CONTENTS

SPECIFIC RESPONSES TO COMMISSION'S COMMENTS/QUESTIONS

1. PROJECT DESCRIPTION

CCC Comment 1

Section 1 -The City proposes to construct a 175-foot tangent pile wall and, clarifies that the emergency revetment constructed in 2010 would be extended 70 feet to the south. This revetment was authorized to be 425' in length under the issued emergency permit; however, as-built plans show that the City extended it to 440 feet (15 feet more than was authorized). Please clarify if the City's request is to extend the rock revetment 70 feet beyond what was permitted or 70 feet beyond what was constructed.

CCSF Response 1

The City proposes to extend the rock revetment 70-ft south of the existing (as-constructed) limit to provide for a smooth transition from revetment to existing bluff. The rock to be used for this 70-ft extension will come from the existing revetment, by regarding the toe and pulling back the southern extent of the structure.

1.1 Unpermitted 1997 Emergency Quarry Stone (EQR):

CCC Comment 2

Section 1.A.ii -Your response states that historically there was no formal shore protection prior to placement of the rock in 1997; however, it is also stated that the shore was protected at that time by a mixture of concrete rubble and rock. Please provide an estimate of the length, depth, width, and slope of that material.

CCSF Response 2

The debris that was on the bluff is very likely a relict from the time Lake Merced was closed off and dimensions of the historic rubble are not known. From historic photos, it appears that rubble existed on the slope from the north parking lot to the current location of the SWOO. Bare earth is often visible between rubble pieces, occurring over approximately 20% of the slope. The rubble appears to be in a layer varying from approximately 1-ft to 3-ft. Although the slope cannot be accurately determined from the photos, it appears to be between 2h:1v to 3h:1v. See Appendix A for a timeline of photographs.

CCC Comment 3

Section 1.A.vii -Your submittal provides four options that would be available to protect the existing infrastructure, which include: 1) a rock revetment, 2) curved sea wall, 3) vertical sea wall with rock buttress, and 4) restore the existing Emergency Quarry Stone Revetment (EQR). It identifies the existing EQR at its "original condition", as having the least environmental/public impact and the most cost-effective. Please provide an expanded analysis that supports this conclusion. The analysis should include comparisons of the costs, the amount of beach area that would be covered by the structures/development, construction methods, projected life span, and long-term maintenance requirements.

CCSF Response 3

Please note that the list of four options was in response to the Commission letter of October 16th question "*Are there options to protect the principal existing structure*, *e.g.*, *the parking lot*?" These options were provided to describe a range of possible ways to protect the existing infrastructure, but have not been evaluated to date and are not being proposed for consideration for reasons described below.

The EQR was designed to be the minimum dimension revetment that would still provide protection

to the City infrastructure. Although the EQR has been gradually deteriorating with age and exposure, it is performing its intended function to protect the sewer facilities, and to provide safe travel along the Great Highway. The presence of the two parking lots provides a degree of protection to City infrastructure, at least until they erode. Recognizing that the entire reach south of Sloat is vulnerable to storm damage, removing the EQR and replacing it with an engineered rock revetment, curved seawall, or vertical seawall would be short-sighted. It would be a significant capital project that cannot be limited to this shoreline segment only. The entire reach south of Sloat needs to be considered, but we have been limited in our ability to lead a process do so because of complex land ownership issues. Only recently has SPUR taken on a leadership role bringing all stakeholders together towards preparation of an Ocean Beach Master Plan. Until the SPUR-led long-term planning process is complete and recommendations are presented, maintaining the EQR would have the least environmental/public impact, provide uninterrupted protection, and be the most cost-effective solution.

Once the Master Plan is complete, the Environmental Documentation phase will begin, and only after the Plan-proposed improvements have regulatory clearances and funding, can the two temporary structures can be dismantled and replaced with other schemes which could range from beach/dune nourishment to the other described engineered structures.

At this time, it's the City's intent to permit only the minimum structure(s) that directly protect its infrastructure, namely the two revetments, and the two tangent pile walls. Between these four structures and the two parking lots (until they erode), the infrastructure will be protected from damage in the near future. We recognize that all four structures may have to be dismantled if the Master Plan deems it to be so, but the Risk Assessment Study that we have completed recently (Moffatt & Nichol 2010) indicates that the four specific segments are too vulnerable in the near future to leave them unprotected. The consequences of infrastructure failure are not just loss of roadway and recreational access, but significant impacts to the environment from potential spills and loss of storm/sewage conveyance for a large population. It will also prevent the need for emergency placement of rock on the beach again, which does not benefit the City in the eyes of the general public or the regulatory agencies.

CCC Comment 4

Section 1.A.ix -Your submittal states that the proposed stabilization for Reach 3 would function independent of the temporary EQR, but would require modification, particularly if the EQR is not a long-term protection measure. Please describe the modifications that would be necessary.

CCSF Response 4

The pile wall proposed for Reach 3 is intended to overlap with the northern limit of the existing EQR. Designing an appropriate transition of the wall, by incorporating a return (or wing) wall, ensures that the wall will be independent of the EQR. Thus, the pile wall will be part of the overall protection for the shoreline, the roadway, and the tunnel. Degradation of the EQR would lead to unraveling of armor rock and further erosion of the bluff underlying the EQR. Since damage to any part of the shoreline protection will impact adjacent elements and lead to roadway and tunnel damage, other forms of protection will have to be installed where the EQR degrades. This could be in the form of extensions of the tangent pile wall, beach/dune nourishment, or any of the other structures described earlier.

1.2 Beach and Bluff Monitoring Posts: Coastal Development Permit (COP) No. 2-00-040:

CCC Comment 5

Section 1.B.ii -The current proposal is to keep the 11 beach monitoring posts and you have submitted a map of their locations. Would the locations and number of posts need to be changed if the shore protection measures were different, i.e., a sea wall or pile wall versus the rock revetment (EQR)?

CCSF Response 5

The monitoring posts are not part of the shoreline protection scheme and are independent of the type of structure that may be constructed. The posts are there purely to measure seasonal variation of beach elevation and no changes are envisioned.

1.3 Emergency Revetment: Emergency Permit No. 2-10-003-G:

CCC Comment 6

Section 1.C.i -You have submitted a rationale for undertaking development out of compliance with Emergency Permit 2-10-003-G, which included in brief a) adjustments made to respond to active erosion that was occurring at the site during the time between obtaining the permit and initiating construction, b) constructing a more stable and durable revetment because of flatter slopes, c) worker safety, d) a compressed schedule that resulted in design and permitting work occurring simultaneously, and e) not making changes would have caused greater impacts to the beach and f) reduced the performance of the revetment. Our technical and enforcement staffs are reviewing this rationale and we will contact you shortly regarding corrective actions.

You have, additionally, indicated that communication with NPS staff and construction management personnel, obtaining permit authorizations, and finishing design plans is easier to achieve in non-emergency situations. You state that the City would ensure consistency with all permit authorizations through its Monitoring and Maintenance of the proposed project. The section on Monitoring and Maintenance, however, does not provide proposed quality control measures to ensure that development is constructed consistent with authorized plans. Measures need to be included that would make certain the City complies with permit conditions prior to and during construction. How does the City propose to address this?

CCSF Response 6

The Coastal Commission's October 16th letter asked, "*Does the City propose a temporary timeframe for this development? If so, please indicate the time period proposed for each development*."

A ten-year span for permitting the maintenance of the temporary structures is to provide sufficient time to assess the effectiveness of the Army Corps/NPS Beach Nourishment Plan to protect the bluff face as well as maintain the beach. Prior attempts to perform structural maintenance to the EQR were unsuccessful due to divergent opinions on what was necessary. Ocean beach is in a dynamic state, where the beach south of Noriega Avenue is receding and the area north of Noriega is accreting, based on recent studies performed by the USGS. The ability to plan for maintenance of the temporary structures, based on an approved suite of actions, fits into the near-term needs until stakeholders and public agencies can determine a suitable solution for the 10- to 50-year and longer time frame as the dynamic situation at Ocean Beach unfolds.

The City Departments responsible for infrastructure served by the revetment are committed to budget allocations which will be used to monitor and maintain the proposed structures. The intent of the Monitoring and Maintenance Plan is to develop an agreed upon schedule and level of maintenance required, to be proactive and end the cycle of emergency actions in response to El Niño Storm events. The Monitoring and Maintenance plan is for existing and proposed structures. It does not relieve us from reporting back to you, along with all necessary construction plans and details, about any maintenance action(s) that is taken by the City.

It's important for the City to maintain the improvements proposed to protect our infrastructure. The City and the National Park service work together on a number of projects each year and seek to maintain a spirit of cooperation to the benefit of the public we serve. The City will work closely with NPS staff to ensure permit compliance through all stages of construction. Under non-emergency conditions, the City's inspectors strictly adhere to procedures established in the City's Standard Provisions manuals and the design documents for each project.

CCC Comment 7

Section 1.C.iii -The Purpose and Need document states that the City proposes to "regrade" the existing rock and extend it another 50 feet; the Project Description indicates a proposal to extend it 75 feet. Commission staff requested clarification on this length. The City in response, now states that based on current conditions it is 70 feet to the south. Please briefly discuss the factors that caused this change in length and the potential likelihood for this to change again in the future.

CCSF Response 7

The proposed regrading of the revetment placed in 2010 is intended to protect the entire Reach 1 as originally identified as part of the emergency work. As described in CCSF Response 1, the proposed extension is 70 ft from the southern limit of the constructed revetment. During construction of the emergency work, the southern limit of the emergency work was truncated based on concerns by Commission staff about the quantity of rock on the beach; the northern limit was also truncated at the SWOO instead of extending through Reach 2. The regrading of the existing revetment will provide a well-defined transition at the southern limit and help prevent erosion immediately south of the revetment, without requiring additional rock to be imported. Because the Great Highway is located a sufficient distance from the eroding shoreline, the southern limit is not expected to move further south beyond Reach 1.

CCC Comment 8

Section 1.C.iv -Your response provides a description of how the revetment would terminate. Please include, as previously requested, a discussion of how this design would prevent 'end effects.'

CCSF Response 8

The regraded rocks will be placed in a manner to smoothly transition from the full revetment cross-section to original ground; the revetment will terminate in a manner that will prevent concentration of erosive energy at the end of the revetment.

CCC Comment 9

Section 1.D.i-The monitoring and maintenance plan is proposed for 10 years, as well as implementation of both the Beach Nourishment Plan and the Ocean Beach Master Plan; however it is not clear if this would apply to the entire proposed development. Please indicate the time period proposed for the shoreline protective devices.

CCSF Response 9

Generally, two things can affect the lifespan of a structure: deterioration of the structure itself, and increased loads/forces beyond the designed capacity.

Being in a marine environment, the pile wall will be designed to prevent/delay corrosion of steel members. Eventually, corrosion will occur and the steel member will lose structural capacity. As a result, the pile wall will be designed to provide a service-life of approximately 50- to 75-years.

The pile wall will be designed for a maximum retained height; however, the actual retained height of the pile wall will vary depending on the beach elevation. Additionally, the pile wall must be protected from scour; it is important to note that scour protection cannot be done at the same time

as the pile wall construction because the pile wall will be constructed a short distance inland of the shoreline. As the shoreline erodes and approaches the pile wall, scour protection measures must be implemented. Typical scour protection would include large armor rock placed as a buttress against the pile wall or a short cut-off wall installed near the toe of the pile wall.

The 10-year MMP is intended to track the progress of shoreline erosion and to determine the appropriate time for installation of toe protection. In conjunction with the MMP, the Beach Nourishment Plan and Ocean Beach Master Plan could propose regular placement of sand along the pile wall to resist shoreline erosion and effectively delay the need for toe protection.

CCC Comment 10

Section 1.D.iv -Please also submit a discussion on long-term planning for protecting the shoreline along Ocean Beach. Your discussion should address a proposed / estimated timeframe for having a plan in place for protecting the shoreline in the long term. How does your permit application correlate with the master planning process currently underway; i.e., what is the City's level of commitment to implementing the results of the master planning?

CCSF Response 10

Long-term planning for protecting Ocean Beach is a complex issue. Ocean Beach is 4-miles long with several subareas being impacted separately, with each requiring a separate conversation.

The following is a brief example of the issues being sorted out by the SPUR Master Planning effort.

- Timing (short-term coastal erosion caused by El Nino-type storm events vs. long-term coastal changes and Sea Level Rise issues: The short-term events are immediate and the long-term events are 40- to 100-years out).
- Protecting the Beach / Resources vs. Protecting City infrastructure: The beach is a dynamic, ever-changing land form. Planning needs to be adaptive and changing as the dynamics of the beach change. The current situation at Ocean Beach is the area south of Noriega is eroding. Beach nourishment might mitigate the problem in the near term, say next 10 to 20 years, but in the longer term the amount and/or frequency of sand nourishment required to provide for a recreational beach may not be feasible (based on coastal processes), or consistent with National Park Service policies.

The options proposed to address short-term vulnerability of the infrastructure at risk is with the two existing rock revetments, beach sand, and the two proposed tangent/secant pile walls. These options would continue providing recreational beach uses, while leveraging the longer-term protection of the City assets. The useful life of the tunnel and sewer box is several hundred years. The SPUR-led planning study will address the questions for the reach south of Sloat, which are: should the 2 parking lots, the restroom, and the Muni turnaround be protected, or should the National Park Service abandon the facilities?

The City is committed to implementing the results of the master planning effort as public support, finances approvals and permits can be obtained. The implementation of the Master Plan is a phased long-range multi-jurisdictional commitment involving a commitment from City, State and Federal agencies. The City is not is in a position to speak on behalf of the other agencies.

CCC Comment 11

Section 1.E -The proposed Monitoring and Maintenance plan (dated March 28, 2000) does not identify equipment that would be used, access routes, or the staging areas. Please provide this information.

CCSF Response 11

Monitoring equipment consists of cameras, tripods and other hand held equipment to measure or record changes in beach and or structures. Maintenance equipment would consist of back hoes,

excavators or off-road trucks. Access south of Sloat is limited due to the steep bluff face. Beach access exists at the extension of Sloat Blvd and is the access point for the GGNRA parking lot. Any access point required south would need to be engineered and constructed. The most logical point would be at the north end of the revetment where rock could be laid down to access the beach and removed at the completion of the repair work. Staging area in the past have been at the GGNRA parking lots.

Any future access and staging would need to be permitted by the National Park Service.

Work restrictions to be applied for maintenance are applied by the National Park Service in the Special Use permits.

Park Service work restrictions previously imposed are as follows:

1. Project work and project vehicles (by or belonging to the Permittee or its contractors) are not allowed at any time on Ocean Beach north of Sloat Blvd without the approval of the NPS.
2. The Permittee and its contractors can use the 2nd Overlook parking lot for staging equipment and vehicles. Portions of the north lot (Sloat lot) may be used as needed when scheduled with the NPS Project Manager. The Permittee and its contractors are responsible for providing all traffic controls and public safety measures when working in any NPS parking lots.
3. The Permittee and its contractors are responsible for protecting catch basins in the parking lots from sediment runoff from any materials which may be stockpiled in the parking lots for this project.
4. The Permittee and its contractors are responsible for providing adequate barriers and signage to direct the public around the construction site.
5. Because low tides may occur during night-time hours, construction activity on this project may occur during night and daylight hours. The Permittee or its contractors will provide a copy of anticipated and actual activity hours for this permit with the National Park Service. This information will be sent to the NPS Project Manager for review and approval prior to any night-time work. Design details to avoid or minimize impacts from night lighting will be developed and will be agreed upon by Permittee and NPS staff prior to the use of night lighting.
6. All sand removed from the revetment work site will remain on Ocean Beach. No sand will be removed from Ocean Beach (except rubble).
7. Rubble and/or debris encountered during the excavation for this project that is not suitable for construction of the emergency action will be removed and disposed of off-site by Permittee or its contractors.
8. Large ruts created by vehicles performing the emergency actions on the beach must be groomed by the Permittee or its contractors so that unimpeded beach walking can be done consistent with areas outside and adjacent to the project area.
9. Fuel filling of vehicles is prohibited on the beach. Fueling may be done at the 2nd Overlook Parking (parking lot furthest south along Ocean Beach) parking lots. The Permittee or its contractors is required to provide a spill contingency plan 3 days prior to beginning work.
10. The Permittee will work with NPS and California State Fish and Game biologists to minimize impacts to the State-threatened bank swallows and their nesting habitat. Where impacts are unavoidable, Permittee will implement agreed upon mitigation measures and monitoring. Permittee will implement procedures and outcomes from consultation with California Department of Fish and Game. The Permittee will make every effort to have the project completed by mid-March as to avoid direct construction impacts to the migrant

bank swallow that arrives mid to late March.

11. 11. The Permittee is responsible for contacting other regulatory agencies that have oversight or regulatory authority over this emergency work. The Permittee will incorporate these agencies recommendations or requirements into the project. The Permittee will keep NPS informed regarding these consultations and agency recommendations and/or requirements.
12. Maintenance requirements for the rock revetments will be defined and agreed to by the NPS. The Permittee will be responsible for the maintenance of the emergency structure.
13. The Permittee will provide the Request for Proposal, Final Construction Drawings, and As-Built Drawings to NPS.
14. The Permittee will provide to the NPS any pre-project condition assessments conducted on NPS lands.
15. The Permittee will conduct baseline (pre-project) and long-term monitoring (post-project) of the beach and bluff conditions inside and adjacent to the project area to document changes as a result of the project. The protocol will be provided in a Monitoring Plan, and the Plan will be agreed to by both the NPS and the Permittee.
16. The Permittee will remove the material used to construct these temporary emergency measures, and/or ensure that their removal is considered and evaluated as part of the long-term project.
17. The Permittee or its contractor shall submit a daily update report by email to the NPS Project Manager, Steve Ortega, in order to keep him abreast of work progress or problems taking place in the project area. The Permittee shall report employee and visitor accidents to the NPS Project Manager, Steve Ortega, in conformance with NPS requirements and the Golden Gate National Recreation Area safety program.
18. The Permittee will enter into a Memorandum of Understanding (MOU) with the National Park Service to document mutually agreed upon policies, procedures, objectives, and/or assistance for necessary work beyond the emergency actions described herein. The MOU will describe the roles and responsibilities of the parties beyond the emergency actions described herein, including but not limited to: monitoring and maintenance of the emergency structures; and the studies, compliance, design, and construction of the long-term sand nourishment solution.

CCC Comment 12

Appendix A of The Monitoring and Maintenance plan is supposed to provide work restrictions to be applied to any work being performed on the beach; however this is missing from the document. Please provide this information.

CCSF Response 12

Contactor work restrictions are generally nights and weekends. There is a bank swallow nesting season from April to September that needs to be accounted for in any maintenance project for the repairs to the south revetment. These restrictions are addressed in the National Park Service Special Use permit issued for each project we undertake at Ocean Beach.

2. PUBLIC ACCESS AND RECREATION

CCC Comment 13

Section 2.C -We previously requested a public access plan that includes an analysis of public access impacts from the proposed development; a conceptual design plan; and alternatives considered. Your response references the "Great Highway Emergency Repair Phases 2 Southbound Roadway Emergency Opening plan and profiles and typical cross section drawings". Please provide copies of this report (as it was not included with your submittal). As previously requested, please provide an analysis of the public access impacts from the proposed shoreline protection structures. Of particular concern is to what extent the placement of the revetments on the beach has impeded public use of, and access along, the beach. What measures does the City propose to mitigate impacts resulting from its development/structures on the beach?

CCSF Response 13

The with- or without-project conditions at Ocean Beach south of Sloat are very similar based on the dynamic nature of Ocean Beach. In 1992 the Clean Water Program, as part of the Lake Merced Tunnel, installed public access points from Sloat Blvd south to the Fort Funston bluffs, resurfaced the parking lots and constructed a comfort station for the National parks service to maintain and operate. Since 1992, winter storms have damaged or destroyed all the formal public access points to the beach. Currently the over 3,000' length of Ocean Beach from Sloat Blvd south past the Fort Funston bluff have a near vertical face. The two rock structures only represent 1/3 of the total length. The placement of the 1997 or the 2010 rock revetment did not displace, impact, or impede existing access to the beach. At higher tides in the winter, the narrow beach south of Sloat is not passable. The loss of beach elevation is shown in the attached Figure 1 from USGS.

The report referred to in this question is the Great Highway Emergency Repair Phase 2 drawing; there are no other reports. The drawings were provided in our November 29th transmittal and in the CD. Additional sets are submitted with this transmittal. As identified in the drawing, the relocated roadway has created additional space for lateral access.

The question implies that the structures or development are impacting the beach, which is not accurate. The two structures are in response to -- or mitigating the impact of -- naturally occurring events to protect the beach and near shore environment from sewage flows.

The analysis of natural conditions at Ocean Beach conditions is follows:

- Since 2004 the overall beach elevation has lowered by 6-feet (~2 meters).
- Since 1994 the Bluff has receded 50- to 70-ft.
- The beach elevation adjusts seasonally by 6-feet or more.
- The 1997 revetment is the westernmost point along this reach.
- The footprint of 2010 revetment is east of the historic bluff line and above the high tide line.

Mitigation

In addition to the two emergency structures the City is working with the Army Corps of Engineers and the National Park Service to implement the Beach Nourishment Plan. Since 2000 the City has encumbered or spent over $2 million dollars in beach nourishment, technical studies and reports and requested over $900,000 in Federal appropriations to assist Army Corps and NPS in completing the Beach Nourishment technical studies and environmental documentation. As directed in the 1974 property transfer agreement, windblown sand from the Great Highway is retuned back to critical areas of Ocean Beach.

3. VISUAL RESOURCES

CCC Comment 14

Section 3.A -You have indicated that the proposed project does not include any visual treatments. Evaluation criteria used for the alternatives analysis (contained in the "Great Highway Emergency Repairs" report, dated September 2010 and prepared by Moffatt & Nichol) include "Appearance Concerns". Please provide an analysis of the visual effects of the shore protection that includes the basis/rationale for not including visual treatments as part of the proposed work. Your analysis should discuss options to consider for addressing the visual compatibility of the development with surrounding area; including but not limited to rock color, the aesthetic character/features of a sea wall, and an evaluation of the visual effects of a sea wall versus rock revetment.

CCSF Response 14

Appearance and permitting issues were developed as criteria used to evaluate each of the alternatives proposed for the non-emergency projects proposed in the application; these criteria were not meant to be an independent evaluation but one point either positive or negative for the overall comparative evaluation of non-emergency project elements.

Considering the visual aspect of the alternatives there are (1) the “without project” condition; (2) the emergency projects constructed; and (3) the proposed pile walls:

(1) The visual condition of Ocean beach varies from eroded parking lot rubble to engineered rock structures to naturally eroding colma formation bluffs. The rubble form the eroding National Park Service Parking Lots that comprises 2/3 of the area is very light weight material and subject to significant movement along the beach into the tidal area from the wave action and winter storms.

(2) The engineered rock structures that comprise about 1/3 of the reach from Sloat Blvd to Fort Funston Bluff for the most part are stable. When comparing the engineered revetment to the existing rubble the material is larger, thicker, more angular, and without the debris (pieces of metal, asphalt, etc).

For the emergency actions visual compatibility and effects were not considered. The primary criteria for the emergency actions were effectiveness in halting loss of bluff and impact to the City’s infrastructure. The rock revetments were designed to absorb and dissipate energy generated by the large winter storms with a minimum footprint. The beach nourishment plan will cover the lower reaches of the revetment with sand.

(3) The upland alternative of a pile wall as proposed for Reaches 2 and 3 have no initial visual impact. Initially after construction the wall will be almost completely buried (only the top will be visible); the wall face will become exposed when erosion occurs on the bluff face. The beach nourishment plan will provide cover to the toe of the bluff and build up the beach. As erosion continues, a buttress of large rock will be placed along the pile wall toe to prevent scour. The pile wall and future rock buttress are expected to be located within the historic bluff line and historic high tide line.

4. ALTERNATIVES ANALYSIS

CCC Comment 15

Section 4.A -You have indicated that the City has prepared an evaluation for creating a single north and southbound roadway and identified stakeholders who need to be involved. Please submit this evaluation.

CCSF Response 15

Traffic information reports are attached. What we have prepared are traffic evaluations, traffic volumes, current speed and, through observations, the key stakeholders that need to be involved based on the uses adjacent to the Great Highway south of Sloat Blvd. The elements of a single north- and south-bound roadway need to take into consideration acceleration and deceleration lanes for the Zoo and Oceanside Treatment Plant, break down shoulders, travel lanes, control barriers, access to the beach, impacts to the signalized intersections, etc. We expect more details of this topic to be included as part of the SPUR's Ocean Beach Master Plan effort.

CCC Comment 16

Section 4.C -You have indicated in your letter that planned retreat, as a non-structural alternative, is only an option if both the Great Highway and the Lake Merced Tunnel are abandoned prior to occurrence of erosion. You have also indicated that other public facilities may require protection or abandonment. You reference City investigations for the possible realignment of the tunnel and find that related costs and impacts are extremely high. Please provide the details of these investigations, including reports, cost estimates, and any other materials supporting these claims.

CCSF Response 16

The cost of relocation the tunnel is approximately $110 to $150 million. This is only a planning estimate for relocation and does not include other infrastructure issues such as the National Park Service comfort stations, parking lots, reconfiguring the Sloat and Great Highway intersection, etc. A 2007 draft Economic Analysis Report was prepared by Moffatt & Nichol for the Army Corps as part of the Beach Nourishment Study, which identifies an inventory of structures and public facilities. This report is being updated as part of the Army Corps Beach Nourishment Plan. A copy of the draft report is included in this submittal.

5. SAND SUPPLY

CCC Comment 17

Section 5 -Your response identifies the locations of concrete and other rubble, as well as the revetment constructed in 2010 (Reach 1), located immediately south of the Southwest Ocean Outfall (SWOO). It states that the sand sources to the north of the 2010 revetment are scarce. One can conclude, based on this response that all the structures located to the north of the 2010 emergency revetment do affect sand supply. These structures include the 600 linear feet of unpermitted rock that was placed in 1997. There would be adverse impact on public access and recreation if the proposed development, either directly or cumulatively, results in less sandy beach area available for public use over the long-term. Please quantify the impacts of this shoreline protection on sand supply, as previously requested. A copy of Section 4.6 of the California Coastal Commission's December 1999 Beach Erosion and Response Guidance Document is attached for your use in calculating sand supply impacts. Such impacts should include sand size material in the bluff that will be retained by the proposed structures and would otherwise have contributed to the beach sand supply, public beach that will be covered by the proposed structures, and beach loss that will occur due to future sea level rise and fixing the back of the beach at the location of the proposed seawall. In addition, please quantify the lost recreational opportunities that will occur due to the future loss of the beach.

CCSF Response 17

The primary source of sand is the offshore littoral system, based on grain-size analysis. The bluff material is fine-grained and is carried off relatively quickly, while the beach material is coarser-grained. Thus the contribution by the bluff is minimal and short-lived in comparison to the offshore contribution.

Without an offshore source of sand the existing beach cannot persist indefinitely, both with and without shoreline protection. Shoreline erosion along the bluffs is not sufficient to replenish beach sand carried down-shore. Sea Level Rise will cause accelerated erosion on the bluffs, with an increased probability of damage to the Merced Tunnel.

Under a "no action" scenario wherein the pile wall is not constructed, erosion will continue until reaching the Merced Tunnel. Further erosion landward would be essentially stopped by the tunnel, and beach loss would eventually occur.

The Tunnel is approximately 8-ft from the proposed pile wall. Based on the rapid erosion occurring during the 2009-2010 storm where over 30-ft of shoreline eroded, the time to erode 8-ft of material between the pile wall and Tunnel is very short, possibly happening during the next significant storm event. There would effectively be no difference regarding beach loss between the no-action scenario and construction of the pile wall due to the proximity of the pile wall to the Tunnel.

CCC Comment 18

Your response states that the proposed pile wall behind the National Park Service (NPS) South Parking Lot would not halt erosion of the rubble in the NPS Sloat parking lot. Please confirm/clarify a) that this response should be referring to the North Parking Lot; b) that it (the wall) would only provide bluff protection to the area south of the lot; and c) what would be proposed to protect the parking lot, if required.

CCSF Response 18:

a) The proposed pile wall in Reach 3 will not prevent erosion occurring along the north parking lot at Sloat Blvd; the pile wall will extend northward approximately 175 feet from the north limit of the EQR.

b) The pile wall will protect the area south of the lot toward the EQR.

c) Nothing has been proposed to protect the north parking lot.

CCC Comment 19

Please clarify the fourth paragraph of your response to this section. To what does "primary sand" refer? Please provide references to or, better, the actual reports from Hanes Barnard and others to which you refer. Do you mean to say that these reports identify the area south of Noriega as a sediment-depleted area [emphasis added]? Or are they referring to an additional sediment-depleted area?

CCSF Response 19

What we meant to say was that the primary source of sand to the reach south of Sloat Blvd is offshore sand from within the littoral zone. Several studies conducted by Moffatt & Nichol and the Army Corps have proposed that sand travels along the crest of the crescent-shaped Bar that attaches to shore immediately north of Sloat Blvd, and diverges from that point with most of the sand traveling northwards, and some of it traveling southwards. This southward transport of sand has been diminished over the past few years and the reach south of Sloat has been eroding, with no other source of sand supplying this reach.

The reports/studies which summarize these coastal processes/observations are listed below:

- Moffatt & Nichol, Sediment Transport Processes Study, Ocean Beach, July 1995, prepared for the U.S. Army Corps of Engineers, San Francisco District.
- Patrick Barnard --- ?

These studies have identified the reach south of Sloat as a sediment-depleted reach.

6. FUTURE LONG TERM PLANS

CCC Comment 20

Section 6.C -You have stated that the expected life spans for the structures that are not identified as temporary are typically 25 years to 100 years. Please provide the life span for each component of the proposed project; i.e., tangent/secant pile walls, rock revetments, etc.

CCSF Response 20

Structural Loading: The pile wall will be designed to perform when subjected to events of 1% probability of occurrence, otherwise known as "100-year" events. This includes seismic events, tidal events, and storm events.

Structural Durability: The wall will be designed to: 1) prevent the onset of corrosion; and 2) to remain serviceable while undergoing corrosion. With regular and required maintenance, the expected "life span" is the total length of time after construction until the structure no longer is serviceable, and it can range from 50- to 100-years for a marine structure. Without maintenance, the structure life could be shortened considerably to approximately 25 to 35 years.

CCC Comment 21

Section 6.0 -Please describe, as previously requested, how maintenance will alter or extend the life span of the structures.

CCSF Response 21

The pile wall will require toe scour protection to prevent undermining; this will be performed when erosion progresses to such an extent that the toe of the wall will be exposed. Placement of toe protection is considered part of the original design, and will ensure the life span of the structures rather than extend the life span.

The pile wall may also include cathodic protection as an additional means to prevent the onset of corrosion to extend the service life of the wall.

Where concrete spalls occur due to age and/or ground-shaking such as with earthquakes, maintenance including concrete-patching in concert with the above will extend the lifespan of the structure.

7. SEA LEVEL RISE

CCC Comment 22

Section 7 -You indicate, in your response letter, that you haven't addressed sea level rise with the revetments; and that adding rock up to the bluff edge as part of your maintenance for the 1997 revetment "could add an allowance to address sea level rise". Dr. Peter Bromirski, Scripps Institute of Oceanography (as we informed you) is preparing projections for coastal flooding at Ocean Beach, based on nearby sea level estimates. This work is underway and is scheduled to be finalized in the summer 2011. Please discuss, as previously requested, how Dr. Bromirski's projections to date may be applied to the proposed development.

CCSF Response 22

The original design of the EQR did not include rock up to the bluff edge (top of slope), and the top of rock is currently about 3- to 4-ft below the top of slope. The addition of rock would be done to repair worn areas of the revetment while also extending the service life of the revetment by preventing erosion above the revetment. The added rock will raise the protected portion of the shoreline by approximately 3- to 4-ft, and is intended to provide the same level of protection as the original EQR under various scenarios of sea level rise in the next 50- to 100-years.

For the proposed tangent pile walls, the top of wall will extend to just above the bluff elevations such that a parapet wall can be utilized as overlook areas for public access and viewing. The top of bluff itself is as high and in most cases higher than the 100-yr wave profile, and with the addition of the parapet wall will also be higher than future 100-yr storms where sea level rise would increase the elevation of the 100-yr storm. It is difficult to state how long into the future will these structures remain without being overtopped during storm events, but they can generally accommodate up to 3-4 ft of sea level rise, after which the overtopping could be more frequent than once every 100 years.

Appendix A

Supplemental photo history of two revetment areas

Appendix B

Traffic Information Reports

Appendix C

Ocean Beach California, Guidance for a Beach Nourishment Study Under Section 933, Economic Analysis and Justification

Appendix D

Public Access Plan in Response to 2010 Storm Damage Impacts to Ocean Beach