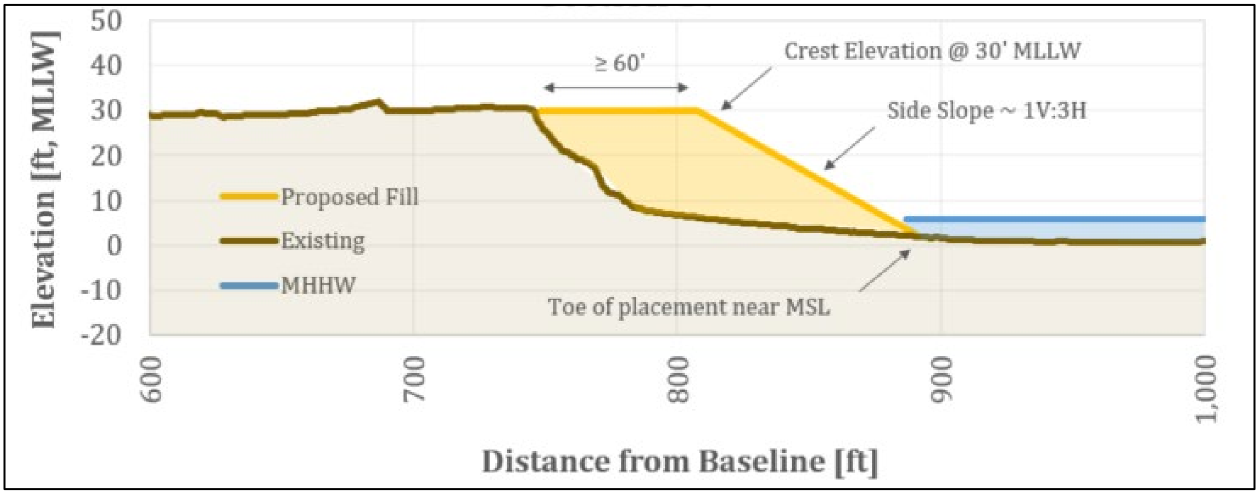


Figure 5. Example Cross-Section 57. (Plan View location shown in Figure 7)

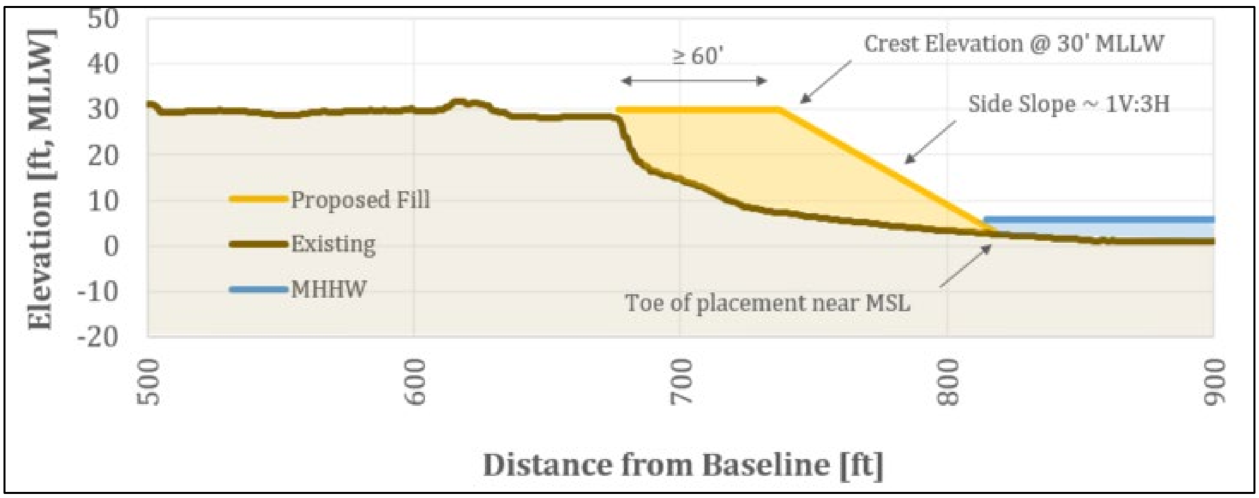


Figure 6. Example Cross-Section 93. (Plan View location shown in Figure 7)

Figure 7. Location of Example Cross-Sections in Project Area.

Figure 8. Approximate Footprint of Fill. Extends Approximately 3,000 Ft Along Shoreline.

Placement Method

For the purpose of beach nourishment, a hopper dredge with pump-off capabilities is the optimal dredge plant for this application. The USACE dredge *Essayons* currently does not have pump-off capabilities; therefore, for episodes where beach nourishment occurs, it is anticipated that a contract hopper dredge with pump-off capabilities would conduct this work. The proposed action would involve pumping of material onshore and then onshore construction of a dune along a 3,000-foot stretch of Ocean Beach starting at Sloat Boulevard and extending southward to the northern part of Fort Funston.

The hopper dredge is assumed to have a daily production rate of approximately 15,000 yd^3 per day, including dredging, hauling, and pumpout operations. The hopper has a bin capacity of approximately 3,500 yd^3, and pumpout takes approximately 1.5 hr to complete. Based on a 24-hour workday, it is estimated that the hopper would make 4-5 trips per day. The annual average volume of material that is dredged from the MSC is approximately 324,000 yd^3 with a range of 78,000 to 667,000 yd^3. This means that there should be enough dredged material available to complete the project in one cycle in any given year, since it is only projected to require 250 kcy to 285 kcy of material to complete. The placement of dredged material on the beach footprint would be expected to take from 20 to 25 days based on an estimated 265,000 yd^3 total volume of dredged material needed to construct the 3,000 ft long sacrificial dune. Operations would occur between July 15th and September 30th. Any additional material from the MSC in excess of what is needed to construct the dune during that dredging cycle, would be placed at the proposed SF-17. However, while unlikely, there is the possibility of delays in dredging or onshore placement due to equipment malfunction, weather, or other factors and such delays could necessitate construction of the dune over multiple dredging cycles. If construction of the dune were to take multiple dredging cycles, earth moving equipment from the beach and the dredge and pipeline would be removed during the interim period to allow for greater public access.

The hopper dredge would be expected to anchor offshore of the intersection of Sloat Boulevard and the Great Highway, in water that is approximately 35 ft MLLW deep. A 28-30 inch diameter pipeline would be placed perpendicular to the beach, beginning at a point that is approximately 30 ft seaward of the bluff (this varies based on the available width of the beach), cross the beach (Figure 9), and run along the ocean bottom to a mooring station located where the hopper dredge would anchor. The pipeline would need to extend approximately 2700 ft offshore in order to reach the required 35 ft depth. The terminal end of the pipeline would either be fixed to a floating platform that would be secured to the seafloor by an anchor or would be a floating pipe with a buoyant collar. Once the hopper is anchored, the pipeline connection would be made. .

Figure 9. Typical beach-placement operation for sand pumped from a nearshore vessel.

Initially, a 100-foot long toe berm would be constructed during low tides using the available sand within the existing footprint of project on the beach. This would allow for work during high tides and contain the activities to within the beach nourishment footprint. The purpose of the toe berm is to contain the sand slurry as it comes out of the end of the pipeline and to minimize the loss of sand while it dewaters. The toe berm would collect the decanted water and guide it south to the end of the toe berm structure where it would then return to the ocean. The toe berm would be located parallel to the bluff and approximately 100 ft (or less depending on the available beach width) west of the bluff, and would be built to an elevation of approximately 17 ft above MLLW. The berm would be constructed using bulldozers that push beach sand into a berm-shaped structure of uncompacted sand that is approximately 5-10-ft high at the crest. Approximately 100 ft of berm per day would be constructed, and there would always be at least 75 ft of toe berm in place ahead of the dredged material placement area during the sand-placement period. A diffuser would be attached to the end of the pipe to control the deposition of the dredged material and to prevent the slurry water from scouring the surrounding area. As the dredged material is pumped into the area behind the toe berm, it would be piled higher than the toe berm and then graded to its final 1V:4H slope.

After each hopper bin load is pumped onto the beach behind the toe berm, bulldozers would shape the dredged material into the desired profile as it dewaters. It is estimated that the dune structure would be constructed at a rate of 100 ft per day to achieve the desired dune profile. It is estimated that two bulldozers would operate 18 hrs per day each. As each 100-foot section of dune structure is completed, additional lengths of pipeline would be attached so the construction area can move southward.

Portions of the public parking lot located between the southbound lane of the Great Highway and the coastal bluff (referred to as North Parking Lot) would be used as a staging area for equipment and supplies (Figure 10). To prevent public access and/or theft, temporary fencing would be installed by the contractor around the immediate work areas on the beach and the staging area in the parking lot. No public access to or through the beach in the immediate construction area would be provided for the full construction period

All earthwork heavy equipment would be stored and secured in the staging areas when not in use. Best management practices (BMPs) would be implemented to minimize the potential for releases of petroleum products from equipment in the staging areas. Signage, security, and mobile lighting around the work areas would be the responsibility of the contractor.

Construction access for the beach work would likely be from the north end of the North Parking Lot. The contractor would be required to protect existing pavement and curbs when staging and transporting construction equipment to the work areas on the beach. The contractor would also be required to control public vehicle access to the beach from the construction access points by the use of fencing or barriers. At completion of construction, the contractor would be required to restore the access roads and parking areas to pre-construction or better conditions. Pre-construction and post-construction surveys of these features would be completed to document existing and final conditions.

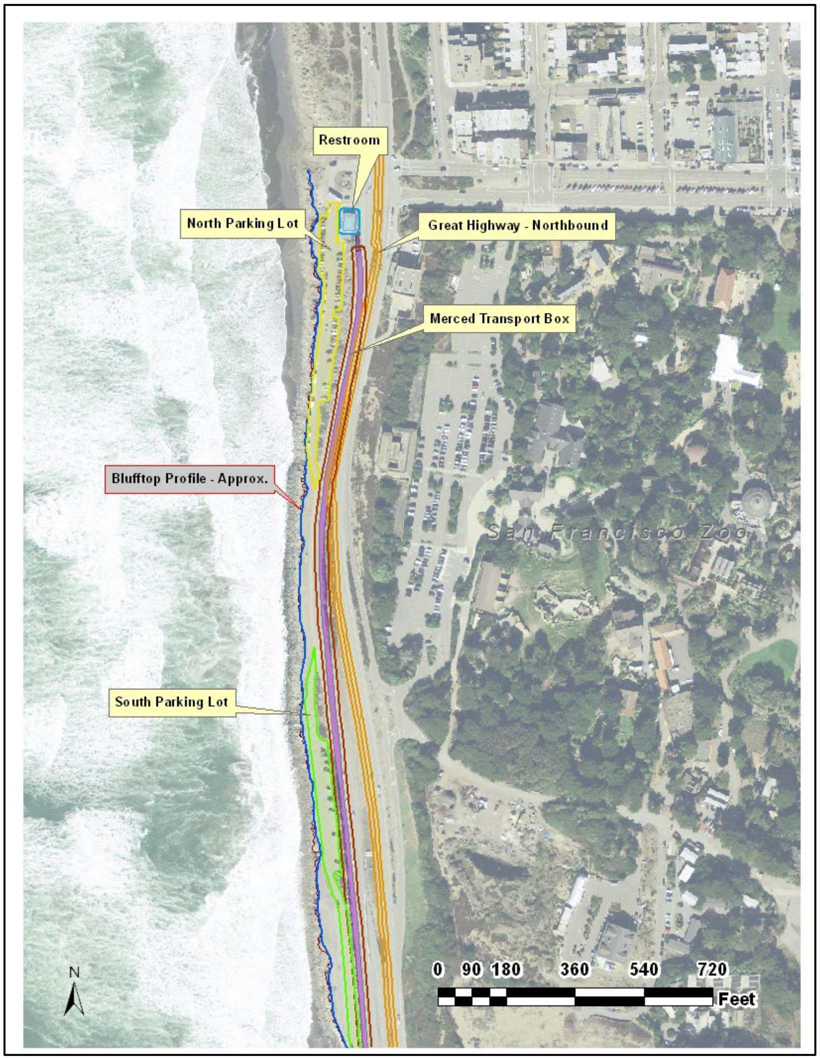


Figure 10. Staging Area and Environs

Sediment Source

Sediment used for Ocean Bay beach nourishment would come from the O&M dredging of the MSC deep-draft navigation channel immediately offshore San Francisco Bay, California that is the outer vessel traffic lane to the Golden Gate (Figure 1). Dredged material from MSC maintenance activities generally consist of fine sand (D50 range = 0.15 mm to 0.21 mm), and are generally consistent with grain size of local dunes in the area (D50 range = 0.19mm to 0.30 mm). Historic records show the grain size at Ocean Beach in the vicinity of the proposed beach nourishment area consists of fine to medium sand (D50 range = 0.21mm to 0.45 mm) (USACE 1996). These records also show a wide variation in the gradation of the sand from the general Ocean Beach area which is believed to reflect the influence of the coarser winter beach sand. In general, historic samples show coarser sand in the swash zone. Existing grain size conditions at Ocean Beach are believed to be consistent with these results. However, if required, USACE may conduct confirmatory grain size analysis of the receiving dune and beach prior to nourishment activities associated with the proposed action. Sediment from MSC has consistently tested clean during chemical testing for Tier III approvals for dredging through the Dredge Material Management Office (Diaz 2018).

6. CONSISTENCY WITH PROVISIONS OF THE CALIFORNIA COASTAL ACT

This section of the Consistency Determination analyzes the consistency between the proposed action of beach nourishment at Ocean Beach and the policies set forth in Chapter 3 (*Coastal Resources Planning and Management Policies*) (Section 30200 *et. seq.*) of the California Coastal Act (Division 20, Cal. Pub. Resources Code Section 30000 *et. seq.*; California Code of Regulations, Title 14, Section 13000 *et. seq.*).

ARTICLE 2, PUBLIC ACCESS (Section 30210 thru 30214)

Article 2 of the CCA requires that development shall not interfere with the public's right of access to the sea.

Public access to the shorelines of Ocean Beach would be temporarily limited in the locations where earth work is being performed. Public access would also be limited within the breakwaters immediately adjacent to the beach while earthwork and pumping of sediments onto shore is taking place. Public access to the recreation trail would still be maintained during construction.

ARTICLE 3, RECREATION (Sections 30220 thru 30224)

Article 3 of the CCA requires that coastal areas suited for recreational activities shall be protected for such uses and places priorities on development of recreational or visitor serving uses rather than residential uses, that upland areas necessary to support coastal recreation uses shall be reserved for such uses, and that recreational boating use of coastal waters shall be encouraged.

Use of the beach for recreational activities would remain the same after construction, and would be improved by providing a higher elevation for the beach. With a higher beach elevation, recreation activities would be able to take place for more days of the year and over a larger area during high tides, because inundation during high tides would not occupy as much of the beach area and would be less likely to force closures.

ARTICLE 4, MARINE ENVIRONMENT (Sections 30230 thru 30237)

Article 4 of the CCA requires that marine resources be maintained, enhanced, and, where feasible, restored and special protection given to areas and species of special biological or economical significance. It further requires that uses of marine environments be such that habitat function, biological productivity, healthy species

populations, and fishing and recreational interests of coastal waters be maintained for long–term commercial, recreational, scientific, and educational purposes and that marine resources be protected against the spillage of crude oil, gas, petroleum products, or hazardous substances.
The vicinity in and around Ocean Beach consists of many types of habitats that provide roosting, breeding, and foraging grounds for many species of invertebrates, plants, fishes, mammals, and birds. Marine environments that have the potential to be affected by the proposed action include the nearshore habitats of Ocean Beach with depths ranging from 20 – 50 ft MLLW consist of sandy bottomed subtidal habitat. The habitat along Ocean Beach consists of both aquatic/marine and terrestrial environments (i.e. sandy beach and cliff, as well as intertidal habitat).

Benthic and Invertebrate (infaunal) Community
In the shallower sand and mud bottom, the benthic fauna includes various assemblages of polychaete worms, crustaceans (amphipods, crabs, and ostracods), molluscs (pelecypods, gastropods, and scaphopods); echinoderms (starfish, brittle stars, heart urchins, sea cucumber, and sea pens). Other phyla which may be present include nematodes, coelenterates, echiurans, and rhynchocoels. Overall, the benthic community in the proposed action area is similar to those typically found in high energy environment along the coast of Northern California. Seasonal epibenthic surveys conducted in late winter and fall showed Arthropods dominated the intertidal and subtidal habitat, while Echinodermata, mainly sand dollar (*Dendraster exentricus*) was the dominant species in the benthic surveys (McCormick, 1992). The survey found the most characteristic infaunal species of the beach and intertidal habitat are the great beach hopper (*Orchistoidea corniculata*), the mole crab (*Emerita analoga*), the Pismo clam (*Tivela stultorum*), razor clam (*Siliqua patula*), short-spined starfish, a nephtyid polychaete worm (*Nephtys californensis*), and various species of jellyfish (McCormick 1992).

Among the infaunal community of the beach, the larger and mobile organisms have the ability to leave the area during onshore placement of material and berm construction associated with the proposed action, while the less mobile, sessile type of organisms are more likely to be smothered by sand. Even organisms which are motile or those able to burrow out still have the potential to be smothered by the overburden. Detrimental effects of dredged material placement on benthos along the beach and intertidal habitat of Ocean Beach include disturbance or disruption to species using these habitats by direct burial, crushing by heavy equipment shaping or pipeline anchoring activities, or removal of invertebrates.

Placement of dredged material onshore at Ocean Beach and the temporary anchoring of a pipeline in the nearshore environment would cause temporary disturbance to these benthic organisms, however, both the nearshore and the shore environment along the coast of Ocean Beach are dynamic and high energy environments which experience rapid sediment flux and recolonization. The National Research Council's review of several studies on impacts of beach nourishment activities on the invertebrate community have shown the benthic community recovery at the beach, and intertidal habitat generally takes place in the order of few weeks to months (National Research Council, 1995). It is anticipated the entire footprint of the beach nourishment area (approximately 10 acres) would be temporarily disturbed. Indirect effects of this temporary loss of intertidal community would also occur on marine and avian predators, including non-breeding shorebirds, for example due to temporary disruption to foraging patterns.

Turbidity levels from the proposed action are expected to remain generally within the ambient range of turbidity experience at Ocean Beach given the active wave climate in the foreshore, the sandy material, and the proposed toe berm. By design the berm is expected to erode over a 3-4 year period. As sands are eroded from the berm by wave action they would enter the littoral drift along with the ambient sediment load. This is not expected to increase turbidity significantly and would remain within the ambient range. Because the MSC material is clean sand, most of it would settle out quickly and not create a turbidity plume. The mooring buoy and dredged material delivery pipeline would be lowered from tugs .and would lie under the bottom under its own weight. Placement of the pipeline is not expected to cause turbidity above the ambient level. It is possible that some of the subtidal benthic flora would be crushed by the pipeline, but due to the small area (.31 acres), this is not considered significant. Therefore, turbidity effects on benthic invertebrates, would be minor.

<u>Flora and Fauna</u>
Vegetation on the dunes of Ocean Beach mainly consist of the introduced European beach grass (*Ammophila arenaria*), however, native dune vegetation may also be found on portions of the dunes. Ocean Beach provides habitat to a number of terrestrial and avian species. Terrestrial mammals in the proposed action area of Ocean Beach are not diverse or abundant. The most common of these species include California ground squirrel, California gray squirrel, and house mouse. Reptiles and amphibians such as western toad, western fence lizard, gopher snakes, and common garter snake may also inhabit the area. These species would be limited to the top of the bluff above the placed riprap and along a 150 ft of the dune above the elevation of the placement area. These species may be temporarily impacted by the noise of the construction activity, but would not come into contact with the construction equipment or material being placed.

Both the open coastal waters of the Pacific Coast and the intertidal habitat along the beach serve as foraging habitat for shorebirds and waterbirds. Over 150 species of birds have been observed on the coast of Northern California at various times of the year. Commonly observed seabirds and shorebirds in the vicinity of Ocean Beach include brown pelicans and sea gulls, cormorants, murrelet and some species of terns. Beach areas are used by shorebirds and the species vary by season. In fall, winter, and spring loons and grebes may be observed, whereas, plovers may use the area for wintering. Other shorebirds using this area for foraging and cover may include sanderling and snowy plover. The upper intertidal zone is of special importance as a foraging area for shorebirds during the fall migration. The proposed action would primarily effect shorebirds due to temporary material placement and heavy equipment movement in the proposed action area which includes foraging habitat. However, the proposed action area involved is approximately 10 acres and intertidal foraging habitat is available for miles in either direction of the placement site. Some avian species may actually utilize the placed material as a food source depending on the invertebrates present in the dredged material. Effects to the benthic community (a food source for shorebirds) are described above and expected to be minor and temporary as well.

Given the short term nature of the onshore placement and shaping activities to construct the proposed berm, the disturbed nature of the existing terrestrial habitat, and the availability of abundant similar habitat in the immediate vicinity of the proposed action area, the effects of the proposed action to terrestrial species would be minor and short-term.

Endangered Species

Federal Endangered Species Act (16 U.S.C. 1531 et seq): These species include federally threatened (FT), endangered (FE), critical habitat (CH), and proposed critical habitat (PCH), including: California least tern (*Sterna antillarum browni*) (FE) (CH), marbled murrelet (*Brachyramphus marmoratus marmoratus*) (FT), western snowy plover (*Caradrius alexandrines nivosus*) (FT), bank swallow (FT) (*Riparia riparia*), Central California Coast steelhead and Central Valley DPS (*Oncorhynchus mykiss*) (FT), Sacramento River Winter-Run Chinook Salmon (FE) (*Onchoryhynchus tshawytscha*), Central Valley Spring-Run Chinook Salmon (FT) (*Onchoryhynchus tshawytscha*), Central California Coast Coho Salmon (*Onchorhynchus tshawytscha*), green sea turtle (FT) (*Chelonia* mydas), leatherback turtle (FE) (CH) (*Dermochelys coriacea*), green sturgeon (FT) (CH), southern sea otter (*Enhydra lutris nereis*) (FT), Stellar sea lion (FE) (*Eumetopias jubatus*), humpback whale (FE) (PCH) (*Megaptera novaeangliae*), Killer Whale (FE)(PCH) (*Orcinus orca*), Black abalone (FE) (CH) (*Haliotis cracherodii*).

Magnuson-Stevens Fishery Conservation and Management Act Amendments of 1996 (16 U.S.C. 1801 et seq)—Essential Fish Habitat (EFH): Ocean Beach is located within an area designated as EFH for three Fishery Management Plans (FMPs): the Pacific Coast Salmon, the Coastal Pelagics, and Pacific Groundfish. Many of the 87 species protected under this law are known to occur in the area.

Conservation Measures to Avoid Potential Impacts from Beach Nourishment

The contractor would be required to implement best management practices (BMPs) as provided by the USFWS, NMFS, EPA and the RWQCB, which would ensure only areas proposed for beach nourishment are affected, and that adjacent areas outside the proposed project areas are avoided Staging, storing, and stockpiling of equipment and materials would be onboard the dredge barge and would also require on-land facilities. BMPs for avoidance of spills and procedures to clean up spills would be implemented to ensure effects to terrestrial and marine species are avoided. Mitigation measures would be in place to prevent/respond to any leakage or spilling, including halting operations until the cause of the leak or spill can be determined and fixed. A qualified biologist would survey the project area for bank swallows prior to mobilization of construction equipment onto the site. If swallows are still present, no construction would be allowed within 900 feet of an active nest. While using a hopper dredge, dredge material transport would occur using a temporary placed "transport" pipe located between the beach and the anchored dredge to convey dredge materials to the beach. All equipment would be removed after beach nourishment has been completed, to ensure that buoys, anchors, etc. would not ensnare wildlife, especially marine mammals.

ARTICLE 6, DEVELOPMENT (Sections 30250 thru 30255)

Article 6 applies to new residential, commercial, or industrial development and requires that new development be contiguous with, or in close proximity to, existing developed areas. It requires that scenic and visual qualities, of coastal areas be considered as a resource of public importance and protected during the process of development. Additionally, it maintains that new development shall not impede access to coastal resources, minimize risks to life and property, and be serviceable by public works.

The proposed beach nourishment project is not a development project and, therefore, does not apply to this project.

ARTICLE 7, INDUSTRIAL DEVELOPMENT (Sections 30260 thru 30265.5)

Article 7 states that the California Coastal Commission has permitting authority over all offshore oil and gas development within the three – mile jurisdiction and onshore facilities within the coastal zone. Further, it encourages coastal – dependant industrial facilities to be located or expanded within existing sites.

The proposed beach nourishment project does not involve industrial development; as such, this article does not apply to this project.

A-5 Cultural Resources Coordination

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
450 GOLDEN GATE AVE.
SAN FRANCISCO, CA 94102

November 27, 2020

SUBJECT: Ocean Beach Storm Damage Reduction and Beach Nourishment Project, San Francisco, San Francisco County, California.

Ms. Julianne Polanco
California State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street
Sacramento, CA 95816

Dear Ms. Polanco,

The U.S. Army Corps of Engineers, San Francisco District (USACE), along with the City and County of San Francisco Environmental Planning Division (CCSF), and the National Park Service (NPS) are proposing the Ocean Beach Storm Damage Reduction and Beach Nourishment Project (Project) a large scale beneficial reuse of dredged material from the San Francisco Main Ship Federal Navigation project located on the west coast peninsula of San Francisco at South Ocean Beach (Figure 1). The undertaking is authorized under the USACE Continuing Authorities Program, Section 204 of the Water Resources Development Act of 1992, as amended. The USACE is the lead federal agency responsible for the proposed undertaking's compliance with Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, and it's implementing guidelines at 36 C.F.R. § 800.

No historic properties have been identified within the Area of Potential Effects (APE) and no historic properties will be affected by the proposed project.

The APE is situated on the west side of the San Francisco Peninsula at South Ocean Beach. It extends from the foot of Sloat Boulevard on the north to Fort Funston on the South, and from the bluffs of the Great Highway on the east to the Pacific Ocean on the west. The APE is within an area approximately 3.5 miles and encompassing a 3000 foot strip of beach onshore, and SF-17 the authorized offshore disposal site for the maintenance dredging program. The *Final Environmental Assessment Environmental Impact Report for the Maintenance Dredging of the Federal Navigation Channels in San Francisco Bay for years 2015 to 2024* provides analysis of the annual dredging program and displays the regional location of the Main Ship Channel and authorized SF-17 disposal site where the dredge would anchor to pump onshore.

The project involves the beneficial reuse of sand obtained from the annual dredging program. This year the material from the Main Ship Channel will be pumped onshore from a hopper dredge anchored approximately 0.25 miles offshore and passed through an anchored pipeline on shore. The sandy material will be mounded into a dune that will provide continued temporary protection to important civic infrastructure (i.e., Great Highway, Oceanside Water Treatment Outfall, etc.) and safe access to public beaches and recreation at the Golden Gate

National Recreation Area. Figure 2 displays the onshore and offshore portions of the project area.

A large percentage of Ocean Beach has been surveyed, including the Ocean Beach Disposal Site SF-17, by NPS archaeologists although most of the work occurred more than 30 years ago (Delgado 1999). Recent records search identified Prehistoric archaeological sites within one-half mile of the APE and historic sites within one mile of the APE (Delgado 1999; ESPY 1990; Spillane 2014).

We are providing you with two draft reports prepared to meet the federal and State requirements for NEPA, CEQA and section 106 of the NHPA [36 C.F.R § 800.11(d)] documenting the investigations for this project, including a description of the undertaking and the federal involvement associated, the undertaking's delineated vertical and horizontal APE, photographs of the project area, various informative maps, and a description of the steps taken to identify historic properties including efforts to seek information pursuant to 36 C.F.R § 800.4(b). The reports will provide the basis for no historic properties pursuant to 36 C.F.R. § 800.4(d)(1) in the APE and as such the undertaking having no affect upon them.

- *Ocean Beach Climate Change Adaptation Project Historic Resources Evaluation Report,* and
- *Ocean Beach Climate Change Adaptation Project Cultural Resources Identification Report* prepared for City and County of San Francisco Planning Department Environmental Planning Division and United States Department of the Interior National Park Service, June 2020 (ESA, 2020).

We are consulting with interested parties and Native American tribes according to USACE policy and requesting their expertise with regard to their ancestral lands and cultural resources, and advising them of our findings (36 C.F.R § 800.2(c)) that no historic properties were identified within the APE.

A geotechnical analysis was conducted south of Sloat Boulevard (ESA 2020). The findings indicate that the project area is composed primarily of re-deposited dune sand and fill from 5 to 38 feet deep. The fill was the result of a massive program of grading and filling prior to construction of the Great Highway Extension south of Sloat Boulevard. There is no sensitivity for intact prehistoric or historic resources to be present within the fill (ESA 2020; Spillane 2014; NPS 2014).

Over time the submerged areas of direct impact (SF-17) have undergone various surveys as channel modifications and disposal sites change or expand. Shipwreck preservation is better in offshore areas and areas of low-energy as opposed to the destructive quality of the near-shore zone like that of SF-17. The deeper-water areas are characterized as a sediment-starved environment. The placement of dredged sand and sediment at SF-17 would only temporarily cover seafloor surfaces, given the dynamic factors operating in this ocean environment, any shipwreck remains that might exist there now would still be identifiable during future episodes. (Delgado 1999).

A review of the California State Lands Commission Shipwreck Database and the Automated Wreck and Obstruction Information System database (https://www.fisheries.**noaa**.gov/) identified no known shipwrecks or other underwater obstructions at South Ocean Beach. The proposed project therefore has a negligible potential to impact shipwrecks or other underwater archaeological resources within the APE.

The USACE concludes that no historic properties have been identified and dredge material disposal activities at the Ocean Beach Demonstration Site would have no effect on historic properties.

Pursuant to section 106 of the National Historic Preservation Act and its implementing regulations (36 C.F.R. § 800), we are requesting the SHPO review and comments on our APE, efforts to identify historic properties, and our finding of no historic properties affected [36 CFR 800.4(d)(1)].

At this time the USACE has no further obligations under Section 106 of the NHPA. If you have any questions regarding this project or our request for review, please contact Ms. Kathleen Ungvarsky at (415) 503-6842, or by email at Kathleen.ungvarsky@usace.army.mil.

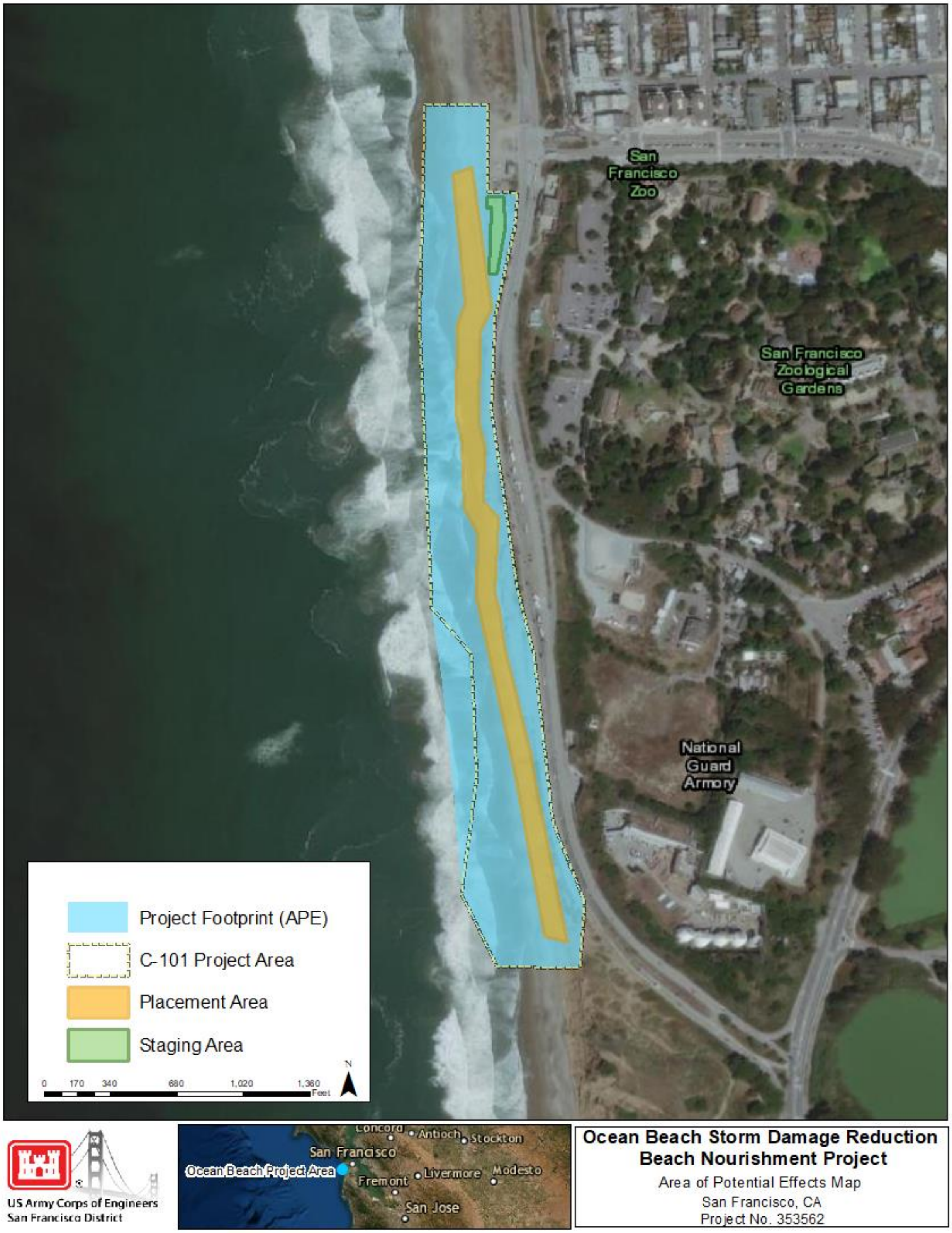
Sincerely,

Tessa E. Beach, Ph.D.
Chief Environmental Sections

CC (Electronic):
Karen Frye, City of San Francisco Environmental Planning Division

Figure 1 Project Location

Figure 2 Area of Potential Effects



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ENCLOSURES

Ocean Beach Storm Damage Reduction and Beach Nourishment Project
San Francisco, San Francisco County, California November 2020.

Enclosure 1: San Francisco Public Utilities Commission/ESA Cultural Resources Group

DRAFT Ocean Beach Climate Change Adaptation Project Historic Resources Evaluation Report, and

Enclosure 2: San Francisco Public Utilities Commission/ESA Cultural Resources Group

DRAFT Ocean Beach Climate Change Adaptation Project Cultural Resources Identification Report

Enclosure 1

Draft

OCEAN BEACH CLIMATE CHANGE ADAPTATION PROJECT

Historic Resources Evaluation Report

Prepared for June 2020
City and County of San Francisco Planning Department
Environmental Planning Division

and

United States Department of the Interior
National Park Service

Records Search and Literature Review

ESA conducted a records search of the APE at the Northwest Information Center (NWIC) of the California Historical Resources Information System (CHRIS) on October 24, 2019 (NWIC File No. 19-0705).

The records search included a review of previous studies, records, and maps on file at the NWIC. The records search area consisted of the APE and the west side of the San Francisco Peninsula. The records search included a review of the *State of California Office of Historic Preservation Historic Properties Directory* with summary information from the *National Register* of *Historic Places, Registered California State Landmarks*, *California Historic Points of Interest*, Archaeological Determinations of Eligibility, and *California Inventory of Historical Resources* (2012).[21]

The purpose of the records search was to:
(1) determine whether known cultural resources have been recorded within or adjacent to the project area; (2) assess the likelihood for unrecorded cultural resources to be present based on historical references and the distribution of nearby resources; and (3) develop a context for the identification and preliminary evaluation of cultural resources.

Additional research conducted for this report included reviews of historical aerial photographs, historical photographs on file at the San Francisco Historical Photograph Collection at the Main Branch of the San Francisco Public Library and the Western Neighborhoods Project website, Library of Congress, historical newspapers and periodicals, and other online research.

Records Search and Literature Findings

The records search and literature review indicate that two historic-age resources have been recorded within and adjacent to the APE.

Field Methods and Findings

ESA staff conducted field surveys on November 5, 2019, and February 7, 2020. Nine architectural resources in and adjacent to the APE were identified through consultation with the Planning Department and SFPUC, including the two previously-recorded resources listed above (Figure 5).[22]

Three historic-age resources, for which evaluations are provided below:

- Great Highway Extension (1964-65; in APE),[23] including an exposed stormwater drain and concrete support possibly constructed at the same time[24]
- O'Shaughnessy Seawall (1914-29; adjacent to APE)
- Fleishhacker Pool and Bathhouse complex (1923-25; adjacent to APE)[25]

21 Department of Parks and Recreation, *California Inventory of Historical Resources. University of Michigan* (2012).
22 ESA. "Ocean Beach Climate Change Adaptation Project – Historic Resources Inventory Case No. 2019-020115ENV." Memorandum to Julie Moore, EP, and Karen Frye, SFPUC, November 21, 2019.
23 A segment of the Great Highway from Lincoln Way to Sloat Boulevard (outside the APE) was previously evaluated as part of *San Francisco Westside Recycled Water Project Draft Historic Resources Evaluation Report,* prepared by Environmental Science Associates in January 2011.
24 Email from Jon Loiacono, SFPUC, to Karen Frye, SFPUC, December 11, 2019.

25 The pool and bath house were evaluated in 1978. They are jointly listed in the 2012 San Francisco County Historic Properties Directory under the misspelled name “Fleishacker Pool.”

There are two resources that are less than 50 years old and they are not evaluated herein:

- Public restroom building located at the southwest corner of Sloat Boulevard and the Great Highway (constructed ca. 1987-93 according to historic aerial photographs; in APE)
- Southwest Ocean Outfall (SWOO), an in-water buried structure that carries effluent from the Oceanside Water Pollution Control Plant and most flow from the Westside Combined Sewer System (WCSS) to the Pacific Ocean[26] (constructed in the early 1980s according to a drawing provided by SFPUC[27] and began operation in 1986;[28] in APE)
- Four historic-age resources that were surveyed and determined to be not extant (i.e., demolished or severely deteriorated) and are not evaluated herein:
- Two pedestrian tunnels under the Great Highway Extension that once connected Fleishhacker Pool to the beach (in APE)
- One equestrian tunnel located southeast of the Fleishhacker Pool site (in APE) Former U.S. Military Reserve bunker (in APE)

The three resources for which evaluations were completed or updated have been recorded in Department of Parks and Recreation 523 form-sets (**Appendix A**).
[Note to reviewers: Appendix A will be provided with the final draft.]

History and Evaluations

The following sections have been informed by the field surveys and documentation presented in the preceding subsections.

Great Highway Extension

Architectural Description

The Great Highway forms the city’s western edge along the Pacific Coast. It runs for approximately 3.5 miles along Ocean Beach, from Point Lobos Avenue and the Cliff House at its northern end to Skyline Boulevard (State Route 35) near Lake Merced at its southern end. South of Sloat Boulevard, it is called the Great Highway Extension. While the original Great Highway is outside of the APE, the Great Highway Extension is in the APE.

The Great Highway Extension is a limited access highway approximately 0.8 miles long, from Sloat Boulevard on the north to present-day Skyline Boulevard on the south (**Figure 6**). The highway, which ranges in width from approximately 70 feet at the narrowest point to approximately 120 feet at the widest point, is maintained jointly by Public Works, Rec and Park, and the Golden Gate National Recreation Area. There are two northbound lanes with turnoffs to access the Oceanside Water Pollution Control Plant, the San Francisco Zoo, and the Westside Pump Station. The southbound lanes have been reconfigured as a result of erosion. At present, there are two southbound lanes that narrow to one lane for approximately 0.6 miles in the middle of the segment in the APE.

26 California Regional Water Quality Control Board, San Francisco Bay Region and U.S. Environmental Protection Agency, Region 9. “Draft NPDES Permit No. CA 0037681 for City and County of San Francisco Oceanside Treatment Plant, Southwest Ocean Outfall, and Westside Wet Weather Facilities,” June 30, 2003, p. 4. Accessed January 10, 2020, at ttps://www.waterboards.ca.gov/rwqcb2/board_info/agendas/2006/july/07-16-03-8torevised.doc.

27 City and County of San Francisco Clean Water Program. "SWSOO Onshore Extension: Plan and Profile," September 23, 1983. Sheet 1 of 9.
28 U.S. Bureau of Reclamation. *Central California Regional Water Recycling Project Step 1 Feasibility Study, Administrative Draft Volume 1,* June 28, 1995, p. 9-42. Accessed Jan 10, 2020, at https://babel.hathitrust.org/cgi/pt?id=uc1.31210025005388&view=1up&seq=7.

Northbound and southbound traffic is separated by a concrete curb and median at the north end, a metal guardrail in the middle, and by a planted median strip at the south end. Narrow breakdown lanes are located along the entire length of the highway. Roadway materials include asphalt paving and concrete curbs and gutters. Landscaped berms covered by iceplant are located to either side of the highway.
The field survey identified several objects beneath the Great Highway Extension that have been exposed as a result of erosion at the shoreline. These include a rusted metal stormwater drain and a concrete support that is believed by SFPUC to have been constructed as part of the Great Highway Extension in the early 1960s

History

The Great Highway was originally called Ocean Boulevard around the turn of the 20th century. The idea of a wide boulevard running alongside the Pacific Ocean, linking the Cliff House to Lake Merced, was initially conceived by Parks Superintendent John McLaren around the turn of the 20th century, and reiterated in Daniel Burnham's unrealized 1905 plan for San Francisco (**Figure 8**). Burnham is most significantly associated with the design for the 1893 Chicago World's Fair and is largely credited with spreading ideas from the City Beautiful Movement throughout U.S. cities, including the connection of public open spaces with grand boulevards and park-like medians. Burnham stated in his 1905 report:

The special treatment requisite for this ocean section of the boulevard will be based on the plans of Mr. McLaren. It is proposed that the boulevard be built at a certain elevation above the present highway, which should eventually be raised to the same level. The normal height of the sand-dunes, according to observations made, dictates the level of this roadway.

Entering the [Lake] Merced country, the boulevard skirts the western shore of the lake, and crossing the [San Mateo] county line, traverses a wide, sheltered valley to Colma. This will probably be a borough enter.[30]

According to report from the Board of Public Works for the 1914-15 fiscal year: Apart from the advantage of location, the great highway has nothing to commend in the way of ease of traction or regularity of outline. It will shortly be replaced by an esplanade [composed of a new highway, a public promenade along the beach, and a seawall, the last of which is discussed in detail below], now under study in this Bureau.[31] […]

With the assurance of an appropriation of $50,000 by the Supervisors, the initial work on the proposed esplanade along the ocean beach south of the Cliff House will soon be inaugurated, and in time, the present antiquated and irregular though scientifically beautiful Great Highway, will be superseded by one of the most popular and elaborate boulevards in the entire system. Plans are now being prepared in this office for the proposed esplanade. The study of a plan that will survive the inroads of the sea and harmonize with the uses and improvements of the Park and Beach, is being considered.[32] […]

The Board of Supervisors adopted a resolution on February 15 approving the construction of an Esplanade along the Great Highway. It was determined, however, to have it built in sections from annual appropriations and not as the result of an issue of bonds. An appropriation of $50,000 for that purpose was made in the budget.[33]

A 1920 report of paved roads noted that: In the development of the Great Highway the principal problem involved is in protecting the roadway from encroachment by the ocean, for the placid waters of the Pacific sometimes cease to be placid and pound upon the beach in such tremendous assault that a concrete sea wall set many feet down below the surface of the sands has become necessary. Part of this sea wall has been already built and as funds are made available it is being extended, the highway being paved with concrete standard pavement as the wall is extended, and within a comparatively short time a modern smooth roadway with sea-wall protection will reach from the foot of the sheer rock wall below Sutro Park at the Cliff House to Sloat Boulevard.

At the present time the Great Highway is surfaced and amply comfortable to drive over. This improvement being merely of a temporary character, and over it on a bright Sunday or holiday a tremendous volume of automobile traffic flows, supplied by the routes described as well as by the smooth driveways which John McLaren, continuous roadway through San Francisco, San Mateo, Santa Clara, and Santa Cruz counties superintendent of Golden Gate Park, has provided with the help of Curtis H. Lindley, Herbert Fleishhacker, John A. McGregor, M. Earl Cummings, and A. B. Speckles, the Park Commissioners.[34] Herbert Fleishhacker, John A. McGregor, M. Earl Cummings, and A. B. Speckles, the Park Commissioners.[34]

Within the APE, the original S-shaped alignment of the coastal road that continued south from the south end of the Great Highway was the first and northernmost segment of Skyline Boulevard to be constructed.[35] Passage of the 1919 Joint Highway Act provided for the construction of the According to a 1921 account, "The most important unit of this highway naturally is the one which begins at Sloat Boulevard at the edge of the ocean, and this will be the first to be built." [36]

31 *San Francisco Municipal Reports for the Fiscal Year 1914-15, Ended June 30, 1915.* San Francisco, CA: Neal Publishing, Co. 1917. P. 353.
32 *San Francisco Municipal Reports for the Fiscal Year 1914-15, Ended June 30, 1915.* San Francisco, CA: Neal Publishing, Co. 1917. P. 355.
33 *San Francisco Municipal Reports for the Fiscal Year 1914-15, Ended June 30, 1915.* San Francisco, CA: Neal Publishing, Co. 1917. P. 952.
34 Ben Blow. *California Highways: A Descriptive Record of Road Development by the State and by Such Counties as Have Paved Highways.* San Francisco, CA: H.S. Crocker Co., Inc., 1920. P. 220.

35 In the APE, Skyline Boulevard predated the Great Highway Extension by more than 40 years.
36 "First Link of Skyline Road to be Started in Near Future." *San Francisco Chronicle,* November 13, 1921, pp. A1-A2.

Additionally, "This first unit of the Skyline Boulevard will be thirty-four feet in width, later to be enlarged to thirty-eight feet. When the grading is completed it will be macadamized and then opened to traffic [and later paved with concrete or asphalt]."[37] Construction began on the first segment of Skyline Boulevard on February 13, 1922,[38] and it was opened to automobile traffic in April 1923.[39] The two-lane road jogged between land owned by the Spring Valley Water Company and the north end of Fort Funston (**Figures 9, 10, and 11**).

In 1922, the San Francisco Board of Supervisors authorized the purchase of 60 acres of land belonging to the Spring Valley Water Company for public recreation use, and this property was located south of Sloat Boulevard at the Great Highway. A number of public projects were constructed in the 60 acres that collectively became known as the Fleishhacker Playfield, after Parks Commission President Herbert Fleishhacker and his philanthropist brother Mortimer Fleishhacker, including the Fleishhacker Pool and Bathhouse complex (which opened to the public on April 23, 1925), the adjacent athletic field that contained 10 tennis courts and five baseball diamonds, picnic grounds, a children's playground, a carousel, a miniature railroad, and a building designed as a nursery and mothers' retreat named the Mothers Building.[40] The WPA-era Fleishhacker Zoo –renamed the San Francisco Zoological Gardens in 1940 – was constructed on this property in the 1930s, and the earliest zoo buildings opened to the public on October 6, 1940.

The following improvements were made at the intersection of Sloat and Skyline boulevards at the Great Highway in 1923-24: A contract for the improvement of the junction of Sloat Boulevard, Great Highway, and the Skyline Boulevard has been awarded and construction is now under way. One of the principal features of this improvement is an underground pedestrian passageway beneath the southerly paved strip of Sloat Boulevard from a ramp at the terminus of the street railway line and leading to the new Municipal Playground and Swimming Pool. With the completion of the Skyline Boulevard and the playground and pool, this junction will be called upon to carry a large amount of automobile traffic, especially on Sundays and holidays.[41]

37 "New Artery Will Open Up Region." *San Francisco Chronicle,* July 15, 1922, p. 6.
38 *Municipal Record of the City and County of San Francisco,* Vol. 15, No. 1 (January 5, 1922). P. 34.
39 "Lake Merced, the Golfer's Paradise." *San Francisco Water,* Vol. 2, No. 2 (April 1923). San Francisco, CA: Spring Valley Water Co., p. 4.
40 "Park Development in San Francisco." *The Playground,* Vol. 17, No. 10 (Jan 1924), p. 558. Accessed Nov 11, 2019, at https://books.google.com/books?id=DiCkMN7ZnW4C&pg=PA556&lpg=PA556&dq=%22herbert+fleishhacker+playfield

%22&source=bl&ots=uDgngF87aJ&sig=ACfU3U2B-z52Zs77F2cQoJAjcIvwi4Lfg&hl=en&sa=X&ved=2ahUKEwiQlOSstuPlAhWYnp4KHX2LAYAQ6AEwBHoECAYQAQ#v=onepage&q=%22herbert%20fleishhacker%20playfield%22&f=false.

41 *Report of the Bureau of Engineering of the Department of Public Works, City and County of San Francisco, Fiscal Year Ending June 30, 1923.* P. 12.


RICHMOND

1925 aerial photograph showing the first and northernmost segment of Skyline Boulevard bordering the newly opened Fleishhacker Pool and Bathhouse complex, looking north

Ca. 1930 photograph of Skyline Boulevard, looking southeast toward Lake Merced

1941 aerial photograph showing original S-shaped alignment of Skyline Boulevard through the APE

Much of the widening and general improvements to the Great Highway north of Sloat Boulevard, which gave the road a more formal alignment, occurred between 1927 and 1929. Historic photographs from the late 1920s show the highway was largely completed and operational by the end of 1929. The grand opening celebration for the completion of the Great Highway took place on June 9, 1929, "[marking the] inauguration of the last link of the Esplanade and the connecting up of the widest stretch of pavement in the United States with Sloat Boulevard, Skyline Boulevard, and other heavy traffic arteries."[42] As part of the annual appropriation budget of the City and County of San Francisco for fiscal year 1960-61, the department of Public Works allocated $134,000 to construct the "Great Highway Extension" between Sloat and Skyline boulevards.[43]

The purpose of the extension was twofold:1) the existing S-shaped segment of Skyline Boulevard, which was seen as "a narrow inadequate connection between two multilane parkways," would be redesigned as a scenic parkway and 2) the new road would better accommodate a proposed expansion of the zoo.[44] The exact alignment ofthe roadway, however, had not been finalized, and in June 1960, it was reported that, "[Planning Department] surveys now under way on a proposed location for a Great Highway extension through Fort Funston would not be completed until December [1960]."[45] That same month, it was also reported that, "[Mayor George] Christopher warned [Public] Works Director Reuben H. Owens to prevent, as far as possible, the Great Highway extension from cutting through the middle of the 116-acre surplus military tract [at Fort Funston]."[46]

In 1961, voters approved a major bond issued to enable the City of San Francisco to purchase a large, northern portion of the former Fort Funston site from the Federal Government for $1.1 million, and in 1962, the sale was finalized.[47, 48] It was through this land, which contained Battery Bruff and Battery Howe, that the Great Highway Extension was planned (**Figure 12**).[49] It was designed with two lanes of traffic with shoulders in both directions separated by a 50-foot-wide landscaped median.[50]

In 1964, $460,000 in construction funds that had been previously appropriated through the Department of Public Works' Road Fund were rescinded and re-appropriated to the Great Highway Extension project.[51] Construction began on July 20, 1964, and concluded on April 26, 1965.[52] Photographs published in June 1965 show the completed four-lane extension with expansive medians running the entire length of the new roadway (**Figures 13, 14, and 15**). The S-shaped segment of Skyline Boulevard through the APE is still visible, and it remains in use to this day, albeit under different names.[53]

42 "Completing the Great Highway." *The Municipal Employee,* June 1929. Accessed November 11, 2019, at http://www.sfmuseum.org/hist2/ghiway.html.
43 *San Francisco Chronicle Business World,* April 18, 1960, p. 7.
44 *Annual Report of the Department of Public Works, City and County of San Francisco, Fiscal Year Ending June 30, 1965.* Pp. 20-21.
45 "Board Delays on Funston Recreation." *San Francisco Chronicle,* June 3, 1960, p. 3.
46 Russ Cone. "Mayor Maps Shopping, Home Area at Funston." *San Francisco Examiner,* June 23, 1960, p. 8.
47 "Supervisors' Actions." *San Francisco Chronicle,* August 15, 1961, p. 4.
48 "Hearing Set on Funston Park Plan. "*San Francisco Chronicle,* September 28, 1964, p. 38.
49 Carey & Co. *Historic American Engineering Record: Fort Funston, Panama Mounts for 155mm Guns* (HAER No. CA-193-A), February 1998. Accessed November 11, 2019, at https://cdn.loc.gov/master/pnp/habshaer/ca/ca2300/ca2388/data/ca2388data.pdf.
50 *Annual Report of the Department of Public Works, City and County of San Francisco, Fiscal Year Ending June 30, 1961.* P. 20.
51 *San Francisco Chronicle,* February 28, 1964, p. 27.
52 *Annual Report of the Department of Public Works, City and County of San Francisco, June 30, 1965.* P. 21.
53 The segment of Herbst Road south of Armory Drive is a public road, and the segment of Armory Drive north of Herbst Road is a private road for zoo employees and deliveries.

1961 aerial photograph showing Fort Funston along the coast to the south of San Francisco Zoo

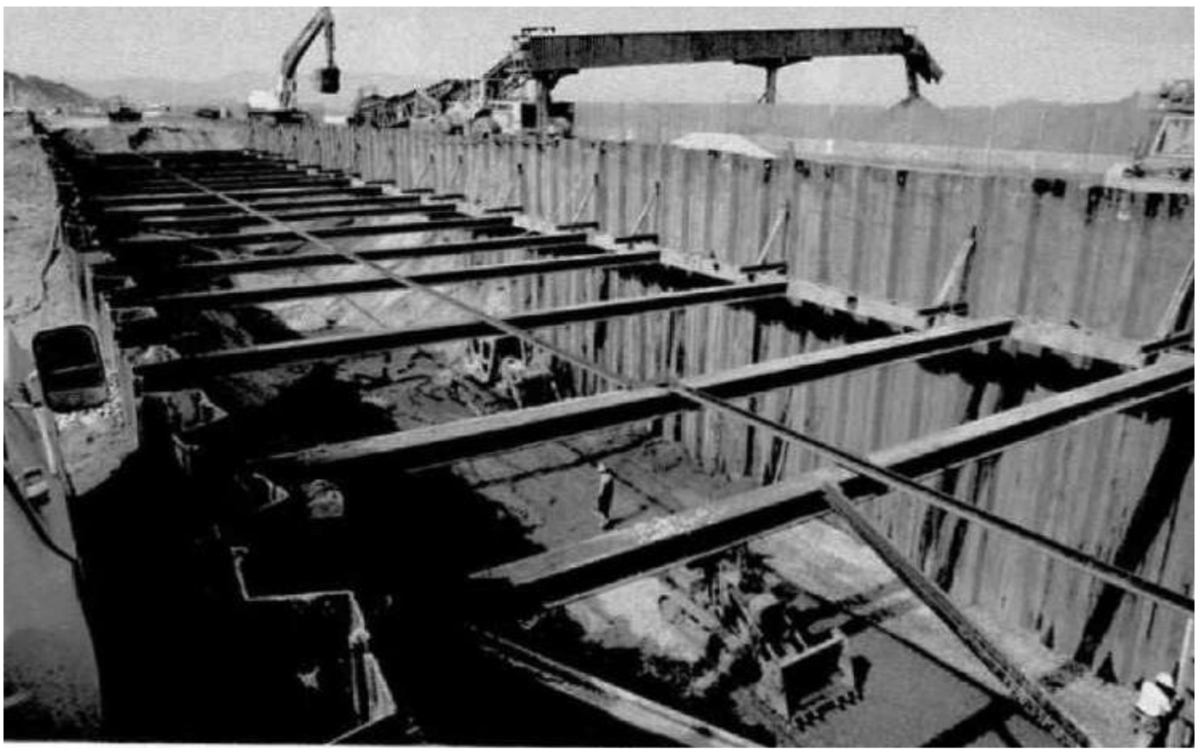
1965 aerial photograph showing the recently completed Great Highway Extension

1965 photograph looking north along the recently completed Great Highway Extension

1965 photograph looking south along the recently completed Great Highway Extension

Alterations

The Great Highway between Lincoln Way and Sloat Boulevard (outside the APE) remained largely unchanged until the 1980s when the Westside Transport Box was constructed beneath the entire length of the Great Highway from Lincoln Way to the Oceanside Water Pollution Control Plant (WPCP) just south of the San Francisco Zoo. This transport structure was initiated and funded by the San Francisco Clean Water Program, and was built to capture and store a combination of stormwater and wastewater flows from San Francisco's west side prior treatment at the Oceanside WPCP. The Westside Transport went online in anuary 1987 and provided an extra 48 million gallons of storage capacity. Construction of the 2.5-mile underground transport/storage structure began in 1981. Using a cut-and-cover construction technique, the size of the subterranean structure ranged from 25 to 50 feet wide and 15 to 48 feet deep. A construction photo from 1983 demonstrating this technique is provided in **Figure 16**. By 1988, reconstruction and landscaping of the Great Highway was completed and construction began on the Noriega Seawall.[54]



Westside Transport Box Construction Photo – 1983

As a result of the Westside Transport Box, the original 1920s-era Great Highway was entirely reconstructed from Lincoln Way to Sloat Boulevard, and the pedestrian undercrossings were eliminated, although the public convenience stations remained intact. The project also installed the recreational paths which parallels the highway on its western and eastern sides, and added the Noriega Seawall along a portion of the western side of the highway. Modifications to the highway at this time included new curbs, gutters, pavement, planted median dividers, drainage, signage, and lighting.[55]

A review of historic aerial photographs shows that in 1987, traffic on the Great Highway was temporarily rerouted onto the southbound lanes of the original highway north of Sloat Boulevard, while the Westside Transport Box was constructed generally beneath the northbound lanes and median planting strip. After 1991, the aerial photos show a restored landscape and a new high way moved approximately 50 feet to the east from where the original highway had been. The new highway was narrowed from eight to four lanes, and was reconfigured to fit entirely into the space originally occupied by the northbound lanes and median planting strip. The former southbound lanes became a restored dunescape with a pedestrian path along its western edge.

Roadway demolition and reconstruction plans show that the original 1920s era road was narrowed from about 120 feet in width with a wide (25-foot) median to approximately 70 feet from curb-to curb, and with a narrower (10-foot) median.[56] The new concrete seawall was constructed beginning in 1988 along the western side of the highway between Santiago Street to the south and Noriega Street to the north. The western pathway through the dunes continued atop a new concrete seawall.

Pedestrian overlooks were installed along the seawall at the termini of seven streets: Vicente, Taraval, Rivera, Pacheco, Noriega, Lawton, and Judah streets. By this time, the sinuous, asphalt pedestrian path running along the eastern side of highway was also installed between Sloat Boulevard and Lincoln Way, with pedestrian connections to all 15 streets in the Sunset District which terminate at the highway.

South of Sloat Boulevard, the Great Highway Extension has also seen changes in recent decades. During the construction of the Oceanside Water Pollution Control Plant on the east side of the Great Highway xtension in the early 1990s, the highway was temporarily narrowed from two lanes in each direction to one lane in each direction.[57] Between 2007 and 2009, the coastal bluffs along this stretch of road eroded pproximately 70 feet.[58] In December 2009, the southbound lane collapsed as a result of "intense slip-out of the upporting bluffs," and emergency repair work was unded by the Federal Highway Administration and the California Governor's Office of Emergency Services.[59]

Repairs were completed in three phases from 2010 to 2014. Phase I entailed removal of 1,000 tons of debris and construction of a rock revetment on the beach below the road. Under Phase II, the Great Highway Extension was realigned and the two southbound lanes were reduced to one lane. Additional storm damage to the 3,500-foot stretch of coastline was performed under Phase III.[60]

55 SFDPW. *Great Highway Redesign, Sloat Boulevard to Lincoln Way – Demolition Plan, Roadway Plan*. San Francisco Clean Water Program. Prepared by the City and County of San Francisco DPW Bureau Of Engineering. Specification. No. 1158W, 1986.
56 SFDPW. *Great Highway Redesign, Sloat Boulevard to Lincoln Way – Demolition Plan, Roadway Plan*. San Francisco Clean Water Program. Prepared by the City and County of San Francisco DPW Bureau Of Engineering. Specification. No. 1158W, 1986.
57 "Ocean Beach." *San Francisco Examiner,* January 31, 1990, p. A-17.
58 "DPW Acts Quickly to Address Coastal Bluff Erosion at Great Highway" (press release). *San Francisco Public Works,* February 10, 2010. Accessed January 17, 2020, at https://www.sfpublicworks.org/project/dpw-acts-quicklyaddress-coastal-bluff-erosion-great-highway.
59 "Great Highway Roadway Improvement Projects." *San Francisco Public Works,* no date. Accessed January 17, 2020, at https://www.sfpublicworks.org/great_highway.

Evaluation and Integrity

A segment of the Great Highway between Lincoln Way and Sloat Boulevard (which is outside the APE) was previously evaluated by ESA in January 2011 as part of the *San Francisco Westside Recycled Water Project Draft Historic Resources Evaluation Report.*[61] The evaluation found that the highway was no longer significantly associated with the City Beautiful Movement as a result of extensive reconstruction activities during the 1980s, and it was recommended ineligible for listing under Criteria A/1. Associations with Park Superintendent John McLaren (who initially conceived of a grand Oceanside boulevard around the turn of the 20th century) and Daniel Burnham (who reiterated this concept in his 1905 plan for San Francisco) were found to be tenuous, as these men were not directly involved in the realization of the Great Highway like they were for Golden Gate Park (in the case of McLaren) and the 1893 Chicago World's Fair (in the case of Burnham). It was therefore recommended ineligible for listing under Criteria B/2. The reconstruction of the Great Highway during the 1980s-era Westside Transport Box project redesigned and realigned the highway to adhere to modern standards, and all materials associated with the original highway were removed. It was therefore recommended ineligible for listing under Criteria C/3.[62]

Within the APE, the Great Highway Extension was constructed in 1964-65, decades after the northern stretch of the highway. It was conceived as an improvement to the S-shaped segment of Skyline Boulevard, which was deemed inadequate for traffic needs, and also to accommodate a proposed expansion of the zoo. As such, it does not appear to be significantly associated with important events and is recommended ineligible for listing under Criteria A/1. Unlike the original Great Highway located north of the extension, which was conceived by McLaren and Burnham, the Great Highway Extension does not appear to be significantly associated with important people and is recommended ineligible for listing under Criteria B/2. The Great Highway Extension was designed as a paved and separated limited access highway that was typical during the 20th century. As a result of the periodic improvements over time including realignment and reconstruction of parts of the road in response to emergency conditions that would keep it safe and functional, the Great Highway Extension does not appear eligible for listing under Criteria C/3.

The Great Highway Extension is neither considered a historic property for the purposes of Section 106 nor a historical resource for the purposes of CEQA.

60 "Public Works Reopens Great Highway South of Sloat Boulevard" (press release). *San Francisco Public Works,* October 15, 2010. Accessed January 17, 2020, at https://www.sfpublicworks.org/project/public-works-reopensgreat-highway-south-sloat-boulevard.
61 The report was not finalized because the Great Highway pipeline alignment was ultimately removed from the

project. The information presented in the draft Historic Resources Evaluation Report remains accurate.
62 ESA. *San Francisco Westside Recycled Water Project Draft Historic Resources Evaluation Report,* January 2011, p. 63.

View of Ocean Beach showing the north end of the Great Highway, esplanade, and seawall, view facing south

View of the east side of the seawall and the pedestrian promenade, view facing south

The west side of the seawall faces the ocean and is characterized by a board-formed concave surface that is covered with graffiti (**Figure 19**). A significant portion of the seawall structure that was originally visible has long been buried in sand. This includes bleacher seating that was built into the west side of the seawall as well as the majority of each of the 28 staircases that provide access to the beach. SOURCE: ESA Ocean Beach Climate Change Adaptation Project

Figure 19
View of the west side of the seawall, view facing northeast


History
The seawall that is today known as the O'Shaughnessy Seawall was constructed in phases between 1914 and 1929 as part of the esplanade along Ocean Beach (**Figures 20 and 21**). A 1915 account of the proposed design was published in the *San Francisco Chronicle:*

A reinforced concrete seawall will be built to check the waves. This wall is to have a concave curve to counteract the force of the breakers. Broad concrete steps will descend from the wall to the sand, and in front of these steps interlocking piles of reinforced concrete will be driven into the sand to a point fifteen feet below mean tide, as a protection against the underscour [i.e., erosive force] of the seas. The main wall will be supported by pedestal piles, which will be driven ten feet apart. […]

1917 photograph showing the first completed segment of the esplanade and seawall along Ocean Beach, view facing south

1930 photograph showing the completed esplanade and seawall, view facing south

The wall is to have an ornamental top, and between this coping and the Great Highway will be an artificial stone walk, twenty-five feet wide. The walk will have a slight slope, so that water may run off it through scupper holes in the wall. From the walk concrete stairways will lead to the sand. The stairways are to be placed 150 feet apart. The Park Commission is to co-operate in the construction of the esplanade and will ornament it with plants and flowers.[63]

Named after City Engineer M. M. O'Shaughnessy (1864-1934) who oversaw all preparations, designs, and construction of the seawall and Ocean Beach Esplanade,[64] the design of the seawall was "a matter of great interest among engineers and has been discussed by the American Society of Civil Engineers in New York and the plans given general approval. Similar plans [were] adopted in Florida for handling some of the wasting sea beaches."[65] O'Shaughnessy, who was appointed City Engineer in 1912, is renowned in San Francisco and beyond for his numerous achievements. A profile detailing his legacy of "doing big things and doing them well" was published in the February 1927 issue of *The Municipal Employee.* In addition to the Ocean Beach esplanade and seawall, these include his supervision of the Twin Peaks Reservoir, the Stockton Street Tunnel, the Twin Peaks Tunnel, the Municipal Railway System, and, perhaps most importantly, the Hetch Hetchy Water Supply Project, a system that continues to provide water to millions of people in Northern California.[66]

In O'Shaughnessy's 1929 *Report of the Bureau of Engineering*, the major features and impetus of the recently completed Ocean Beach Esplanade were described as follows:

Ocean Beach Esplanade is the broad highway and parking space along the ocean beach frontage, reaching from the bluffs south of the Cliff House to the southerly line of Golden Gate Park, a distance of 4298 ft., of which 2232 ft. were completed during this fiscal year. Two walks 20 ft. wide, a 15-ft. lawn, and a roadway varying in width from 188 ft. to 199 ft., are protected from erosion by the waters of the Pacific Ocean by erection of a concrete seawall. Rising from the sand beach are stepped, reinforced concrete bleachers. Back of these is the sea wall proper, its shape so designed as to check the ocean waves gradually and then turn them back without splashing or inundating the esplanade. […]

Prior to [1914], the Great Highway […] been washed away from time to time by giant breakers during great storms. Some protection had been afforded the Beach Chalet by a barrage of piles driven in the sand beach under the direction of the Park Commission, but the line of piles was very unsightly and of doubtful utility.

Before undertaking construction of the esplanade sea wall, [the Bureau of Engineering] made extensive studies of sea protective work in the United States and in Europe. There have been many failures of such work previously constructed, but although the conditions here are difficult, largely on account of the sand foundation which extends to a depth of at least 200 ft., it is felt that we now have an adequate, permanent wall, which is both useful and ornamental.[67]

63 "Beach Esplanade Plans Are Ready." *San Francisco Chronicle,* August 29, 1915, p. 29.
64 The earliest newspaper mentions of the "O'Shaughnessy Seawall" appear to be from the 1980s.
65 "Supervisors Approve $335,000 for Beach Esplanade: Plans Drawn for Extension of Boulevard." *San Francisco Chronicle,* January 24, 1928, p. 13.
66 "M. M. O'Shaughnessy." *The Municipal Employee,* Vol. 3, No. 1 (January 1929), p. 5.

The bleacher-like seating on the ocean side of the seawall has long been buried in sand (**Figures 22 and 23**). As part of its ongoing efforts to manage erosion at South Ocean Beach, the city has undertaken several beach nourishment projects involving excavation of sand from North Ocean Beach and placement along the South Ocean Beach Shoreline. These include projects in 2012(73,000 cubic yards), 2014 (28,000 cubic yards), 2016 (95,000 cubic yards), 2018 (65,000 cubic yards), and 2019 (53,000 cubic yards). [68,69,70] Even after these efforts, the seawall remained mostly buried.[71]

In 2014-16, critical repairs amounting to $336,000 were made to the length of the seawall, which was reported to be "in really poor condition" by the GGNRA. The *San Francisco Chronicle* reported that, "In addition to the winds, weather and occasional waves, the dampness of the seaside environment has caused the steel reinforcing bars near the surface of the inland side of the wall to crack and spall — pitting, breaking and popping on the surface and inside — causing chunks to slough off, sections to become rough and broken, and leaving parts of the wall unstable and ugly."[72]

Evaluation and Integrity

The O'Shaughnessy Seawall is recommended eligible for listing under Criteria A/1 at the local level as a crucial and enduring component of the Ocean Beach Esplanade along the Great Highway, a major engineering effort constructed from 1914 to 1929 that improved public access to, enjoyment of, and protection of the coast. The seawall does not appear to be associated with the life of a person significant in our past, and it is not recommended eligible for listing under Criteria B/2. (Significant architects and engineers are addressed in the Criteria C/3 discussion.) The seawall is directly and significantly associated with City Engineer M. M. O'Shaughnessy, who oversaw all preparations, designs, and construction of the seawall and Ocean Beach Esplanade. Responsible for some of the most prominent and important engineering undertakings in San Francisco and Northern California, O'Shaughnessy is considered a master in his field. For these reasons, the seawall is recommended eligible for listing under Criteria C/3 at the state level.

67 *Report of the Bureau of Engineering of the Department of Public Works City and County of San Francisco forFiscal Year Ended June 30, 1929.* Pp. 9-11.
68 "2014 Ocean Beach Sand Management Project." *National Park Service,* no date. Accessed January 17, 2020, at https://parkplanning.nps.gov/projectHome.cfm?projectID=53313.
69 Michael Cabanatuan. "42,000 Tons of Sand Trucked Down Ocean Beach; Here's Why." *San Francisco Chronicle,* December 5, 2014, pp. A1, A15.
70 ESA, *Ocean Beach Short-term Erosion Protection Measures Project, 2019-2020 Monitoring Report, Draft.* May 2020.
71 Michael Cabanatuan. "Nip, Tuck for Seawall as It Nears Age 100." *San Francisco Chronicle,* March 23, 2015, pp. A1, A9. 72 Michael Cabanatuan. "Nip, Tuck for Seawall as It Nears Age 100." *San Francisco Chronicle,* March 23, 2015, pp. A1, A9.

Ca. 1970s photograph showing the north end of the seawall, view facing southeast

When this photograph was taken in June 2012, sand covered the stairs, bleacher seating, and part of the pedestrian walkway and parking lot along the seawall. The seawall was almost completely buried.

The seawall remains on its original site and therefore retains integrity of location. Because of its physical connection to the esplanade and proximity to the Great Highway, the seawall retains integrity of association as a key component of the shoreline improvements constructed in the early 1900s. Despite extensive repairs in recent years, the seawall retains integrity of design, materials, and workmanship. The setting of the seawall is essentially unchanged, with the Pacific Ocean immediately to the west and the esplanade and Great Highway to the east. As a result of the periodic deposits of sand, a significant portion of the seawall (notably the bleacher seating on the west side) has long been buried in sand, but it is assumed to be largely intact as designed. The seawall presently does not retain integrity of feeling as a massive seawall designed with ample seating facing the ocean. Overall, the seawall retains sufficient integrity to convey its historical significance.

The O'Shaughnessy Seawall is considered a historic property for the purposes of Section 106 and a historical resource for the purposes of CEQA.

Fleishhacker Pool and Bathhouse Complex

Architectural Description

The area bounded by the east side of the San Francisco Zoo parking lot, Sloat Boulevard, and the Great Highway Extension is the former site of the Fleishhacker Pool and Bathhouse complex. The complex has been almost entirely removed, as discussed below.

On the west side of the San Francisco Zoo parking lot is a remnant of the large bathhouse that was part of the Fleishhacker Pool and Bathhouse complex (**Figure 24**). The bathhouse was almost completely demolished following a fire in 2012. The remnant is a segment of an exterior wall that contained the main entrance to the bathhouse and led into a loggia (a type of covered porch).[73] It features three rectangular openings, and each is surrounded by classical moldings, an architrave (the horizontal member above the doorway) supported by corbels (similar to brackets), and a cartouche (a type of ornament) with shell imagery and scrollwork. The openings are separated by Ionic pilasters (rectangular, column-like elements), and the remnant terminates in a cornice with dentil and egg and dart moldings (ornamental horizontal elements at the top).[73]

73 Charles Hall Page & Associates, Inc. "Fleishhacker Pool (HABS No. CA-2075)" Written Historical and Descriptive Data, Historic American Buildings Survey, National Park Service, U.S. Department of the Interior, 1980. Accessed January 9, 2020, from https://cdn.loc.gov/master/pnp/habshaer/ca/ca0600/ca0642/data/ca0642data.pdf.

Remnant of the Fleishhacker Bathhouse, view facing southwest

History

The following history of the Fleishhacker Pool and Bathhouse complex site is from the 1996 *San Francisco Recycled Water Master Plan and Groundwater Master Plan Draft Environmental Impact Report:*

Fleishhacker Pool, located at Sloat Boulevard and the Great Highway, opened on April 23, 1925, and was the world's largest swimming pool of its time. It was named in honor of Herbert Fleishhacker, a wealthy banker and the 1920's President of the Park Commission of San Francisco, whose donations to the City's recreational facilities included development of the pool and adjoining Herbert Fleishhacker Playfield. Land was purchased from the Spring Valley Water Company for development of a swimming pool and golf links, and the pool was constructed during 1923 and 1924. It contained a uniquely designed circulation and heating system that kept 6,000,000 gallons of saltwater heated using the ocean's tides to fill the pool. […]

The Fleishhacker Pool site contains one structure, the Fleishhacker Bath House, which was located centrally along the western side of the pool. The Bath House was designed by Ward and Blohme in 1923-1925, in the Mediterranean style. The front [east] façade is Ionic in design with a three-part central entranceway crowned with aquatic creatures and ornaments [i.e., the extant remnant]. The arrangement of windows on the second floor on both pool side and ocean side consists of large squares of industrial sash that created well-lit spaces formerly used as restaurant dining areas. The Bath House has light stucco walls and green-tiled hip roofs.[74]

[The Fleishhacker Pool and Bathhouse complex closed to the public in 1971. They were jointly evaluated in 1978 and determined eligible for listing in the National Register by the Keeper and listed in the California Register (CHRSC 2S).[75] At that time, the deteriorated swimming pool and bathhouse that had been in disuse for eight years were slated for demolition to accommodate the proposed Westside Pump Station project.[76]] The decision to demolish the pool and Bath House was opposed by several citizen's groups, which urged that the pool either be restored and reopened or be converted into a fresh-water pool and enclosed. The City obtained the necessary approvals and implemented the required measures to allow the structure to be removed. [...]

A Memorandum of Agreement (MOA) was issued by the California State Historic Preservation Officer, the Environmental Protection Agency (Region IX) and the Advisory Council on Historic Preservation; the MOA concluded that avoiding the property would substantially increase the cost of the project and still not result in its preservation due to the prohibitive cost of its rehabilitation.[77] [The swimming pool and bath house were subsequently documented in a Historic American Buildings Survey (HABS) package in 1979-80.[78]]

Demolition of the Bath House ultimately was not required for the pump station project. A 1990 structural review of the Fleishhacker Pool facilities noted that the Bath House building is in a very deteriorated state and would require extensive repairs/reconstruction to restore it for occupancy. In [the *San Francisco Draft Water Recycling Master Plan Alternative Sites Assessment and Screening Study* prepared by ESA for the San Francisco Department of Public Works in December 1992], the site's eligibility for the National Register was examined. The study determined that the action of filling in Fleishhacker Pool [with sand and gravel, which had already occurred at that time] had compromised the historic integrity associated with the Fleishhacker Pool Bath House and that the site failed to meet the criteria for listing on the National Register. The study concluded that the Fleishhacker Pool site is not considered eligible for the National Register.[79]

74 San Francisco Planning Department and San Francisco Public Utilities Commission. *San Francisco Recycled Water Master Plan and Groundwater Master Plan DEIR,* November 1, 1996, pp. 246-248.
75 The pool and bath house were evaluated in 1978. They are jointly listed in the 2012 San Francisco County Historic Properties Directory under the misspelled name "Fleishacker Pool."
76 Charles Hall Page & Associates, Inc. "Fleishhacker Pool (HABS No. CA-2075)" Written Historical and Descriptive Data, Historic American Buildings Survey, National Park Service, U.S. Department of the Interior, 1980. Accessed January 9, 2020, from https://cdn.loc.gov/master/pnp/habshaer/ca/ca0600/ca0642/data/ ca0642data.pdf.
77 San Francisco Planning Department and San Francisco Public Utilities Commission. *San Francisco Recycled Water Master Plan and Groundwater Master Plan DEIR,* November 1, 1996, p. 248.
78 Charles Hall Page & Associates, Inc. "Fleishhacker Pool (HABS No. CA-2075)" Written Historical and Descriptive Data, Historic American Buildings Survey, National Park Service, U.S. Department of the Interior, 1980. Accessed January 9, 2020, from https://cdn.loc.gov/master/pnp/habshaer/ca/ca0600/ca0642/data/ca0642data.pdf.
79 San Francisco Planning Department and San Francisco Public Utilities Commission. *San Francisco Recycled Water Master Plan and Groundwater Master Plan DEIR,* November 1, 1996, pp. 248-249.*c*

In 1999, the filled swimming pool site was paved and replaced with the extant zoo parking lot. The dilapidated bathhouse remained, and a fire on December 1, 2012, destroyed the building, which was razed shortly thereafter.[80] The *San Francisco Chronicle* reported, “The plan is to preserve one of the building's ornate porticos [i.e., the extant remnant] and some of the roof tiles and display them as symbols of the historical significance of the city-owned site on Sloat Boulevard and the Great Highway, adjacent to the San Francisco Zoo.”[81]

Evaluation and Integrity

As stated above, the Fleishhacker Pool and Bathhouse were jointly evaluated in 1978 and determined eligible for listing in the National Register and listed in the California Register. The swimming pool and bathhouse were reevaluated in 1992 following in the filling in of the poo and determined to have significantly diminished in integrity such that they were no longer eligible for listing in the National Register.

Since that time, the swimming pool site has been entirely paved and the bathhouse has been demolished following a fire, save for the one extant remnant. The swimming pool and bathhouse complex would no longer be eligible for listing in either the National Register or California Register due to the complete loss of the swimming pool and the loss of approximately 99 percent of the bathhouse.

The Fleishhacker Pool and Bathhouse complex is neither considered a historic property for the purposes of Section 106 nor a historical resource for the purposes of CEQA.

Conclusions

The results of the field survey indicate that there are two previously recorded historic-age resources in or adjacent to the APE: the Great Highway and the Fleishhacker Pool and Bathhouse complex. Additionally, one extant historic-age resource that has not been previously recorded was identified adjacent to the APE at the north end of Ocean Beach: the O’Shaughnessy Seawall.

A segment of the Great Highway north of Sloat Boulevard (outside of the APE) was previously evaluated and recommended ineligible for listing in the National Register and California Register under any criteria. Archival research also found that the Great Highway Extension within the APE, between Sloat and Skyline boulevards, is not historically or architecturally significant, and it is recommended ineligible for listing in both the National Register and California Register under any criteria.

80 Annetta Black. “Fleishhacker Pool Ruins.” *Atlas Obscura.* Accessed January 2, 2020, at https://www.atlasobscura.com/places/fleishhacker-pool-ruins.
81 Peter Fimrite. “Last Remnant of Fleishhacker Pool’s Storied Past Headed for Final Plunge.” *San Francisco Chronicle,* December 19, 2012, pp. A1, A10.

The Fleishhacker Pool and Bathhouse complex (within and adjacent to the APE) was previously determined eligible for listing in the National Register in 1972 and subsequently listed in the California Register. The complex was reevaluated in 1992 after the pool was filled in, and it was determined to have significantly diminished in integrity such that the property was no longer eligible for listing in the National Register. In 2012, a fire destroyed the bathhouse, and today, only a small remnant of the bathhouse is extant. The complex is recommended ineligible for listing in the National Register and California Register due to the fact that it has been almost completely demolished and lacks integrity.

The field survey and evaluation found that the O'Shaughnessy Seawall (adjacent to the APE) is significant under Criteria A/1 at the local level as a crucial and enduring component of the Ocean Beach Esplanade along the Great Highway and Criteria C/3 at the state level as an important work of City Engineer M. M. O'Shaughnessy. Additionally, the seawall retains sufficient integrity to convey its historic significance. For these reasons, the seawall is recommended eligible for listing in the National Register and California Register and is considered a historic property for the purposes of Section 106 and a historical resource for the purposes of CEQA.

Appendix A
Department of Parks and Recreation 523 form-sets

Enclosure 2

CONFIDENTIAL NOT FOR PUBLIC INFORMATION

memorandum

date	July 21, 2020
to	Kathleen Ungvarsky, M.A., RPA - U. S. Army Corps of Engineers, San Francisco District
cc	Karen Frye, San Francisco Public Utilities Commission
from	Heidi Koenig M.A., RPA – ESA Cultural Resources Group
subject	

Introduction

This memorandum provides the preliminary results of the cultural resources records search and identification effort underway for the Ocean Beach Climate Change Adaptation Project (project) in San Francisco, California (**Figure 1**). The City and County of San Francisco (the city) is proposing a coastal adaptation and sea level rise resiliency project to improve the portion of Ocean Beach from Sloat Boulevard to Fort Funston known as "South Ocean Beach." The project is needed to address sea level rise and related shoreline erosion, severe coastal storm and wave hazards, which threaten city infrastructure, coastal access and recreational facilities, and public safety.

Efforts to identify cultural resources in the proposed Area of Potential Effects (APE) included a records search, a review of potential shipwrecks and underwater obstructions, a surface survey, and a geoarchaeological analysis. Paul Zimmer, M.S., Geology, with 10 years of archaeological experience, is completing the geoarchaeological analysis. Heidi Koenig, M.A., Cultural Resources Management, Registered Professional Archaeologist (RPA), with 19 years of archaeological experience throughout California, is completing the sensitivity analysis and compiling the report. She meets the Secretary of the Interior's Professional Qualifications Standards for archaeologist. Matthew A. Russell, Ph.D., RPA, is reviewing the report and providing oversight.

Previous Archaeological Research

On October 24, 2019, the archaeological consultant conducted a records search of the APE at the Northwest Information Center (NWIC) of the California Historical Resources Information System (CHRIS) (NWIC File No. 19-0705). The records search included a review of previous studies, records, and maps on file at the NWIC. The records search area consisted of the APE and the west side of the San Francisco Peninsula. The records search included a review of the State of California Office of Historic Preservation Historic Properties Directory with summary information from the National Register, Registered California

State Landmarks, California Historic Points of Interest, Archaeological Determinations of Eligibility, and California Inventory of Historical Resources/

Figure 1 Project Location

8.5x11

There are several recorded prehistoric archaeological resources in the vicinity of the APE, including CA-SFR-25, -101/H, -184, the un-numbered Outlet Creek Midden. SFR-181, within the APE, is discussed below (**Table 1** and **Figures 2a and 2b**). **Appendix A** provides the NWIC site records. Site CA-SFR-101/H is recorded about 250 feet east of the Great Highway and the APE, just north of the Oceanside Treatment Plant. The site is recorded as a historic-era well and an isolated obsidian projectile point. The Outlet Creek Midden is another reported shell midden deposit, reportedly located about 1,800 feet east of the APE, along Sloat Boulevard next to the San Francisco Zoo. In addition, north of the borrow area are a series of prehistoric sites (some with historic-era components) on the bluff at Point Lobos. Several shell midden sites also are present in the dunes of Fort Funston, a short distance south of the APE.

TABLE 1
ARCHAEOLOGICAL RESOURCES IN THE VICINITY OF THE APE

Designation	Site Type and Period	Components	Distance from APE
CA-SFR-5	Prehistoric	Resource-processing location; listed on the NRHP as part of the Point Lobos Archaeological Sites (#76000176)	Point Lobos, north of borrow area
CA-SFR-20	Prehistoric	Shell midden; Nelson's 396	Northeast of Point Lobos
CA-SFR-21/H	Prehistoric/Historic	Resource-processing location; listed on the NRHP as part of the Point Lobos Archaeological Sites; historic-era component Sutro Baths	Point Lobos, north of borrow area
CA-SFR-25	Prehistoric	Shell midden and isolated milling stone	6,800 feet east
CA-SFR-101/H	Historic and Prehistoric	At Oceanside Treatment Plant - glass-filled well built with concrete and rocks possibly associated with 1890s lifeguard station, 1898 Spanish-American War cantonment, or World War II-era Battery Bluff; one isolated obsidian point	400 feet east
CA-SFR-164H	Historic	Architectural remains and refuse deposit associated with Adolph Sutro's Ocean Terrace dating from 1890s to 1910s	Ocean Terrace/ Cliff Ave; 750' NE of APE
CA-SFR-181	Not applicable	Ocean Beach Midden – deposit of shell, bone, charcoal, lithic debitage, and other refuse (determined to not be prehistoric); one obsidian fragment identified)	In APE
CA-SFR-184	Prehistoric	East Lake Merced Midden – secondary deposit of shell and bone with lithic debitage; location of originating deposit unknown	4,000 feet east
Outlet Creek Midden	Prehistoric	Outlet Creek Midden – reported buried midden deposit at the San Francisco Zoo; has not been formally documented	1,600 feet east
----	Historic	Reported ship remains identified during installation of Lake Merced Tunnel at Sloat Boulevard and Great Highway	In APE

SOURCE: NWIC, 2019

There is one previously recorded site within the APE: CA-SFR-181. Archaeological survey of a portion of the APE along the Great Highway bluff in 2013 revealed possible shell midden on the bluff top and face in the vicinity of the San Francisco Public Utilities Commission (SFPUC) Oceanside Treatment

Plant.[1] Subsequent geoarchaeological coring, small scale test excavations, and radiocarbon dating indicate that the apparent shell midden material, previously recorded as CA-SFR-181, appears to consist of modern shell and naturally-occurring animal bone, rather than a prehistoric archaeological deposit.[2] However, AECOM also recovered an obsidian flake from a geoarchaeological core at the location of the suspected site, which they interpreted as an isolated artifact; that is, an artifact not associated with the previously-recorded shell deposit, and likely redeposited in fill. Together with the isolated projectile point found as part of CA-SFR-101/H, the isolated obsidian flake suggests that a prehistoric archaeological deposit likely is (or was) present in the general vicinity.

Two historical shipwrecks have been identified on the shoreline to the north and the south of the APE: the *King Phillip*/*Reporter* approximately 1-mile south of the North Ocean Beach borrow area, and the *Neptune* approximately 0.75-mile south of the southern end of the APE. Additional background research to identify shipwrecks and other submerged historical archaeological resources included reviewing the California State Lands Commission (CSLC) Shipwreck Database and the National Oceanic and Atmospheric Administration (NOAA) Office of Coast Survey's Automated Wreck and Obstruction Information System (AWOIS). The CSLC Shipwreck Database is one source of information for identifying potential historical shipwrecks in and around San Francisco. The CSLC database disclaimer notes,

> Information … was taken from books, old newspapers, and other contemporary accounts that do not contain precise locations. Except as verified by actual surveys, the database reflects information from many sources and is not based on actual fieldwork unless stated otherwise. Even though latitude and longitude coordinates are given for vessels in the database, these represent a guess, and must be considered along with other information. Not all shipwrecks are listed in the database and listed locations may be inaccurate. Ships were often salvaged or re-floated.

The CSLC Shipwreck Database lists a total of 143 shipwrecks in San Francisco County; many of these are inside San Francisco Bay (i.e., east of the Golden Gate Bridge) and at the mouth of the Golden Gate. The database and historic background research did not reveal any known shipwrecks or other submerged historic archaeological resources within the Marine Study Area. As noted above, there is a great deal of uncertainty about offshore shipwreck locations in the CSLC database. ESA sent an email to the CSLC on July 21, 2020 requesting an internal review of their database and maps related to the Marine Study Area. A response has not yet been received; additional information will be forwarded to the U.S. Army Corps of Engineers and the SFPUC.

ESA also consulted the NOAA Office of Coast Survey's AWOIS database for information about potential shipwrecks or other underwater obstructions in the vicinity of the Marine Study Area. The AWOIS database maintains a list of shipwrecks and other submerged objects that could pose a hazard to navigation. The AWOIS database does not include any entries within the Marine Study Area or within a

1 Spillane, Tim, Archeological Overview and Assessment: Indigenous Sites of the GGNRA. Prepared for the National Park Service, Golden Gate National Recreation Area, San Francisco. Prepared by BayArcheo, San Francisco. On file at the Northwest Information Center, Rohnert Park, California, 2014.

2 AECOM, Archeological Testing Results, South Ocean Beach Short Term Erosion Protection Project (2015-013754ENV), San Francisco, California. Prepared for the San Francisco Public Utilities Commission, 2016.

0.5-mile radius. The nearest location is an unnamed obstruction approximately 2 miles from the shoreline and 1.5 miles west of the Marine Study Area.

Figure 2a Archaeological Resources in Project Vicinity

8.5x11

Figure 2b Archaeological Resources in Project Vicinity

8.5x11

During excavation of the access portal shaft for the Lake Merced Tunnel of the San Francisco Clean Water Program, the remains of a 1860s ship were identified near the intersection of Sloat Boulevard and the Great Highway at a depth of nearly 30 feet below ground surface (bgs). The fragment of wooden hull was 20-feet long by 15-feet wide. Archaeologists and maritime specialists from the NPS and the San Francisco Maritime Museum determined that the remains were from the 1860s. The hull section was removed from the shaft, stored on-site, and reburied in the same location when the shaft was backfilled at the end of the tunnel installation.[3] This ship's hull fragment was likely present near the mouth of the Lake Merced outlet creek when it was filled in the late 19th or early 20th century, although there is no documentation available about the site and it was not formally recorded (personal communication, James P. Delgado, 2020). The presence of the ship remains within the APE near Sloat Boulevard demonstrates the amount of fill present beneath that section of the Great Highway.

Pedestrian Survey

On November 5, 2019, ESA archaeologists Heidi Koenig, Matthew Russell, and Paul Zimmer completed a pedestrian surface survey of the APE. On May 20, 2020, ESA archaeologist Heidi Koenig conducted a follow-up survey on the access road within the San Francisco Zoo. All areas of the APE with exposed ground surface were walked in narrow transects (less than 5 meters apart) to inspect the surface for cultural materials or other evidence of past human use and occupation.

All areas exhibited similar dune and beach sand, highly disturbed from existing roads, structures, and infrastructure. The North Ocean Beach borrow area includes several existing sand supply source locations, with excavated borrow areas varying in depth. Zoo and Herbst roads are paved with limited adjacent areas showing sandy exposed surfaces. The Great Highway Extension includes an unpaved sandy median that is currently used for parking. The Great Highway Extension also includes areas that have eroded to the beach, including former parking lots. Two options for a proposed restroom, one adjacent to the existing restroom and one on the median adjacent to the Great Highway and Sloat Boulevard exhibited disturbed dune sand. The west side of the Great Highway Extension is eroding. All edges of the eroded and exposed banks were closely inspected. Further detail about the subsurface stratigraphy of the APE is provided in the Prehistoric Archaeological Sensitivity and Potential section (below).

Historic-era and modern features in and adjacent to the APE are discussed in a separate historic architectural resources report being developed for the project.[4] This includes two former pedestrian tunnels below the Great Highway and a former equestrian tunnel below Zoo Road (no evidence of these tunnels was identified during the survey and all are presumed to have been destroyed during construction of the Lake Merced Tunnel and other infrastructure); the site of a former U.S. Military Reserve bunker (no longer extant); the San Francisco Zoo Historic District (previously recommended eligible for listing in the National Register); and remnants of Fleishhacker Pool (previously recommended as not eligible for listing in the National Register). In addition, the O'Shaughnessy Seawall (recommended eligible for listing in the National and California Registers) and the Great Highway Extension (recommended not eligible for listing in the National and California Registers) are discussed in the historic architectural resources report.

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[3] Robinson, M.J., M.H. Kobler, J. Cheung, and J. Chia. "Lake Merced Transport – Tunneling Through a Differing Site Condition." Rapid Excavation and Tunneling Conference Proceedings, 1993.

[4] ESA, *Draft Historic Resources Evaluation Report, Ocean Beach Climate Change Adaptation Project.* July 2020.

No prehistoric cultural materials or culturally-modified soils were identified in the APE during the pedestrian survey. Additional details regarding prehistoric archaeological sensitivity and potential of the APE are discussed further below.

Prehistoric Archaeological Sensitivity and Potential

Geotechnical borings conducted for the project, as well as archaeological observations completed during the geotechnical boring combined with existing information and previous archaeological investigations, inform the prehistoric archaeological sensitivity assessment of the APE along the Great Highway south of Sloat Boulevard. The following sections summarize the geotechnical boring data and archaeological observations completed for the project to date.

Geotechnical Testing Program

In order to further characterize the subsurface stratigraphy of the APE, a SFPUC geotechnical consultant completed a geotechnical testing program along the Great Highway, from south of Sloat Boulevard to the northern end of Fort Funston, distributed along a project area approximately 150 feet wide by 3,000 feet long (**Figure 3**).The geotechnical testing program consisted of soil borings and cone penetration tests (CPTs) up to 101.5 feet deep to obtain soil samples at the site and record the subsurface stratigraphy, and vacuum-extraction utility potholing up to 25 feet bgs to locate the top and alignment of the Lake Merced Tunnel. The work also included a geophysical survey to provide an acoustic image of the subsurface (similar to ground penetrating radar), which did not entail ground disturbance, as well as three geotechnical test pits. ESA completed a geoarchaeological analysis in conjunction with the geotechnical testing program by reviewing the geotechnical core samples collected on February 11 and March 6, 2019, and January 19, 2020. An ESA geoarchaeologist inspected the collected core samples and extruded samples in the lab when the geotechnical coring was completed. ESA also provided an archaeological monitor during excavation of geotechnical test pits on February 7, 2020. While the CPTs, utility potholing, and geophysical survey did not provide any direct archaeological value, in conjunction with soil borings they helped the geotechnical consultant to map the subsurface stratigraphy in the APE, which aids in identifying archaeologically sensitive strata. Due to the lack of archaeological materials observed during the core sample inspections (described below), the geoarchaeologist, in consultation with the San Francisco Planning Department's Environmental Review Officer (ERO) and SFPUC, recommended that archaeological monitoring of potholing was not warranted, and it therefore was not required during potholing.

The initial geotechnical testing program included drilling six (6) soil borings (designated B-1 through B-6) Each geotechnical core hole was approximately 5 inches in diameter; and samples were extracted in 1.25- and 2.0-inch-diameter tubes, depending on the sampling method. Soil samples from soil borings B-1 and B-2 were collected at about 2.5-foot depth intervals in fill and dune sand. Below the fill and dune sand, soil samples were collected at about 5 to 10-foot depth intervals. For B-1 and B-2, samples from the surface to depth of exploration up to 101.5 feet bgs were retained in metal coring tubes and plastic bags labeled by location and depth for post-field inspection by the archaeological consultant. For soil borings B-3, B-4, B-5 and B-6, the geotechnical consultant extracted continuous cores from surface to the depth of exploration up to 81.5 feet bgs. Subsequent environmental cores were conducted consisting of six (6) additional soil borings (designated ET-1 through ET-6) with similar methodology.

Figure 3 Geotechnical Testing Location

8.5x11

To summarize, the geotechnical testing program indicate that the APE along the Great Highway south of Sloat Boulevard contains from 5 to 38 feet of fill that is likely composed primarily of redeposited dune sand. Where present in the APE, intact dune sand deposits comprise a thin stratum along the shore face ranging from 5 to 10 feet thick, which progressively thickens to the east. The fill and dune sands (where present) are underlain by the Colma Formation, and where the Colma is absent, the Merced Formation, at depths ranging from approximately 15 to 30 feet bgs.[5]

Geotechnical Core Inspection and Documentation

As described above, the geotechnical consultant collected soil samples from the initial six boring locations and subsequent six boring locations, and retained the samples for inspection and analysis by the archaeological consultant. The archaeological consultant was not present on-site during soil boring operations, as it had been concluded, based on prior coring, that the potential for archaeological resources at pothole locations was low; however, archaeological inspection of the initial core samples was completed prior to utility potholing so that if any cultural material was identified in the cores, pothole excavations in the same vicinity could be monitored for archaeological materials. The determination, based on archaeological inspection of initial geotechnical cores, that pothole excavation did not require monitoring was made in consultation with the SFPUC and ERO.

Inspection and Documentation Procedures

An ESA geoarchaeologist inspected all core samples in the geotechnical consultant's laboratory during the course of the geotechnical soil boring program to determine whether prehistoric archaeological material was present from the surface to the maximum depth of exploration. The geotechnical consultant provided stratigraphic logs for each bore, which the geoarchaeologist annotated to confirm and refine soil stratigraphy for each location; to note the presence of artifacts or buried soils, if present; and to further document the overall stratigraphy in the APE.

Geotechnical Core Analysis Results

The geoarchaeologist observed an isolated undiagnostic whiteware fragment 8.5 feet bgs in fill soils in B-4, but no other traces of cultural resources or buried paleosols were identified during geotechnical core sample inspection. Observed stratigraphy included fill overlying dune sands and deposits associated with either the Colma Formation or the upper Merced Formation. As discussed above, similarities between the Colma and Merced deposits preclude easy distinction between the geologic units through visual inspection.[6] However, both of these two formations are older than the period of human occupation in California, so the distinction is not critical to this assessment. No paleosol was identified within or below the dune sand deposits, the horizon likely having been removed by coastal erosion and/or by development of the Great Highway and associated infrastructure.

Geotechnical Test Pit Monitoring

On February 7, 2020, the archaeological consultant monitored the excavation of three geotechnical test pits in the APE, with maximum depths ranging from 6 to 14 feet below surface. The test pits were excavated

5 AGS, Inc., Draft Geotechnical Interpretive Report, South Ocean Beach Coastal Erosion and Wastewater Infrastructure Protection, San Francisco, California, 2019.

6 AGS, Inc., 2019

under the supervision of SFPUC's geotechnical consultant. The results are provided in **Table 2** below. All observed soil was redeposited sand fill interspersed with fragments of asphalt, concrete, gravel, and rip-rap; no native or intact deposits were encountered. In addition, no cultural materials such as midden soil, culturally-modified shell or faunal remains, or lithic debitage was encountered. Encountered shell fragments on the surface were naturally deposited as indicated by size and distribution; in addition, no culturally-modified soil was present.

TABLE 2
RESULTS OF TEST PIT MONITORING

Test Pit Designation	Depth	Observations
TP-1b	Surface	Sand, natural shell fragments
	0-1 foot bgs	Redeposited sand over asphalt
	1-6 feet bgs	Redeposited sand light to medium brown, medium grain
	6-14 feet bgs	Auger at depth of trench, moist redeposited sand
TP-2	Surface	Asphalt/gravel
	0-3 feet bgs	Redeposited medium reddish brown, medium grain silty sand with gravel and asphalt inclusions,
	3-8 feet bgs	Large concrete blocks/rip-rap inclusions
	8-10 feet bgs	Dark decomposed asphalt and concrete fragment inclusions
TP-3	Surface	Redeposited sand/gravel, natural shell fragments
	0-6 feet bgs	Redeposited sand, medium brown, medium grain

Summary of Prehistoric Archaeological Sensitivity and Potential

The results of the geotechnical testing program, including geotechnical core observations and the test pit monitoring, determined that the APE along the Great Highway south of Sloat Boulevard consists of a thick stratum of fill ranging from 5 to 38 feet deep that is likely composed primarily of redeposited dune sand. As described above, this fill was the result of a massive program of grading and filling prior to construction of the Great Highway Extension south of Sloat Boulevard. At the southern end of that section, near the Oceanside Treatment Plant, geotechnical borings encountered 38 feet of fill over a concrete pad that caused refusal. Historic maps indicate the concrete may be associated with the Southside Coast Guard Station, which was present in that location throughout the early 20th century. The fill also resulted from infrastructure projects beginning in the 1980s, including the Lake Merced Tunnel and the Southwest Ocean Outfall (SWOO), which caused massive ground disturbance beneath the Great Highway within the APE. Within the fill there is low sensitivity for redeposited prehistoric material to be present throughout the APE. According to the San Francisco Planning Department's General Plan Draft Preservation Element (also called the Heritage Conservation Element), re-deposited prehistoric archaeological materials that could occur in fill layers should be considered *significant* until demonstrated to the contrary: in particular, redeposited material that represents a single temporal component is likely to retain information potential.[7] There is *no sensitivity for intact prehistoric archaeological deposits* to be present within the fill.

Where present beneath the fill in the APE, intact dune sand deposits comprise a thin stratum along the shore face ranging from 5 to 10 feet thick, which progressively thickens to the east. The archaeological observation of the soil borings collected during the geotechnical testing program confirmed a lack of identifiable paleosols and archaeological materials in the geotechnical cores and test pits examined by the archaeologists at sample locations within the APE. An intact paleosol identified during previous geologic investigations at Fort Funston[8], south of the APE, suggests a higher sensitivity for prehistoric archaeological resources in areas not directly impacted by historic and modern ground disturbance, such as the sand dunes southwest of the Great Highway within the north end of Fort Funston, which are outside of the APE. While it is likely that any prehistoric archaeological sites that may have been present along the bluff top within the dune sand prior to the 20th century have been subject to disturbance as the result of coastal erosion and efforts to slow it; by highway construction; and by the construction of major wastewater infrastructure, which runs under and across the Great Highway, there is still a possibility that intact prehistoric archaeological deposits may be present in the dune sand stratum.

The fill and dune sands (where present) are underlain by the Colma Formation, and where the Colma is absent, the Merced Formation, at depths ranging from 15 to 30 feet bgs. Although these formations are too old to harbor archaeological deposits, there is sensitivity for intact prehistoric archaeological deposits to be present in the uppermost portion (approximately 3 feet) of the Colma Formation, and the Merced Formation where the Colma is absent, below the overlying dune sands where they have not been impacted by 20th century ground disturbance.

Based on these conclusions there is an overall low potential for prehistoric archaeological resources in the uppermost 30 feet of the vertical APE; however, there remains the potential that the intact dune sands and/or Colma/Merced Formation could be identified within the vertical APE during ground disturbance below previously disturbed areas and artificially-placed materials and fill.

Historical Archaeological Sensitivity and Potential

This section addresses sensitivity for historical archaeological features and deposits within the proposed APE, including the offshore Marine Study Area, the project area south of Sloat Boulevard, and the borrow area at North Ocean Beach. The potential to impact historic architectural resources is addressed in a separate document.[9]

Based on a review of the CSLC Shipwreck Database and the NOAA AWOIS, there are no known shipwrecks or other underwater obstruction in the Marine Study Area. The proposed project has a low

7 San Francisco Planning Department, Draft Preservation Element of the San Francisco General Plan, 2009. http://default.sfplanning.org/Preservation/Element/PE_2009_Draft_Preservation_Element.pdf, Accessed September 13, 2016.

8 Kennedy, D. G., Neotectonic Character of the Serra Fault, Northern San Francisco Peninsula, California. Unpublished Master's thesis, San Francisco State University, 2002; Yi, Chimi, Depositional and Deformational History of the Uppermost Merced and Colma Formations, Southwest San Francisco. Unpublished Master's thesis, San Francisco State University, 2005.

9 ESA, Historic Resources Evaluation Report. Ocean Beach Climate Change Adaptation Project. Draft July 2020.

potential to encounter and impact shipwrecks or other underwater historical archaeological resources in the Marine Study Area.

Historic maps, aerial images, and photographs suggest that the segment of the Great Highway south of Sloat Boulevard is supported on fill consisting of redeposited dune sand from the 20th century, including the former outlet of the Lake Merced creek, which ran approximately along the same alignment now occupied by Sloat Boulevard. A historic ship fragment was encountered, removed, and reburied during construction of the Lake Merced Tunnel at the intersection of Sloat Boulevard and the Great Highway. Not only does this indicate that the ship remains are still located within the APE, but it also suggests additional historical shipwrecks or fragments may be present in the vicinity of the former Lake Merced creek outlet. Rubble, riprap, and historic debris are evident in the beach cliff face and observed during monitoring of test pits described above.

Historic maps show a number of structures on the ocean bluffs immediately opposite the entrance to the Oceanside Treatment Plant,[10] which were likely related to the (now buried) Southside Coast Guard Station and other nearby military installations. The segment of the Great Highway south of Sloat Boulevard was constructed during the 1960s, and there has been significant erosion of the coast west of the highway alignment since that time, such that any historic structure or feature on the ocean side of the highway in this vicinity is likely to have eroded into the ocean. While there is high sensitivity for historic isolates in the vicinity, the history of fill and erosion makes the presence of significant intact historic features or deposits unlikely.

In the vicinity of the borrow area at North Ocean Beach, historic maps and photographs show the original structure of the O'Shaughnessy Seawall, which was constructed in phases between 1914 and 1929. The bleacher-like seating on the ocean side of the seawall has long been buried in sand. The O'Shaughnessy Seawall, a historic architectural feature, has been evaluated in a separate report completed for the proposed project.[11] Based on a review of the CSLC Shipwreck Database and the NOAA AWOIS, there are no known shipwrecks or other underwater obstruction in the borrow area at North Ocean Beach. The proposed project has a low potential to impact shipwrecks or other underwater historical archaeological resources in the borrow area at North Ocean Beach.

Furthermore, as part of its ongoing efforts to manage erosion at South Ocean Beach, the city has undertaken several beach nourishment projects over the past decade involving excavation of sand from North Ocean Beach and placement along the South Ocean Beach Shoreline. These include projects in 2012 (73,000 cubic yards), 2014 (28,000 cubic yards), 2016 (95,000 cubic yards), 2018 (65,000 cubic yards), and 2019 (53,000 cubic yards). [12,13,14] None of these previous projects, which all occurred within the North Ocean Beach borrow area, has encountered historical archaeological resources. As a result,

10 U.S. Coast and Geodetic Survey, *San Francisco Entrance*, Map, Washington, DC, 1926.

11 ESA, 2020.

12 "2014 Ocean Beach Sand Management Project." *National Park Service*, no date. Accessed January 17, 2020, at https://parkplanning.nps.gov/projectHome.cfm?projectID=53313.

13 Michael Cabanatuan. "42,000 Tons of Sand Trucked Down Ocean Beach; Here's Why." *San Francisco Chronicle*, December 5, 2014, pp. A1, A15.

14 ESA, 2020.

there is a low potential to encounter historical archaeological resources in the North Ocean Beach borrow area portion of the APE.

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS 450 GOLDEN GATE
SAN FRANCISCO, CALIFORNIA 94103-1111

2 December 2020

SUBJECT: Ocean Beach Storm Damage Reduction and Beach Nourishment Project

Mr. Valentin Lopez
Chairman, Amah Mutsun Tribal Band
PO Box 5272
Galt, CA 95632

Dear Chairman Lopez,

The U.S. Army Corps of Engineers, San Francisco District (USACE), in partnership with the City and County of San Francisco Environmental Division and the National Park Service, are proposing the Ocean Beach Storm Damage Reduction Project on the west side of San Francisco peninsula at South Ocean Beach. The project is located near Sloat Boulevard on the north to Fort Funston on the south, and from the Great Highway on the east to the Pacific Ocean on the west. Our current identification efforts have determined that no historic properties are present within the project area based on a records search conducted at the California Historic Resources Information Systems Northwest Information Center and intensive literature review of past cultural resource inventories.

The project proposes to beneficially reuse dredged material to reduce the risks of storm damage to civic infrastructure, property (e.g., Great Highway, Oceanside Water Treatment Outfall, etc.) and safe access to beaches at Golden Gate National Recreation Area. The program involves upland and aquatic areas within a 3.5 mile area on and off shore along a 3,000 foot section of the South Ocean Beach shoreline. The annual dredging of the San Francisco Main Ship Channel will be disposed of on shore at South Ocean Beach. The dredge will anchor offshore in a previously designated disposal area and pump clean sand and sediment onshore. After dewatering, the material will be mounded up and compacted into a dune to protect the CCSF infrastructure including the Great Highway, Oceanside Water Treatment Outfall, and Golden Gate National Recreation Area access points. USACE is preparing an Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. § 4321) and compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA) and its implementing regulations under 36 C.F.R. § 800.

We are contacting your tribal band as a consulting party pursuant to Section 106 (36 C.F.R § 800.2(c)) and requesting your expertise with regard to your ancestral lands and knowledge of important cultural sites or traditional cultural areas that are within the Area of Potential Effects (APE) which is defined as the geographic area where the undertaking may directly or indirectly impact historic properties such as historically significant districts, sites, buildings, objects, or structures if any such properties exist (36 C.F.R. § 800.16(d)). If your tribal band has knowledge or information

concerning important resources that may meet the eligibility criteria for the National Register of Historic Places (NRHP) we respectfully request that you contact us to engage in meaningful consultation. Certain cultural resources that meet the eligibility criteria for the NRHP (36 C.F.R. § 60.4) have certain preservation measures under Section 106.

A geotechnical analysis was recently conducted by ESA, on behalf of the City and County of San Francisco, for the area south of Sloat Boulevard. The findings indicated that the project area is composed primarily of re-deposited dune sand and fill from 5 to 38 feet deep. This secondary layer of fill was the result of a massive program that involved grading and filling prior to major construction and general improvements of the adjacent Great Highway Extension which occurred in 1927 and 1929. Based on the records search results and thorough literature review of past cultural resource surveys conducted in the area, USACE is currently making the assumption that there is a low likelihood for intact precontact or historic resources to be present within the project area's APE. The undertaking's dredged material disposal activities at South Ocean Beach would also involve no ground disturbing work within the APE to uncover any subsurface cultural resources.

At this time, USACE is requesting consultation with your tribal band pursuant to 36 CFR § 800.2(c)(B)(ii)(A) by providing a reasonable and good faith effort to help in identifying and evaluating historic properties within the APE, including resources to be of traditional religious and cultural importance. USACE is also requesting your tribal band's views on the undertaking's effects towards historic properties that may exist within the study area. This includes Traditional Cultural Properties or any other religious or culturally significant resources that may be adversely affected by the proposed actions from this undertaking.

USACE also recognizes that a tribe may be reluctant in sharing information regarding the location, nature, and activities associated with such culturally significant resources or activities. We will ensure that any concerns raised about confidential information are properly addressed pursuant to 36 CFR § 800.11(c).

USACE respectfully requests your tribal band's response within 14 days of receiving this letter to assist in the Section 106 process of identifying historic properties. We kindly request for your tribal bands input within 14 days of receiving this letter, however USACE would still consider any comments your tribal band may have past the suspense date. If you have any questions or concerns regarding the project or this request, please contact Ms. Kathleen Ungvarsky at (415) 503-6842 or by email Kathleen.Ungvarsky@usace.army.mil.

Sincerely,

Tessa E. Beach
Chief, Environmental Sciences

US Army Corps of Engineers
San Francisco District

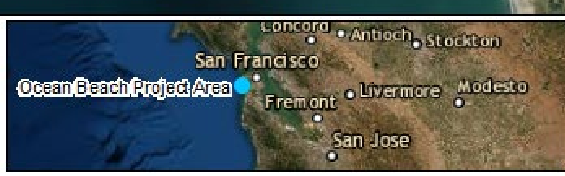
Ocean Beach Storm Damage Reduction Beach Nourishment Project

Area of Potential Effects Map

San Francisco, CA

Project No. 353562

US Army Corps of Engineers
San Francisco District



Ocean Beach Storm Damage Reduction
Beach Nourishment Project

Area of Potential Effects Map
San Francisco, CA
Project No. 353562

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS 450
GOLDEN GATE
SAN FRANCISCO, CALIFORNIA 94103-1111

2 December 2020

SUBJECT: Ocean Beach Storm Damage Reduction and Beach Nourishment Project

Ms. Michelle Zimmer
Amah Mutsun Tribal Band of Mission San Juan Bautista
789 Canada Road
Woodside, CA 94026

Dear Ms. Zimmer,

The U.S. Army Corps of Engineers, San Francisco District (USACE), in partnership with the City and County of San Francisco Environmental Division and the National Park Service, are proposing the Ocean Beach Storm Damage Reduction Project on the west side of San Francisco peninsula at South Ocean Beach. The project is located near Sloat Boulevard on the north to Fort Funston on the south, and from the Great Highway on the east to the Pacific Ocean on the west. Our current identification efforts have determined that no historic properties are present within the project area based on a records search conducted at the California Historic Resources Information Systems Northwest Information Center and intensive literature review of past cultural resource inventories.

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concerning important resources that may meet the eligibility criteria for the National Register of Historic Places (NRHP) we respectfully request that you contact us to engage in meaningful consultation. Certain cultural resources that meet the eligibility criteria for the NRHP (36 C.F.R. § 60.4) have certain preservation measures under Section 106.

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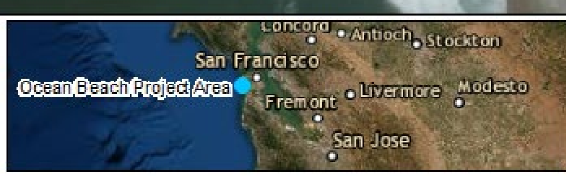
USACE also recognizes that a tribe may be reluctant in sharing information regarding the location, nature, and activities associated with such culturally significant resources or activities. We will ensure that any concerns raised about confidential information are properly addressed pursuant to 36 CFR § 800.11(c).

USACE respectfully requests your tribal band's response within 14 days of receiving this letter to assist in the Section 106 process of identifying historic properties. We kindly request for your tribal bands input within 14 days of receiving this letter, however USACE would still consider any comments your tribal band may have past the suspense date. If you have any questions or concerns regarding the project or this request, please contact Ms. Kathleen Ungvarsky at (415) 503-6842 or by email Kathleen.Ungvarsky@usace.army.mil.

Sincerely,

Tessa E. Beach
Chief, Environmental Sciences

US Army Corps of Engineers
San Francisco District



Ocean Beach Storm Damage Reduction Beach Nourishment Project

Area of Potential Effects Map

San Francisco, CA

Project No. 353562

US Army Corps of Engineers
San Francisco District

Ocean Beach Storm Damage Reduction Beach Nourishment Project

Area of Potential Effects Map

San Francisco, CA

Project No. 353562

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PO Box 3152, Fremont, CA 94539
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DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS 450 GOLDEN GATE
SAN FRANCISCO, CALIFORNIA 94103-1111

2 December 2020

SUBJECT: Ocean Beach Storm Damage Reduction and Beach Nourishment Project

Irene Zwierlein
Amah Mutsun Tribal Band of Mission San Juan Bautista
789 Canada Road
Woodside, CA 94062

Dear Ms. Zwierlein,

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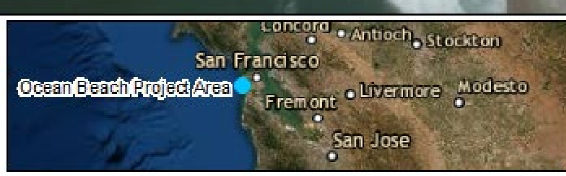
Sincerely,

Tessa E. Beach
Chief, Environmental Sciences

US Army Corps of Engineers
San Francisco District



Ocean Beach Storm Damage Reduction
Beach Nourishment Project

Area of Potential Effects Map
San Francisco, CA
Project No. 353562

US Army Corps of Engineers
San Francisco District

Ocean Beach Storm Damage Reduction Beach Nourishment Project

Area of Potential Effects Map

San Francisco, CA

Project No. 353562

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DEPARTMENT OF THE ARMY
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SAN FRANCISCO, CALIFORNIA 94103-1111

2 December 2020

SUBJECT: Ocean Beach Storm Damage Reduction and Beach Nourishment Project

Costanoan Rumsen Carmel Tribe
Tony Cerda, Chairperson
244 E. 1st Street
Pomona, CA, 91766

Dear Chairperson Cerda,

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Sincerely,

Tessa E. Beach
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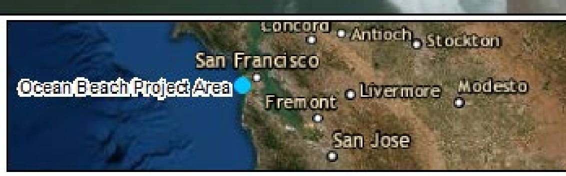
US Army Corps of Engineers
San Francisco District



Ocean Beach Storm Damage Reduction Beach Nourishment Project

Area of Potential Effects Map

San Francisco, CA

Project No. 353562

US Army Corps of Engineers
San Francisco District

Ocean Beach Storm Damage Reduction Beach Nourishment Project

Area of Potential Effects Map

San Francisco, CA

Project No. 353562

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DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS 450 GOLDEN GATE
SAN FRANCISCO, CALIFORNIA 94103-1111

2 December 2020

SUBJECT: Ocean Beach Storm Damage Reduction and Beach Nourishment Project

Federated Indians of Graton Rancheria
Mr. Greg Saris, Tribal Chairman
6400 Redwood Drive, Suite 300 Rohnert
Park, CA. 94928

Dear Chairman Saris,

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Tessa E. Beach
Chief, Environmental Sciences

US Army Corps of Engineers
San Francisco District

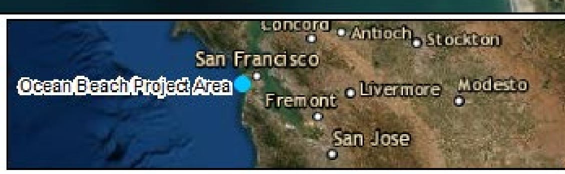
Ocean Beach Storm Damage Reduction
Beach Nourishment Project

Area of Potential Effects Map

San Francisco, CA

Project No. 353562

US Army Corps of Engineers
San Francisco District



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Area of Potential Effects Map

San Francisco, CA

Project No. 353562

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2 December 2020

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Sincerely,

Tessa E. Beach
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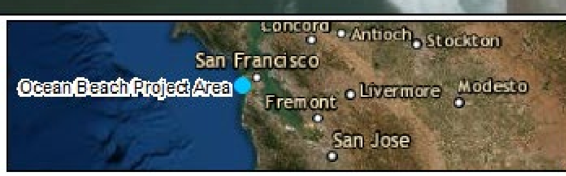
San Francisco District



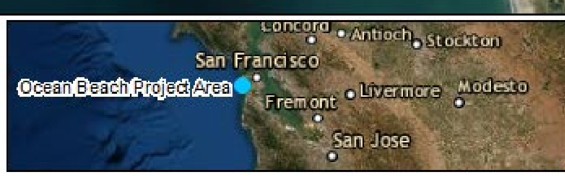
Ocean Beach Storm Damage Reduction Beach Nourishment Project

Area of Potential Effects Map

San Francisco, CA

Project No. 353562

US Army Corps of Engineers
San Francisco District



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DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS 450 GOLDEN GATE
SAN FRANCISCO, CALIFORNIA 94103-1111

2 December 2020

SUBJECT: Ocean Beach Storm Damage Reduction and Beach Nourishment Project

Ms. Ann Marie Sayers
Indian Canyon Mutsun Band of Costanoan
P.O. Box 28 Hollister, CA 95024

Dear Ms. Sayers,

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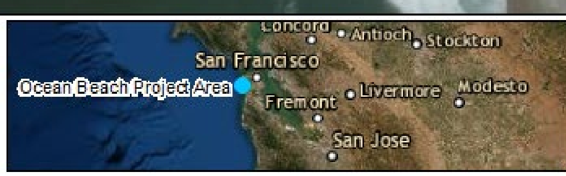


US Army Corps of Engineers
San Francisco District

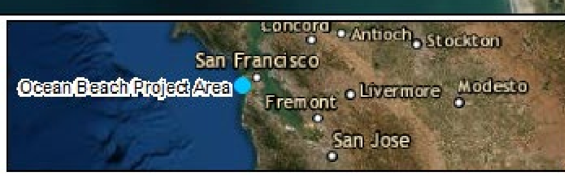
Ocean Beach Storm Damage Reduction Beach Nourishment Project

Area of Potential Effects Map

San Francisco, CA

Project No. 353562

US Army Corps of Engineers
San Francisco District



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San Francisco, CA

Project No. 353562

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2 December 2020

SUBJECT: Ocean Beach Storm Damage Reduction and Beach Nourishment Project

Indian Canyon Mutsun Band of Costanoan Ohlone People
Kanyon Sayers-Roods, Creative Director, Tribal Monitor
P.O. Box 28
Hollister, CA, 95024

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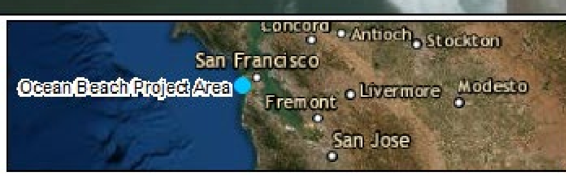
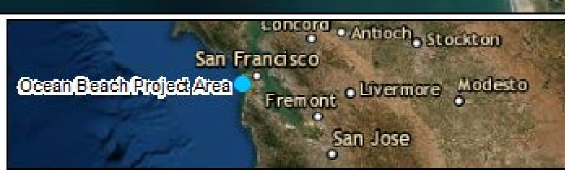


Ocean Beach Storm Damage Reduction
Beach Nourishment Project

Area of Potential Effects Map
San Francisco, CA
Project No. 353562

US Army Corps of Engineers
San Francisco District



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2 December 2020

SUBJECT: Ocean Beach Storm Damage Reduction and Beach Nourishment Project

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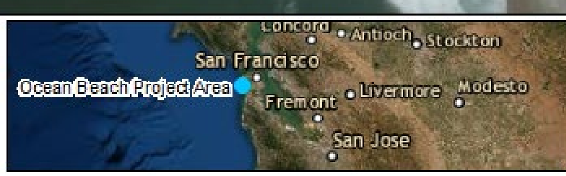

Ocean Beach Storm Damage Reduction Beach Nourishment Project

Area of Potential Effects Map

San Francisco, CA

Project No. 353562

US Army Corps of Engineers
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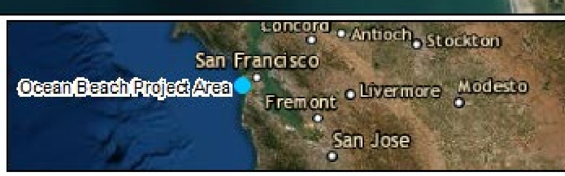

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DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS 450 GOLDEN GATE
SAN FRANCISCO, CALIFORNIA 94103-1111

2 December 2020

SUBJECT: Ocean Beach Storm Damage Reduction and Beach Nourishment Project

Muwekma Ohlone Indian Tribe of the SF Bay Area
Charlene Nijmeh, Chairperson
20885 Redwood Road, Suite 232
Castro Valley, CA, 94546

Dear Chairperson Nijmeh,

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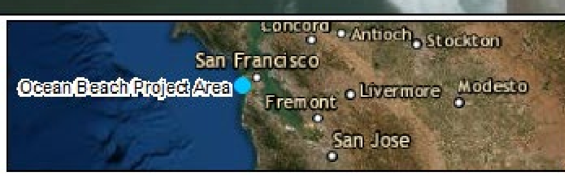
Sincerely,

Tessa E. Beach
Chief, Environmental Sciences

US Army Corps of Engineers
San Francisco District



Ocean Beach Storm Damage Reduction Beach Nourishment Project

Area of Potential Effects Map

San Francisco, CA

Project No. 353562

US Army Corps of Engineers
San Francisco District

Ocean Beach Storm Damage Reduction Beach Nourishment Project

Area of Potential Effects Map

San Francisco, CA

Project No. 353562

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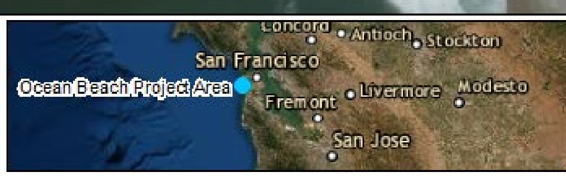


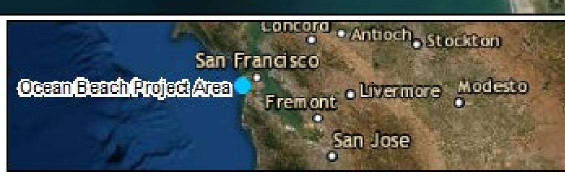
Ocean Beach Storm Damage Reduction Beach Nourishment Project

Area of Potential Effects Map

San Francisco, CA

Project No. 353562

US Army Corps of Engineers
San Francisco District



Ocean Beach Storm Damage Reduction
Beach Nourishment Project

Area of Potential Effects Map

San Francisco, CA

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DEPARTMENT OF THE ARMY
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2 December 2020

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PO Box 3152, Fremont, CA 94539

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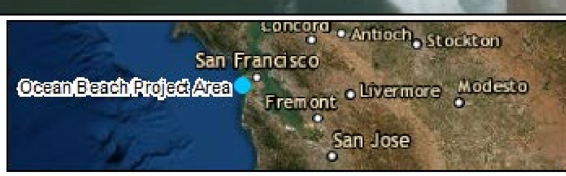


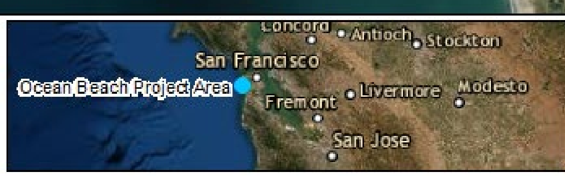
Ocean Beach Storm Damage Reduction Beach Nourishment Project

Area of Potential Effects Map

San Francisco, CA

Project No. 353562

US Army Corps of Engineers
San Francisco District



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720 North 2nd Street
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Sincerely,

Tessa E. Beach
Chief, Environmental Sciences

US Army Corps of Engineers
San Francisco District

Ocean Beach Storm Damage Reduction Beach Nourishment Project

Area of Potential Effects Map

San Francisco, CA

Project No. 353562

US Army Corps of Engineers
San Francisco District

Ocean Beach Storm Damage Reduction Beach Nourishment Project

Area of Potential Effects Map

San Francisco, CA

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NAHC Tribal Consultation List

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Ohlone/Costanoan Indian Tribe Trina Marine
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DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS 450
GOLDEN GATE
SAN FRANCISCO, CALIFORNIA 94103-1111

2 December 2020

SUBJECT: Ocean Beach Storm Damage Reduction and Beach Nourishment Project

Ms. Katherine Erolinda Perez
Ohlone/Costanoan Indian Tribe
P.O. Box 717
Linden, CA 5236

Dear Ms. Perez,

The U.S. Army Corps of Engineers, San Francisco District (USACE), in partnership with the City and County of San Francisco Environmental Division and the National Park Service, are proposing the Ocean Beach Storm Damage Reduction Project on the west side of San Francisco peninsula at South Ocean Beach. The project is located near Sloat Boulevard on the north to Fort Funston on the south, and from the Great Highway on the east to the Pacific Ocean on the west. Our current identification efforts have determined that no historic properties are present within the project area based on a records search conducted at the California Historic Resources Information Systems Northwest Information Center and intensive literature review of past cultural resource inventories.

The project proposes to beneficially reuse dredged material to reduce the risks of storm damage to civic infrastructure, property (e.g., Great Highway, Oceanside Water Treatment Outfall, etc.) and safe access to beaches at Golden Gate National Recreation Area. The program involves upland and aquatic areas within a 3.5 mile area on and off shore along a 3,000 foot section of the South Ocean Beach shoreline. The annual dredging of the San Francisco Main Ship Channel will be disposed of on shore at South Ocean Beach. The dredge will anchor offshore in a previously designated disposal area and pump clean sand and sediment onshore. After dewatering, the material will be mounded up and compacted into a dune to protect the CCSF infrastructure including the Great Highway, Oceanside Water Treatment Outfall, and Golden Gate National Recreation Area access points. USACE is preparing an Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. § 4321) and compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA) and its implementing regulations under 36 C.F.R. § 800.

We are contacting your tribal band as a consulting party pursuant to Section 106 (36 C.F.R § 800.2(c)) and requesting your expertise with regard to your ancestral lands and knowledge of important cultural sites or traditional cultural areas that are within the Area of Potential Effects (APE) which is defined as the geographic area where the undertaking may directly or indirectly impact historic properties such as historically significant districts, sites, buildings, objects, or structures if any such properties exist (36 C.F.R. § 800.16(d)). If your tribal band has knowledge or information

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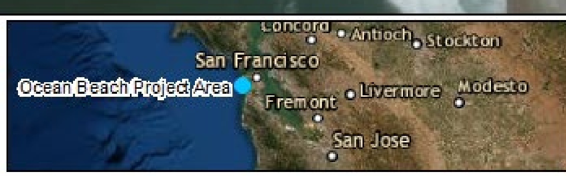
USACE also recognizes that a tribe may be reluctant in sharing information regarding the location, nature, and activities associated with such culturally significant resources or activities. We will ensure that any concerns raised about confidential information are properly addressed pursuant to 36 CFR § 800.11(c).

USACE respectfully requests your tribal band's response within 14 days of receiving this letter to assist in the Section 106 process of identifying historic properties. We kindly request for your tribal bands input within 14 days of receiving this letter, however USACE would still consider any comments your tribal band may have past the suspense date. If you have any questions or concerns regarding the project or this request, please contact Ms. Kathleen Ungvarsky at (415) 503-6842 or by email Kathleen.Ungvarsky@usace.army.mil.

Sincerely,

Tessa E. Beach
Chief, Environmental Sciences

US Army Corps of Engineers
San Francisco District



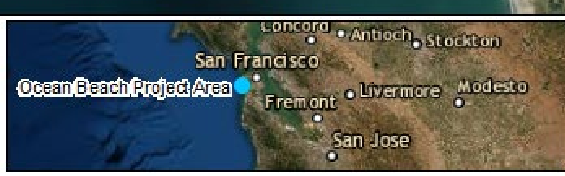
Ocean Beach Storm Damage Reduction Beach Nourishment Project

Area of Potential Effects Map

San Francisco, CA

Project No. 353562

US Army Corps of Engineers
San Francisco District



Ocean Beach Storm Damage Reduction Beach Nourishment Project

Area of Potential Effects Map
San Francisco, CA
Project No. 353562

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DEPARTMENT OF THE ARMY
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SAN FRANCISCO, CALIFORNIA 94103-1111

2 December 2020

SUBJECT: Ocean Beach Storm Damage Reduction and Beach Nourishment Project

Representative Ramona Garibay
Trina Marine Ruano Family
30940 Watkins Street
Union City, CA 94587

Dear Ms. Garibay,

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Sincerely,

Tessa E. Beach
Chief, Environmental Sciences

US Army Corps of Engineers
San Francisco District

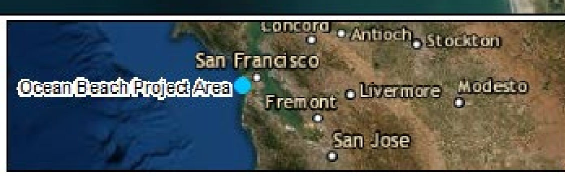
Ocean Beach Storm Damage Reduction Beach Nourishment Project

Area of Potential Effects Map

San Francisco, CA

Project No. 353562

US Army Corps of Engineers
San Francisco District



Ocean Beach Storm Damage Reduction Beach Nourishment Project

Area of Potential Effects Map

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Appendix B - Agency and Public Participation

1.0 Mailing Lists

Insert the mailing list (names and dates) used to inform public and/or agencies of meetings or notifications of project that was listed in section 7.0

2.0 Agency Comments

Include all agency comments received (and dates) that were summarized in section 7.1

3.0 Public Comments/Responses *[if applicable]*

Include all public comments and responses (and dates) that were summarized in section 7.1.

Appendix C – Preparers

U.S. Army Corps of Engineers, SF District
Environmental Planning Section
450 Golden Gate Avenue
San Francisco, CA 94103

For further information regarding this document, contact:

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