CALIFORNIA COASTAL COMMISSION
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Filed:	7/11/2008
180th Day:	1/7/2009
Staff:	MC - SF
Staff Report:	12/22/2008
Hearing Date:	1/7/2009
Commission Action:	

W7a

STAFF REPORT: REGULAR CALENDAR

APPLICATION NUMBER: 2-07-038

APPLICANT: City of Pacifica

PROJECT LOCATION: 528 to 572 Esplanade Drive, Pacifica, San Mateo County

PROJECT DESCRIPTION: Retention of a 700-foot long, 40-foot wide, 20-foot tall rock revetment previously construction under emergency conditions at the face of the bluff

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1.0 STAFF NOTES

Jurisdiction and Standard of Review

The proposed project area is bisected by the boundary between the retained coastal development permit jurisdiction of the Commission and the coastal development permit jurisdiction delegated to the City of Pacifica by the Commission through the City's certified Local Coastal Program. The boundary parallels the Mean High Tide Line, with the Commission's jurisdiction to the west and the City's to the east.

The Coastal Act was amended by Senate Bill 1843 in 2006, effective January 1, 2007. The amendment added Section 30601.3 to the Coastal Act. Section 30601.3 authorizes the Commission to process a consolidated coastal development permit application when requested by the local government and the applicant and approved by the Executive Director for projects that would otherwise require coastal development permits from both the Commission and from a local government with a certified LCP.

The policies of Chapter 3 of the Coastal Act provide the legal standard of review for a consolidated coastal development permit application submitted pursuant to Section 30601.3. The local government's certified LCP may be used as guidance.

2.0 STAFF RECOMMENDED FINDINGS

The City of Pacifica proposes to retain a 700-foot long, 40-foot wide, 20-foot tall rock revetment located at the face of the bluff adjacent to 528 to 572 Esplanade Drive in the City of Pacifica. The City constructed the revetment in 1998 pursuant to Emergency Permit 1-98-048-G, and the Commission approved it in 2002, for a period of five years, under permit A-2-PAC-00-010/2-00-009. The City is in compliance with the conditions of A-2-PAC-00-010/2-00-009. The Chapter 3 findings of the Commission's adopted findings for A-2-PAC-00-010/2-00-009 are hereby incorporated by reference into, and supplemented by, these approval findings. They are attached as Exhibit 1.

In compliance with A-2-PAC-00-010/2-00-009, the City has constructed a lateral bluff-top accessway that is now open to the public. (See Exhibit 2). Therefore, the proposed revetment now protects important lateral access, in addition to the two remaining houses west of Esplanade Drive, Esplanade Drive itself, infrastructure located in the public right-of-way, and eleven houses east of Esplanade Drive.

Special Condition 6 of A-2-PAC-00-010/2-00-009 restricted the Commission's authorization of the development to a period of five years. After the five year period, which ended August 9, 2007, it required the City to submit a coastal development permit application to either remove the development or submit an application to retain the development, along with (1) an analysis of the impact of the revetment to the beach and shoreline, (2) a new analysis of alternative methods of shoreline protection, and (3) an analysis of the feasibility of establishing a special district to fund construction of an alternative shoreline protective device. The City has submitted an application to retain the development and the required analyses.

Impacts to the Beach and Shoreline

The applicant's consulting engineer, Cotton, Shires & Associates, Inc. (CSA) has provided an analysis of the impacts to the beach and the shoreline caused by the revetment from the Fall of 1998 until the Spring of 2008. Their findings, contained in two geotechnical monitoring reports dated September 2007 and May 2008, conclude that the revetment has not caused significant impacts to the beach or shoreline in the past 10 years.

To analyze the impacts, CSA has tracked several distinct "marker" rocks since 1998. The CSA report states that, as of August 2007, all of the marker rocks that were previously identified remain unmoved.

CSA has also used photographic evidence to track the portion of the revetment covered by sand, and the size and amount of rocks that have been dislodged from the revetment. Temporary loss of sand can expose the entire revetment, including the western edge of the keyway, reducing beach width. Although exposure of the revetment up to the keyway has occurred intermittently, CSA has concluded that it only occurs in response to significant storm events and that it does not occur on an annual basis. They also conclude that exposure of the keyway has not occurred more frequently as time has passed.

The report states that rocks became dislodged from the revetment in 2003 and 2006. The City has completed maintenance to reposition the rocks dislodged in 2003, and plans to complete maintenance to address the rocks dislodged in 2006 in 2009. The City is authorized through Special Condition 1.D to undertake this maintenance without additional authorization from the Commission, as long as no new rock is added to the revetment and there is no expansion of the permitted footprint. This maintenance will ensure that public access is not further impeded by wayward rocks, other than the initial loss of beach due to displacement by the revetment.

Passive erosion in front of the revetment, including as it may be accelerated by sea level rise, will continue to be a problem. The CSA reports use photographic evidence to show that the structure of the revetment and the magnitude of sand loss at the revetment keyway at several points in time after winter storm events has not varied significantly. CSA uses this information to conclude that there have not been changes to the beach width in the past ten years, despite the local erosion rate of two feet per year. The Commission's staff engineer agrees that the evidence shows there have not been substantial changes to the amount of sand at the base of the revetment at various times documented by the report. However, the CSA reports do not provide a systematic, quantitative analysis of the change in *beach width* over time, which is one of the more significant impacts to beach resources that may be anticipated from the fixing of the back beach along a receding shoreline. Therefore, the Commission imposes Special Condition 1.A.1.2, requiring the City to perform topographic surveys of the beach and bluff profiles twice annually. These surveys will ensure that the applicant, at the time it submits an application to retain the revetment beyond the 10 year period this permit authorizes, sufficiently analyzes the revetment's impacts to the beach and shoreline when considering alternatives to the revetment at this location.

Alternatives Analysis

Condition 6.B.2 of A-2-PAC-00-010/2-00-009 required the City, when it submitted a new application to extend the length of development authorization beyond the initially authorized 5 year period, to submit "a new analysis of alternative methods of shoreline protection, taking into account factors including the beach profile at the time of analysis, the amount of beach available to the public for recreational use, and the relative costs of alternative methods of shoreline protection, including a vertical seawall or other methods that would have a smaller footprint than the approved revetment." CSA has provided this analysis by addressing several alternatives including sand replenishment, a reduced footprint revetment, managed retreat, and a vertical seawall.

Sand Replenishment

The sand replenishment alternative would be prohibitively costly and ultimately ineffective in slowing the rate of bluff retreat. Sand replenishment is generally used over many thousands of feet of shoreline and may not be suited to shorter lengths of shoreline. This alternative would require an ongoing replenishment program and continuing costs. A sand replenishment program would also result in additional environmental impacts from hundreds of truck trips required to

deliver sand. Sand replenishment would not be effective at protecting the bluff because the majority of erosion occurs during winter storm events when wave forces remove large amounts of sand and replenishment is not possible. Therefore, based on available information, sand replenishment is not a feasible, less environmentally damaging alternative to the proposed revetment as conditioned.

Reduced Footprint Revetment

The reduced footprint alterative would require removal of all of the revetment except the portion directly protecting the two remaining homes west of Esplanade Drive, at the northern end of the revetment. The southern end of the existing revetment is keyed into erosion-resistant bedrock. Removing the southern portion of the revetment would leave the bluff vulnerable to outflanking, and would likely result in severe erosion south of the reduced revetment. In addition, this alternative would not protect Esplanade Drive and associated infrastructure or preserve the public access to the bluff top and homes east of Esplanade Drive. Therefore, the reduced footprint alternative is not a feasible, less environmentally damaging alternative to the proposed project as conditioned.

Managed Retreat

The managed retreat alternative would require the removal and relocation of homes, Esplanade Drive, and utilities within the Esplanade Drive right-of-way, as well as removal of the bluff top public access and the revetment itself. Access to 11 homes on the east side of Esplanade Drive would also be lost, impacting those properties. With no shoreline protection in place, wave forces would gradually erode the bluff top and could, based on observed episodic retreat rates, undermine both the two remaining homes, the bluff top public access and those portions of Esplanade Drive closest to the bluff edge within one to two storm seasons. The relocation of the bluff-top infrastructure would incur significant costs and take several months to accomplish. In 2002, the City estimated the cost of removing the existing revetment to be more than $4 million. This does not include the value of the property and improvements which would eventually be lost. Given the significant costs of revetment removal coupled with the impacts to existing structures and associated costs, at this time, the managed retreat alternative is not a feasible, less environmentally damaging alternative to the proposed project as conditioned.

Vertical Seawall

A steel-reinforced concrete, vertical seawall would be an alternative, effective means of stabilizing the entire bluff. A vertical seawall would have a reduced footprint compared to the existing revetment and would reduce impacts to the beach and public access accordingly. In 2002, the Commission found that construction of a vertical seawall would create resource impacts due to the large amount of excavation required and the need to drill supports into the bluff. The Commission also found that the vertical seawall would create additional wave energy that may exacerbate erosion on the unprotected shoreline north and south of the wall. However, the Commission's staff engineer has stated that these impacts can now be mitigated. Therefore, it is possible that the vertical wall is a less environmentally damaging alternative. Nevertheless, the

cost of such a seawall is prohibitively expensive at this time. In 2002, the cost of construction was estimated to be from $2 million to $4 million and the cost of removing the existing revetment was estimated to be approximately $4 million. No funding is available for the City to remove the revetment and construct a seawall. Therefore, although this alternative may be less environmentally damaging, the excessive cost renders it infeasible at this time.

Feasibility of a Special District

A-2-PAC-00-010/2-00-009 also required the City to submit a study on the feasibility of establishing a special district to fund shoreline protection at this location. The City has completed the feasibility study. In the study, the City has concluded that establishing a special district to fund shoreline protection at this location is infeasible for three reasons: 1) no members of the public have expressed an interest in forming such a district; 2) previous efforts to create a similar special district at this location failed and resulted in a loss of revenue for the City; and 3) there are a large number of affordable rental units in the area and formation of a special district may cause increased rents.

Conclusion

As described above, the City has fulfilled the requirements of Special Condition 6 of A-2-PAC-00-010/2-00-009 by submitting an analysis of impacts to the beach and shoreline, a new alternatives analysis, and an analysis of the feasibility of creating a special district to fund a vertical wall at this location. As in 2002, the Commission finds that the project alternatives discussed above are not less environmentally damaging feasible alternatives to the proposed project as conditioned. However, because there is at least one less environmentally-damaging alternative, the Commission also finds that the alternatives should be reconsidered again in the future to determine if circumstances have changed. Therefore, the Commission imposes Special Condition 4, which limits development authorization to a period of 10 years from the date of approval.

Although the Commission's adopted findings for A-2-PAC-00-010/2-00-009 are hereby incorporated by reference into these approval findings, several of the Special Conditions of A-2-PAC-00-010/2-00-009 have been updated and revised. These revised Special Conditions are stated in section 4.2. The modifications to the Special Conditions of A-2-PAC-00-010/2-00-009 are summarized below:

1. Special Condition 1.A now requires a geotechnical report every 5 years instead of annually. This will make it easier for the City to comply with the condition, but will not diminish its effect because annual monitoring will still be required.

2. Special Condition 1.A includes a new requirement to perform topographic surveys of the beach and bluff profiles twice annually throughout the 10-year authorization period. These surveys will assist the applicant in providing a quantitative analysis of the impacts to the beach and shoreline required by Special Condition 4.B.1.

3. Special Conditions 2.B, 2.C, 3.A, 3.B, 3.C, 3.F, 4 and 5 have been deleted because they apply to requirements that the City has already fulfilled. Except as modified below, the rest of the conditions of A-2-PAC-00-010/2-00-009 remain in full force and effect.

4. The period of authorization in Special Condition 6 of A-2-PAC-00-010/2-00-009 (renumbered as Special Condition 4, below) has been extended from five to 10 years because it is not likely that the feasibility of alternatives will change substantially in the next 5 years.

3.0 STAFF RECOMMENDATION

The staff recommends that the Commission adopt the following resolution to approve Coastal Development Permit No. 2-07-038 subject to the conditions in Section 4.0, below.

Motion:
I move that the Commission approve the coastal development permit no. 2-07-038 subject to Conditions in Section 4.0, below.

Staff Recommendation of Approval:
Staff recommends a **YES** vote. Passage of this motion will result in approval of the permit as conditioned and adoption of the following resolution and findings. The motion passes only by affirmative vote of a majority of the Commissioners present.

Resolution to Approve the Permit:
The Commission hereby approves a coastal development permit for the proposed development and adopts the findings set forth above, and in A-2-PAC-00-010/2-00-009, attached as Exhibit 1, on grounds that the development as conditioned will be in conformity with the policies of Chapter 3 of the Coastal Act. Approval of the permit complies with the California Environmental Quality Act because either (1) feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment, or (2) there are no further feasible mitigation measures or alternatives that would substantially lessen any significant adverse impacts of the development on the environment.

4.0 CONDITIONS

4.1 STANDARD CONDITIONS

1. Notice of Receipt and Acknowledgment. The permit is not valid and development shall not commence until a copy of the permit, signed by the permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.

2. Expiration. If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in

a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.

3. Interpretation. Any questions of intent of interpretation of any condition will be resolved by the Executive Director or the Commission.

4. Assignment. The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.

5. Terms and Conditions Run with the Land. These terms and conditions shall be perpetual, and it is the intention of the Commission and the permittee to bind all future owners and possessors of the subject property to the terms and conditions.

4.2 SPECIAL CONDITIONS

1. Monitoring and Maintenance.

A. By May 1, 2014, and May 1, 2019 the permittee shall submit monitoring reports that have been prepared by a licensed geologist, or civil or geotechnical engineer.

1. Each monitoring report shall contain the following:

1) An evaluation of the condition and performance of the approved shoreline protection device, including an assessment of whether any weathering or damage has occurred that could adversely impact future performance of the device,
2) Topographic surveys of at least three beach and bluff profiles taken twice annually (in the Spring and Fall) for the ten-year duration of this authorization. Surveys shall be conducted within a two-week window of the previous year's survey, to make comparisons of beach width under the same wave climate and climatic conditions over time. Profiles shall be tied into survey monuments, constructed and surveyed in to establish fixed reference points from which any subsequent change can be recorded.
3) An analysis of erosion trends, annual retreat, or rate of retreat of the bluff,
4) A description of any migration or movement of rock that has occurred on the site, and
5) Recommendations for repair, maintenance, modifications, or other work to the device, including methods and materials to be used.

B. The permittee shall repair and maintain the approved shoreline protection. If a monitoring report contains recommendations for repair, maintenance, or other work, the permittee shall, within 30 days of receiving the recommendation, contact the Coastal Commission North Central Coast District Office to determine whether such work requires a coastal development permit or permit amendment. If a permit or permit amendment is required, the permittee shall, within 90 days of receiving the

recommendation (or 30 days if the purpose of the work is to remedy a hazard where the monitoring report concludes that the shoreline protection structure or any portion of the aforementioned structure is unsafe), apply for a permit or permit amendment to undertake the repair and maintenance.

C. The permittee shall examine the revetment at least once before the beginning of the rainy season, at least once six months following the beginning of the rainy season, and immediately after all major storms as conditions permit. The permittee shall look for the following signs of potential revetment failure or impacts to coastal resources:
   1. Excessive scour in front of the revetment following significant storm events,
   2. Dislodged rocks or stones seaward of the revetment,
   3. Gaps or exposed underlayer material,
   4. Slumping or rotation of revetment, and
   5. Settlement of rock into underlying sand.

   If the permittee finds that any condition listed above exists at the project site, the permittee shall hire a licensed geologist, or civil or geotechnical engineer to prepare a monitoring report consistent with the requirements of Special Condition 1(A)1 above.

D. The permittee shall remove, redeposit, or reposition any rock or material that becomes dislodged or displaced from the approved shoreline protection as soon as possible after such displacement occurs. The permittee shall contact the Coastal Commission North Central Coast District Office immediately to determine whether such activities require a coastal development permit or permit amendment. The above referenced activities shall not require a coastal development permit or permit amendment provided that they occur within the envelope of the revetment as shown on plans submitted to the Commission pursuant to this condition.

E. The permittee shall remove any materials not explicitly authorized pursuant to this coastal development permit, including but not limited to debris, trash, or other materials from the shoreline protection device and shall take all necessary measures to discourage the placement of such material on the project site.

F. The permittee shall inspect the 6-inch perforated pipe placed under the fill buttress at the base of the bluff face at least once a year and maintain the proper function of the pipe by cleaning the pipe with a snake and/or water pressure, if appropriate.

G. The permittee shall employ Best Management Practices (BMPs) to prevent erosion and geologic instability of the fill buttress. The BMPs shall include without limitation:
   1. Installation of erosion control fabric,
   2. Vegetation of fill buttress on bluff top using native plant species adapted to the project site conditions,
   3. Installation of signs and/or barriers to prohibit access onto the fill buttress,
   4. Prohibition of any concentrated flows of surface water from natural drainageways, graded swales, downspouts, or other sources, and

5. Stabilization of the face of the buttress using bioengineering techniques when feasible.

H.

1. The permittee shall maintain the access road constructed on the project site in a condition that:
   a. Allows access for vehicles and heavy equipment from Esplanade Drive to the base of the bluff for maintenance purposes,
   b. Does not contribute to erosion of the bluff, and
   c. Does not exhibit signs of erosion.
2. In no case shall the permittee pave the access road.

2. Assumption of Risk, Waiver of Liability and Indemnity.

By acceptance of this permit, the applicant acknowledges and agrees (i) that the site may be subject to hazards from landslide, bluff retreat, erosion, and earth movement; (ii) to assume the risks to the applicant and the property that is the subject of this permit of injury and damage from such hazards in connection with this permitted development; (iii) to unconditionally waive any claim of damage or liability against the Commission, its officers, agents, and employees for injury or damage from such hazards; and (iv) to indemnify and hold harmless the Commission, its officers, agents, and employees with respect to the Commission's approval of the project against any and all liability, claims, demands, damages, costs (including costs and fees incurred in defense of such claims), expenses, and amounts paid in settlement arising from any injury or damage due to such hazards.

3. Public Access.

In addition to the 24,000 square feet of public access required pursuant to Special Condition 3.A of CDP A-2-PAC-00-010/2-00-009, if the permittee acquires any additional property on the bluff top at APNs 009-161-010, 009-161-020, 009-161-100, and/or 009-161-110, all of which are generally depicted on Exhibit 8 of the staff report for A-2-PAC-00-010/2-00-009, within 90 days of acquiring any such additional property, the permittee shall submit, for the review and approval of the Executive Director, a plan for the provision of public access improvements so that at least 8,000 square feet of the 13,500 square feet of total property that can be acquired is improved.

4. Time Period for which Development is Authorized.

This coastal development permit authorizes development for ten years from the date of Commission approval of Application 2-07-038 on January 7, 2009. No later than ten years from the date of Commission approval, the permittee shall either:

A. Submit a coastal development permit application to the Commission for removal of the revetment, or

B. Submit a coastal development permit application to the Commission for retention of the revetment, accompanied by:

1. An analysis of impacts on the beach and shoreline of the approved revetment since the date of construction;

2. A new analysis of alternatives to the existing shoreline protection including, but not limited to, managed retreat and a vertical wall. The analysis should consider factors including, but not limited to: (1) the beach profile at the time of analysis, (2) impacts to the beach profile identified in the monitoring reports required pursuant to Special Condition 1.A, (3) the amount of beach available to the public for recreational use, and (4) the cost of each alternative.

5.0 CEQA

Section 13096 of the California Code of Regulations requires Commission approval of Coastal Development Permit applications to be supported by a finding showing that the application, as conditioned by any conditions of approval, to be consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(A) of CEQA prohibits a proposed development from being approved if there are feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse effects which the activity may have on the environment.

The Commission incorporates its findings on Coastal Act consistency at this point as if set forth in full. The proposed project has been conditioned to mitigate or eliminate any significant impacts to public access, the marine environment, geologic hazards and visual resources. As discussed above, as conditioned, there are no feasible alternatives or feasible mitigation measures available, beyond those required, which would substantially lessen any significant adverse impacts which the development may have on the environment. Therefore, the Commission finds that the proposed project has been conditioned to mitigate the identified impacts and can be found consistent with Coastal Act requirements to conform to CEQA.

ADDITIONAL EXHIBITS

1. Adopted findings for A-2-PAC-00-010/2-00-009
2. Site plan for lateral bluff access

ADDITIONAL SUBSTANTIVE DOCUMENTS

Cotton, Shires & Associates 2007. Geotechnical Monitoring and Performance Summary, Esplanade Avenue Revetment, Pacifica, California. September 2007.

Cotton, Shires & Associates 2008a. Geotechnical Monitoring Report, Esplanade Avenue Revetment, Pacifica, California. May 2008.

Cotton, Shires & Associates 2008b. Response to Coastal Commission Request for Information. May 15, 2008.

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Th-9a

Appeal Filed:	April 5, 2000
49th Day:	Waived
Staff:	PTI - SF
Staff Report:	September 19, 2002
Date of Commission Action:	August 9, 2002

ADOPTED FINDINGS

APPLICATION FILE NO.:	A-2-PAC-00-10 and 2-00-009
LOCAL PERMIT NO.:	CDP-130-98
APPLICANT:	City of Pacifica
PROJECT LOCATION:	528 to 572 Esplanade Drive, Pacifica, San Mateo County (APNs 009-131-010, 009-131-030, 009-161-010 through 009-161-150) (**Exhibits 1-3**)
PROJECT DESCRIPTION:	Construction of a 700-foot long, 40-foot wide, 20-foot tall rock revetment previously constructed under emergency conditions on the face and at the foot of a coastal bluff.
APPELLANTS:	Coastal Commissioners Wan and Potter
PREVAILING COMMISSIONERS:	Wan, Potter, Susskind, Desser, Dettloff, Hart
SUBSTANTIVE FILE DOCUMENTS:	See Appendix A.

1.0 SUMMARY OF CHANGES TO ORIGINAL STAFF RECOMMENDATION

The permit application and appeal of local government permit approved by the Commission at its August 9, 2002 hearing concerns a 700-foot long, 40-foot wide, 20-foot tall rock revetment located on the face and at the foot of a coastal bluff fronting Esplanade Drive in the City of Pacifica. The revetment was constructed in 1998 pursuant to Emergency Permit 1-98-048-G for the purpose of protecting two remaining houses on the bluff top west of Esplanade Drive, Esplanade Drive itself, infrastructure located in the public right-of-way, and eleven houses east of Esplanade Drive.

At its August 9, 2002 hearing, staff revised its original recommendation to make certain changes proposed by the applicant to the staff's recommended conditions of approval. In particular, the staff made the following revisions:

- The staff amended **Special Condition 1.B** to rephrase the condition requirement that the permittee apply for a permit or permit amendment for work whose purpose is to remedy a hazard within 30 days of a Commission staff recommendation that such permit or permit amendment is required, where the monitoring report concludes that the shoreline protection structure or any portion of the aforementioned structure is unsafe.

- The staff deleted Paragraph C of **Special Condition 3**, pertaining to the removal of a fence that no longer exists.

- The staff revised **Special Condition 5.B** to allow 365 days rather than 180 days for the applicant to complete construction of a new or modified bluff top drainage system consistent with the requirements of **Special Condition 5**.

- Finally, the staff added **Special Condition 6,** agreed to by the applicant**,** which limits the time period for which the development is authorized to 5 years from the date of permit approval and requires the City to file a new application at the end of that period. Based on the facts and circumstances of this project, as discussed in detail below, the Commission found that some form of shoreline protection is necessary to protect existing structures at the site, including the existing residential structures along Esplanade Avenue, infrastructure improvements within the Esplanade Avenue right of way and Esplanade Avenue itself. The Commission also found that project alternatives such as removal of the revetment and construction of a vertical seawall are not feasible, less environmentally damaging alternatives to the project as conditioned, but also decided to revisit this issue in 5 years as stated in **Special Condition 6** to determine if circumstances have changed. The 5-year time period for which development is authorized will allow the City to re-explore feasible, less environmentally damaging alternatives, including formation of a Special Assessment District for construction of the seawall alternative, as well as provide opportunity to monitor and evaluate the revetment and the conditions on the site.

The Commission approved the proposed project consistent with staff's revised recommendation as summarized above. As the Commission's action on the project differed from staff's original written recommendation, staff has prepared the following set of revised findings for the Commission's consideration as the needed findings to support its action at the hearing. The Commission will hold a public hearing and vote on the revised findings at its October 10, 2002 meeting. The purpose of the hearing is to consider whether the revised findings accurately reflect the Commission's previous action rather than to reconsider the merits of the project or the appropriateness of the adopted conditions. Public testimony will be limited accordingly.

2.0 STAFF RECOMMENDATIONS

2.1 Motion and Resolution for Revised Findings Approving Coastal Development Permit No. 2-00-009 and Appeal A-2-PAC-00-010

The staff recommends that the Commission adopt the revised findings in support of the Commission's action on August 9, 2002 approving Coastal Development Permit No. 2-00-009 and Appeal A-2-PAC-00-010 subject to the conditions in Sections 2.2 and 2.3 below.

MOTION: *I move that the Commission adopt the revised findings in support of the Commission's action on August 9, 2002 concerning approval of Coastal Development Permit No. 2-00-009 and Appeal A-2-PAC-00-010.*

STAFF RECOMMENDATION OF APPROVAL:

Staff recommends a **YES** vote on the motion. Passage of this motion will result in the adoption of revised findings as set forth in this staff report. The motion requires a majority vote of the members from the prevailing side present at the August 9, 2002 hearing, with at least three of the prevailing members voting. Only those Commissioners on the prevailing side of the Commission's action are eligible to vote on the revised findings.

RESOLUTION TO ADOPT REVISED FINDINGS:

The Commission hereby adopts the findings set forth below in support of the Commission's action approving Coastal Development Permit No. 2-00-009 and Appeal A-2-PAC-00-010 on the ground that the findings support the Commission's decision made on August 9, 2002 and accurately reflect the reasons for it.

2.2 Standard Conditions

1. Notice of Receipt and Acknowledgment. The permit is not valid and development shall not commence until a copy of the permit, signed by the permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.
2. Expiration. If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.
3. Interpretation. Any questions of intent of interpretation of any condition will be resolved by the Executive Director or the Commission.
4. Assignment. The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.
5. Terms and Conditions Run with the Land. These terms and conditions shall be perpetual, and it is the intention of the Commission and the permittee to bind all future owners and possessors of the subject property to the terms and conditions.

2.3 Special Conditions Applicable to A-2-PAC-00-010 and 2-00-009

1. Monitoring and Maintenance.

   A. By May 1 of every year for the life of the structure as well as required under the provision of Special Condition 1(B) below, the permittee shall submit a monitoring report that has been prepared by a licensed geologist, or civil or geotechnical engineer.
      1. Each monitoring report shall contain the following:
         a. An evaluation of the condition and performance of the approved shoreline protection device, including an assessment of whether any weathering or damage has occurred that could adversely impact future performance of the device,
         b. An analysis of erosion trends, annual retreat, or rate of retreat of the bluff based upon measurements and in conformance with the approved monitoring plan,
         c. A description of any migration or movement of rock that has occurred on the site, and
         d. Recommendations for repair, maintenance, modifications, or other work to the device, including methods and materials to be used.

   B. The permittee shall repair and maintain the approved shoreline protection. If a monitoring report contains recommendations for repair, maintenance, or other work, the permittee shall, within 30 days of receiving the recommendation, contact the Coastal Commission North Central Coast District Office to determine whether such work requires a coastal development permit or permit amendment. If a permit or permit amendment is required, the permittee shall, within 90 days of receiving the recommendation (or 30 days if the purpose of the work is to remedy a hazard where the monitoring report concludes that the shoreline protection structure or any portion of the aforementioned structure is unsafe), apply for a permit or permit amendment to undertake the repair and maintenance.

   C. The permittee shall examine the revetment at least once before the beginning of the rainy season, at least once six months following the beginning of the rainy season, and immediately after all major storms as conditions permit. The permittee shall look for the following signs of potential revetment failure or impacts to coastal resources:
      1. Excessive scour in front of the revetment following significant storm events,
      2. Dislodged rocks or stones seaward of the revetment,
      3. Gaps or exposed underlayer material,
      4. Slumping or rotation of revetment, and
      5. Settlement of rock into underlying sand.

      If the permittee finds that any condition listed above exists at the project site, the permittee shall hire a licensed geologist, or civil or geotechnical engineer to prepare a monitoring report consistent with the requirements of Special Condition 1(A)1 above.

   D. The permittee shall remove, redeposit, or reposition any rock or material that becomes dislodged or displaced from the approved shoreline protection as soon as possible after such displacement occurs. The permittee shall contact the Coastal Commission North Central Coast District Office immediately to determine whether such activities require a coastal development permit or permit amendment. The above referenced activities shall not require a coastal development permit or permit amendment provided that they occur within the envelope of the revetment as shown on plans submitted to the Commission pursuant to this

condition. **PRIOR TO ISSUANCE OF THE PERMIT**, the permittee shall provide the Coastal Commission North Central Coast District Office with "as-built" plans showing of the location of the existing revetment in plan view and profile in relation to existing topography using the California coordinate system.

E. The permittee shall remove any materials not explicitly authorized pursuant to this coastal development permit, including but not limited to debris, trash, or other materials from the shoreline protection device and shall take all necessary measures to discourage the placement of such material on the project site.

F. The permittee shall inspect the 6-inch perforated pipe placed under the fill buttress at the base of the bluff face at least once a year and maintain the proper function of the pipe by cleaning the pipe with a snake and/or water pressure, if appropriate.

G. The permittee shall employ Best Management Practices (BMPs) to prevent erosion and geologic instability of the fill buttress. The BMPs shall include without limitation:
   1. Installation of erosion control fabric,
   2. Vegetation of fill buttress on bluff top using native plant species adapted to the project site conditions,
   3. Installation of signs and/or barriers to prohibit access onto the fill buttress,
   4. Prohibition of any concentrated flows of surface water from natural drainageways, graded swales, downspouts, or other sources, and
   5. Stabilization of the face of the buttress using bioengineering techniques when feasible.

H.
   1. The permittee shall maintain the access road constructed on the project site in a condition that:
      a. Allows access for vehicles and heavy equipment from Esplanade Drive to the base of the bluff for maintenance purposes,
      b. Does not contribute to erosion of the bluff, and
      c. Does not exhibit signs of erosion.
   2. In no case shall the permittee pave the access road.

2. Assumption of Risk, Waiver of Liability and Indemnity.

   A. By acceptance of this permit, the applicant acknowledges and agrees (i) that the site may be subject to hazards from landslide, bluff retreat, erosion, and earth movement; (ii) to assume the risks to the applicant and the property that is the subject of this permit of injury and damage from such hazards in connection with this permitted development; (iii) to unconditionally waive any claim of damage or liability against the Commission, its officers, agents, and employees for injury or damage from such hazards; and (iv) to indemnify and hold harmless the Commission, its officers, agents, and employees with respect to the Commission's approval of the project against any and all liability, claims, demands, damages, costs (including costs and fees incurred in defense of such claims), expenses, and amounts paid in settlement arising from any injury or damage due to such hazards.

B. **PRIOR TO ANY CONVEYANCE OF THE PROPERTY THAT IS THE SUBJECT OF THIS COASTAL DEVELOPMENT PERMIT**, the applicant shall submit to the Executive Director for review and approval documentation demonstrating that the landowner(s) has executed and recorded a deed restriction, in a form and content acceptable to the Executive Director over the parcel(s) governed CDP by A-2-PAC-00-010 and CDP 2-00-009: (1) indicating that, pursuant to this permit, the California Coastal Commission has authorized development on the subject property, subject to terms and conditions that restrict the use and enjoyment of that property (hereinafter referred to as the "Standard and Special Conditions"); and (2) imposing all Standard and Special Conditions of this permit as covenants, conditions and restrictions on the use and enjoyment of the Property. The deed restriction shall include a legal description of the parcel or parcels governed by CDP A-2-PAC-00-010 and CDP 2-00-009. The deed restriction shall also indicate that, in the event of an extinguishment or termination of the deed restriction for any reason, the Standard and Special Conditions of this permit shall continue to restrict the use and enjoyment of the subject property so long as either this permit or the development it authorizes - or any part, modification, or amendment thereof - remains in existence on or with respect to the subject property.

C. **PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT**, the applicant shall submit a written agreement, in a form and content acceptable to the Executive Director, incorporating all of the above terms of this condition.

3. Public Access.

A. ***Prior to the issuance of the coastal development permit,*** the applicant shall submit, for the review and approval of the Executive Director, a plan for the provision of public access improvements on the City-owned property at the top of the bluff of the project site at APNs 009-161-030 through 009-161-090 and 009-161-120 through 140, currently consisting of approximately 24,000 square feet, generally depicted on **Exhibit 8**.
   1. A licensed geologist or geotechnical engineer shall determine:
      a. the net developable area, as defined in the Pacifica Local Coastal Program Land Use Plan, of the property to accommodate public access purposes, and
      b. the development setback from the edge of the bluff sufficient to protect the public access improvements for the design life of such improvements.
   2. The plan shall demonstrate that the City-owned public property on the top of the bluff will provide lateral access for pedestrians, bicycles, and persons of limited mobility within one year of issuance of this CDP.
   3. The public access improvements shall be sited and designed for accessibility by people of limited mobility to the maximum extent feasible.
   4. The public access improvements shall be sited and designed for compatibility with the natural character of the shoreline.
   5. The plan shall be at a large scale, such as 1" = 100', and the applicant shall also provide a reduced, 8 ½" by 11" copy of the plan at the same scale showing the public access improvements.
   6. The public access improvements shall include, at a minimum, the following components:

a. a lateral access trail at least eight (8) feet wide and separated from the public road (Esplanade Drive), with the inland edge of the trail at least 10 feet from the occupied residences. The trail shall qualify as a Class I bikeway;
b. overlook point(s);
c. benches; and
d. signage identifying the location of vertical and lateral public accessways, bicycle routes, destination areas, environmentally sensitive habitat, and hazardous conditions. The signage shall use appropriate color, size, form, and material to be compatible with the natural appearance and character of the shoreline.

B. The chain-link fence along the 500-block of Esplanade Drive shall be removed, and a new fence shall be located as close to the bluff edge as practicable while still providing for public safety. The new fence shall be of an open design, compatible with the natural character of the site, and shall not obstruct views.

C. The permittees shall landscape the bluff-top public access area using appropriate native vegetation.

E. In addition to the above-identified requirements of this condition, if the permittee acquires any additional property on the bluff top at APNs 009-161-010, 009-161-020, 009-161-100, and/or 009-161-110, all of which are generally depicted on **Exhibit 8**, with 90 days of acquiring any such additional property, the permittee shall submit, for the review and approval of the Executive Director, a plan for the provision of public access improvements so that at least 8,000 square feet of the 13,500 square feet of total property that can be acquired is improved, consistent with the requirements of Special Condition 3.

F. The permittee shall undertake development in accordance with the approved final plan. The permittee shall complete construction of the public access improvements required by Special Condition 3.A and shown on the approved final plan within one year from the issuance of this coastal development permit. Any proposed changes to the approved final plan shall be reported to the Executive Director. No changes to the approved final plan shall occur without a Commission amendment to this coastal development permit unless the Executive Director determines that no amendment is legally required.

4. Condition Compliance.

Within 90 days of Commission action on this coastal development permit application, or within such additional time as the Executive Director may grant for good cause, the applicant shall satisfy all requirements specified in the conditions hereto that the applicant is required to satisfy prior to issuance of this permit. Failure to comply with this requirement may result in the institution of enforcement action under the provisions of Chapter 9 of the Coastal Act.

5. Revised Bluff-top Drainage Plan.

A. Prior to the issuance of the coastal development permit, the applicant shall submit, for the review and approval of the Executive Director, a Revised Bluff-top Drainage Plan for redirecting

existing drainage of runoff from the bluff-top area and Esplanade Drive away from the beach below the revetment. Runoff currently flowing to the beach shall be redirected to the municipal storm drain system or other suitable conduit and redirected to an outfall away from the beach.

B. Within 365 days of issuance of the coastal development permit, the applicant shall complete construction of a new or modified bluff-top drainage system redirecting drainage of runoff away from the beach below the bluff consistent with the terms and conditions of this permit and the plans approved in Section A of this Condition.

6. Time Period for which Development is Authorized.

This coastal development permit shall be valid for five years from the date of Commission approval of Applications No. A-2-PAC-00-010 and No. 2-00-009 (August 9, 2002). No later than five years from the date of Commission approval, the permittee shall either:

a) Submit a coastal development permit application to the Commission for removal of the revetment, or

b) Submit a coastal development permit application to the Commission for retention of the revetment, accompanied by:

1) An analysis of impacts on the beach and shoreline of the approved revetment since the date of construction,
2) A new analysis of alternative methods of shoreline protection, taking into account factors including the beach profile at the time of analysis, the amount of beach available to the public for recreational use, and the relative costs of alternative methods of shoreline protection, including a vertical seawall or other methods that would have a smaller footprint than the approved revetment, and
3) An analysis of the feasibility of establishing a special district for the purpose of funding construction of a shoreline protective device that would protect specific properties.

3.0 FINDINGS AND DECLARATIONS FOR A-2-PAC-00-010 AND 2-00-009

3.1 Background

The project site has had rock revetments of various dimensions in place documented as early as March 1971. After storms in 1982 and 1983 eroded 33 feet of the bluff in the southern portion of the project area, the owners of private property in the 500 block of Esplanade Drive on the top of the bluff created an assessment district in order to construct a 1,650-foot long revetment with 28,000 tons of rock on the face and at the base of the bluff in 1984 to prevent erosion and protect existing residences. In 1983, Pacifica's City Council also made an effort to plan for integrated shoreline protection by passing a resolution endorsing a master plan for seawall construction for the area south of Manor Drive **(**the site of the approved project) to the southern end of Shoreview Avenue, a distance of about a half mile.

In 1997, the Executive Director issued Emergency Permit 1-97-84-G to the owners of private property at 528, 532, 536, and 540 Esplanade Drive to construct a 150-foot long, 12-foot high, and 1-foot wide reinforced concrete seawall/bluff retaining wall with a 6-foot deep foundation at the base of an eroding 60-foot high coastal bluff to protect four single-family residences. The owner of the residence at 544

Esplanade, immediately south of the aforementioned project, received Emergency Permit 1-98-003-G for the construction of a 50-foot long extension of the shoreline protection contemplated under Emergency Permit 1-97-84-G. The property owners had constructed the foundation and keyway and were in the process of applying for a regular coastal development permit (1-97-065) for a 20-foot high, 250-foot long criblock bluff retaining wall at the time the 1998 storms began.

On February 2, 1998, the State experienced a series of heavy storms and flooding. On February 4, 1998, Governor Wilson declared a state of emergency for the State of California, and on February 9, 1998, President Clinton also declared a state of disaster.

The 1998 storms caused 40 to 60 feet of bluff erosion at the project site and left remnants of the destroyed rock revetment scattered across the public beach. The bluff retreat damaged several of the bluff-top residences on Esplanade Drive. As a result, during February and March 1998, the City Building Official determined that ten residences on the seaward side of Esplanade Drive were unsafe to occupy. The City, with Federal Emergency Management Agency (FEMA) funds, purchased the ten condemned residences. On May 6, 1998, the City demolished seven of the ten condemned residences. The remaining three condemned residences were removed a year-and-a-half later, on October 18, 1999. Two residences, 528 and 532 Esplanade Drive, were not condemned and are still privately owned and occupied. In addition to these two properties, the undeveloped lots at 564 and 568 Esplanade Drive remain in private ownership. The City owns the other eight lots on the seaward side of Esplanade Drive (536, 540, 544, 548, 552, 556, 560, and 572 Esplanade Drive).

On March 9, 1998, the City approved an emergency permit for the construction of the revetment in the City's coastal permit jurisdiction. After the Commission staff received information requested from the City concerning the emergency project, on May 26, 1998, the Executive Director granted a separate emergency permit for the portion of the same revetment located seaward of the mean high tide line, within the Commission's original permit jurisdiction (Emergency Permit 1-98-048-G). The purpose of the revetment was to protect Esplanade Drive, utilities within the public right-of-way, and several remaining homes. Construction of the development began in June 1998 and was completed in October 1998. The City determined that the project is statutorily and categorically exempt from review under the California Environmental Quality Act (CEQA) and Sections 15269 (Emergency Projects) and 15302 (Replacement or Reconstruction) of the CEQA regulations (Title 14 CCR).

In May 1998, the Commission granted an emergency permit for the portion of the revetment in the Commission's permit jurisdiction. The emergency permit granted temporary authorization for the revetment, specifying that within 120 days of the date of the emergency permit, the City must apply to the Commission for a regular coastal development permit. In March 2000, the City submitted its coastal development permit application to the Commission for the permanent authorization of the portion of the revetment in the Commission's permit jurisdiction.

On March 20, 2000, the City approved regular Coastal Development Permit 130-98 for the portion of the project within the City's jurisdiction constructed under the City's 1998 emergency permit. The City's approval is currently before the Commission on appeal. On March 22, 2000, to fulfill the conditions of the Commission's emergency permit, the City submitted a follow-up application to the Coastal Commission to authorize the portion of the revetment in the Commission's jurisdiction.

3.2 Project Location

The project is located at the face and base of a 60- to 70-foot tall coastal bluff at 528 to 572 Esplanade Drive in the West Edgemar/Pacific Manor neighborhood of the City of Pacifica in San Mateo County

(**Exhibits 1 and 2**). The corresponding Assessor Parcel Numbers are 009-131-010, 009-131-030, and 009-161-010 through 009-161-150 (**Exhibit 3**).

The revetment is located both within the City of Pacifica's permit jurisdiction and the Coastal Commission's original permit jurisdiction. The revetment is partially on the bluff face and partially on a public beach at the toe of the bluff.

The land use designation for the property on the beach (APNs 009-131-010 and 009-161-150) is Open Space. The Land Use Plan designates the bluff top and the bluff face behind the residential and formerly residential property (APNs 009-161-010 through –0140) as Low Density Residential. The bluff top and bluff face property (009-131-030) north of the residential property has a Medium Density Residential land use designation. Zoning for the bluff-top property is Single-Family Residential (R-1), the northernmost bluff-top property is Multiple-Family Residential (R-3.1) and property on the beach is Commercial Recreation (C-R). All of the properties are additionally zoned as Coastal Zone Combining District (CZ). The property is surrounded by existing single-family residential development to the east, vacant property zoned multi-family residential to the north, a recreational vehicle park to the south, and public beach and the Pacific Ocean to the west.

3.3 Project Description

As stated in Emergency Permit 1-98-048-G, issued by Commission staff on May 26, 1998, the shoreline protection project proposed by the City was to

> *[c]onstruct a rock revetment to protect Esplanade Drive and utilities as well as several remaining homes by placing approximately 23,000 tons of 2 to 8-ton rock (including remnants from the former rock revetment at the site to be reused and imported rock) on formational material covered with geotextile fabric, approximately 1,000 feet in length 40 feet wide, 20 to 60 feet high, and at a vertical slope of approximately two horizontal to one vertical.*

The Executive Director and the City issued the emergency permits based on the above description to protect remaining residences, public property, above-ground and underground utilities and a public road all located on the top of the bluff from damage resulting from erosion of the coastal bluff. [2]

The project as constructed varies somewhat from the project described in the original plans approved under the emergency permit. As constructed, the revetment varies from the plans approved under the emergency permit as follows:

1. Decreased Revetment Length. The revetment as constructed is approximately 700 feet long, 300 feet shorter than approved under the emergency permits.

2. Decreased Revetment Height. The revetment as constructed is about 20 feet in height. The originally proposed revetment was described as 20 to 60 feet tall. The taller height included the engineered fill buttress and the underground foundation of the revetment.

[2] The Commission staff received the emergency permit application from the City for the revetment on March 20, 1998 and issued Emergency Permit 1-98-048-G on May 26, 1998. All of the twelve, original single-family residences on the seaward side of the 500 block of Esplanade Drive were standing at the time the City submitted the emergency permit application. Before the Executive Director issued the emergency permit, the City condemned and removed seven houses in 1998. The City removed three more houses from the bluff in 1999. Two single-family residences remain and are still occupied.

3. Decreased Revetment Crest Width. The revetment crest width was reduced from 12 feet to 6 feet at the 26-foot Mean Sea Level elevation, resulting in an approximately 15% decrease in the volume of rock approved under the emergency permits.

4. Changed Revetment Stone Size. The April 2, 1998 *Engineering Assessment Report* by the City's engineering consultant states that the weight of the armor stone (the stone placed in the outer layers of the revetment) selected for design is in the range of 8- to 10-tons. Although the contractor originally could not obtain sufficient quantities of 8- to 10-ton revetment rock locally for the entire armor layers and the keyway, the contractor eventually located a quarry supplying 8-ton and larger stone. These stones were used to construct the keyway to support the revetment and most of the first armor layer. 5- to 7-ton stone was used in the first armor layer at elevations above approximately 18 feet Mean Sea Level (MSL). 5-ton armor stone was also placed on the tallest portions of the revetment, at or above 24 feet MSL. With the project engineer's approval, the contractor used 6- to 8-ton stone in the second armor layer. The size of the rocks was estimated visually.

5. Deletion of Hydraugers. The revetment as built does not include the hydraugers originally proposed. Hydraugers are perforated pipes inserted into a hillside in order to improve drainage of ground water in potentially unstable slopes (Lawrence Berkeley Lab 1996). The plan approved under the emergency permits shows 29 100-foot long hydraugers installed into the bluff along the length of the revetment to increase the stability of the bluff. Because the City purchased the bluff-top properties and was not planning to reconstruct the single-family residences on the bluff, the hydraugers were eliminated from the plan.

6. Addition of Fill Buttress. During winter storms, a small cove formed at the southern end of the proposed project site. The City constructed an approximately 50-foot tall fill buttress on the face and at the base of the bluff to replace the material lost in this area and to stabilize the access road for maintenance purposes. The buttress construction consists of the placement of stones ranging in weight from 100 pounds to six tons and drainrock on Franciscan greenstone bedrock. Filter fabric was placed over the drainrock, and 11,000 cubic yards of fill, excavated during the construction of the revetment keyway was compacted to a 1.5:1 horizontal-to-vertical slope. The fill buttress extends the topographic top of slope (not the natural bluff edge) seaward by about ten feet. A six-inch perforated PVC pipe, surrounded by more drainrock runs laterally through the buttress about two feet above the stone and drainrock base. The pipe discharges to the revetment at the southern end of the buttress and opens at the northern end for maintenance. This development was not included in the project plans approved under the emergency permits.

7. Construction of Access Road. Although not shown on the plans approved under the emergency permits, the City constructed an access road from Esplanade Drive down the bluff face to the beach. The road was constructed during the excavation of the keyway and revetment for future maintenance and access to the beach by the City and thus was not used to access the site during the construction of the revetment. The road consists of an approximately 13-foot wide and 80-foot long unpaved slope and is located at the southern end of the revetment. The City constructed the access road by cutting the upper portion of the bluff and placing fill at the base of the bluff and on the revetment (a portion of the fill buttress) to create a 1.5:1 slope.

8. Drainage Improvements on Esplanade Drive. The as-built plans show an expanded system of drainage inlets from the intersection of Esplanade and Avalon Drives to the project area designed to convey street runoff to the base of the revetment.

9. Placement of Base Rock, Concrete Barrier, and Fill on Bluff Top. The project includes the placement of 15,000 square feet of base rock within the Esplanade Drive right-of-way, 420 linear feet of concrete k-rail barrier on the west side of the Esplanade Drive about 40 feet from the bluff edge, and 1,300 cubic yards of fill on bluff-top parcel south of the intersection of Esplanade and Avalon Drives immediately west of the concrete k-rail barrier.

To construct the revetment, a keyway was excavated at the base of the bluff into Franciscan greenstone bedrock with a proposed minimum depth of five feet and minimum width of ten feet. Filter fabric was placed in the keyway and covered with 10- to 12-ton rock. Most rock placed on the first and outermost armor layer weighed from 8 to 10 tons, with some stones weighing up to 20 tons. 5- to 7-ton stones were placed in the first armor layer above about 18 feet MSL. The second armor layer consisted mainly of 6- to 8-ton stone. The innermost stones ranged in weight from 100 pounds to 5 tons. Rock used to construct the revetment was angular in shape, with the shortest dimension not exceeding one-third of the longest dimension, and made mainly of metaconglomerate, welded volcanic tuff, and graywacke sandstone.

The City constructed the approved revetment under state- and federally-declared emergency conditions. The Federal Emergency Management Agency (FEMA) funded the shoreline protection project to repair and stabilize the bluff damaged by severe wave action and subsurface water seepage during the 1998 El Niño storms. The approved revetment replaced the previous revetment constructed in 1983 that deteriorated over time by storm waves.

The City constructed the approved revetment to protect privately-owned residences, public property, public utilities, and a public road on the top of the bluff. Two privately-owned residences at 528 and 532 Esplanade Drive are located approximately 40 feet from the edge of the bluff. Eight of ten vacant lots on the seaward side of Esplanade Drive (536 to 560 Esplanade Drive, and 572 Esplanade Drive) were purchased by the City and are in public ownership. Overhead electricity and telephone cables are located about 50 feet from the bluff edge on the western side of Esplanade Drive. The City is currently considering relocating the overhead utilities underground on Esplanade Drive. The six-inch water line and eight-inch sewer pipe are located less than ten feet underground and about 55 and 60 feet respectively from the existing face of the bluff. The sewer line serves about 42 lots. Both pipes are located within the 60-foot Esplanade Drive right-of-way. Sixty-six properties convey water to a storm drainpipe under the street. The City believes that the underground utilities were installed during the construction of the original subdivision in the early 1950s.

Esplanade Drive, a public road, has a 60-foot wide right-of-way. After the construction of the project, the City reconfigured Esplanade Drive as a one-way northbound street. The one-way configuration of Esplanade Drive ranges from 40 to 80 feet from the bluff edge. The City installed a concrete "k-rail" barrier and a 5-foot tall chain-link fence in the former southbound lane, south of the two remaining houses at 528 and 532 Esplanade Drive, to prevent vehicles and the public from entering the bluff-top area.

As shown in the as-built plans, drainage of runoff from the bluff top and Esplanade and Avalon Drives within the project area is currently routed through a previously existing system of storm drains

connecting to a culvert running through the revetment and emptying at the base of the revetment to the beach below.

3.4 Geologic Stability and Shoreline Erosion

Issue Summary

The revetment project was constructed under emergency conditions to protect an eroding coastal bluff to prevent further erosion of the bluff and protect existing bluff-top structures and does not create or contribute significantly to erosion or geologic instability of the site or its surroundings as required by LCP Policy 26 / Coastal Act Section 30253. However, the existing bluff-top drainage under the access the road and emptying onto the beach could contribute to beach erosion in front of the revetment inconsistent with LCP Policy 26 / Coastal Act Section 30253. The Commission finds that the question of proper site drainage is integral to the project and therefore imposes **Special Condition 5**, requiring the City to submit for the Executive Director's review and approval a Revised Drainage Plan prior to permit issuance for re-routing the existing drainage from the bluff top away from the beach and to redirect bluff-top drainage consistent with the terms and conditions of the permit and approved plan within 365 days of permit issuance. As conditioned, the Commission finds that the proposed project does not create or contribute significantly to erosion and conforms to the policies of the certified LCP and Coastal Act that assure structural integrity and geologic stability.

LCP and Coastal Act Policies

LCP Land Use Plan Policy 26 / Coastal Act Section 30253 in relevant part states:

> *New development shall:*
> *(1) Minimize risks to life and property in areas of high geologic, flood and fire hazard.*
> *(2) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.*
> …

Discussion

The design of the proposed revetment was originally based on 100-year recurrence interval for oceanographic conditions leading to coastal erosion. The City's engineering consultant assessed the oceanographic and geologic conditions of the site to develop the design criteria for the revetment in the pre-construction *Engineering Assessment Report* dated April 2, 1998. Based on conditions such as nearshore bathymetry, maximum possible still water elevation, wave height, beach slope, and bedrock foundation scour depth, to withstand a 100-year oceanographic condition (erosion) event, the engineering consultant recommended the construction of the revetment with 10-ton armor stone and a 14-foot crest width at the 26-foot MSL elevation. The engineering consultant also noted that a revetment designed to withstand 50-year oceanographic condition event would have a crest width of 12 feet at 26 feet MSL and an armor layer of 5-ton stone. To withstand 75-year oceanographic condition event, a crest width of 13 feet and armor stone size of about 8 tons is needed. The report states that "an armor stone size of 8 to 10 tons was selected for design."

As listed in Section 0 above, the revetment as constructed varies from the plans approved under the emergency permits. The effects of these changes on the stability of the proposed project are described below.

The revetment as constructed consists of 8 to 10-ton rock in the first armor layer and a crest width of six feet at the 26-foot MSL elevation. Some stones up to 20 tons in weight were placed in the first armor layer. The engineering consultant concluded that the reduction in crest width

> *may result in a small amount of water striking the bluff during an extreme (greater than 100-year recurrence interval) storm event. However, because the top of revetment is at elevation +26 MSL the water will have very little energy to erode the unprotected cliff face above the revetment.* (Skelly 1998)

The revetment contains smaller armor stone in the second armor layer. The City's engineering consultant states that the use of smaller-than-specified armor stones in the second armor layer will not affect the performance of the revetment. The engineering consultant further remarks that the use of 5 to 7-ton stones as the first armor layer at elevations above +18 MSL is acceptable at elevations above +18 MSL because water forces are greatly reduced at elevations above +16 MSL. However, according to the City's engineering consultant, the use of smaller stones in the second armor layer and in the first armor layer at the top of the revetment may result in additional maintenance as a result of an increase in frequency of movement of dislodged stones movement under extreme storm conditions.

As proposed, the City's engineering consultant opines that the revetment should withstand a 75-year oceanographic condition event, but will likely suffer some damage during 100-year event. The Commission staff engineer has reviewed the engineering reports and plans for the as-built project and hasdetermined that the revetment provides adequate shoreline protection to withstand 75 year oceanographic conditions. The Commission staff engineer emphasizes, however, that as built, the revetment may require more maintenance than a revetment designed to withstand 75-year or 100-year oceanographic condition event because it is designed to withstand less severe oceanographic conditions and will be subject to a greater frequency of dislodged stones.

Hydraugers intended to provide subsurface drainage of the bluff were not installed as part of the project. The City acknowledges that the use of hydraugers would increase the stability of the exposed bluff above the top of the revetment. However, the hydraugers were intended to improve the stability of the bluff to allow for the rebuilding of houses on the bluff top and were not considered essential to protect the adjacent public street or infrastructure. Since the City bought all but four of the bluff-top properties and contemplates the provision of passive public access instead of the construction of new houses on the bluff top, the hydraugers were eliminated from the plan.

As proposed, the revetment generally extends from 528 Esplanade Drive south to the portion of the bluff jutting seaward, a distance of approximately 700 feet. The revetment keyway has a minimum width of 10 feet and a minimum depth of 5 feet to ensure stability of the structure. The keyway ties into the existing bluff by curving inward at the northern end. This engineered design provides an angle to the revetment that eliminates wave uprush reflected from the revetment onto the adjacent unprotected bluffs. At the southern end, the keyway is cut into the Franciscan greenstone bedrock where the bluff forms a relatively erosion-resistant point. Thus, the design reduces the potential for the revetment to create or contribute significantly to erosion or geologic instability of the surrounding bluff.

As proposed, the fill buttress and the access road partially built on the buttress are engineered properly and do not create or contribute to further erosion of the bluff. The City’s engineering consultant supervised the construction of the fill buttress to ensure adherence to design specifications. Compaction tests were conducted to certify that the fill was compacted to a minimum of 90% of the maximum dry density of the material. Furthermore, the buttress was designed and constructed at a

1.5:1 slope to preserve the maximum amount of in-place bluff material (CSA 1998). Because the buttress replaces lost bluff material, the buttress acts as an cover of the natural bluff that prevents further bluff erosion from occurring. In addition, **Special Condition 1** requires the City to maintain the fill buttress and access road and prevent any sloughing or erosion.

The intent of the proposed project is to reduce erosion of the bluff at the project site. Based on review of the geotechnical information provided by the City, the Commission staff engineer concurs with the City's engineering consultant that the design of the revetment is sufficient to achieve this purpose of reduction of bluff erosion. However, the existing configuration of bluff-top drainage through a storm drain system with outfall to the beach below the revetment could contribute to beach erosion, inconsistent with LUP Policy 26 / Coastal Act Section 30253. The Commission raised concerns about this drainage outfall at the May 2001 hearing. Runoff from the bluff top and Esplanade Avenue and Avalon Drive within the project area currently is routed through a previously existing system of storm drains connecting to a drain pipe running under the access road and emptying to the beach at the base of the revetment. Although the storm drain system and beach outfall existed prior to the construction of the revetment, the question of site drainage is integral to the revetment project approved by the City and must be addressed as part of the project. The existing drainage configuration could cause erosion of beach sand below the drainage outfall due to scour resulting from high winter runoff volumes. To address this potential for beach erosion, the Commission imposes **Special Condition 5**, which requires the City to submit for the Executive Director's approval a Revised Drainage Plan for the site prior to permit issuance. The revised Drainage Plan must re-route the existing drainage from the bluff top away from the beach below the revetment. **Special Condition 5** further requires the City to construct new or modified bluff-top drainage plan, consistent with the approved plan, within 365 days of permit issuance. So conditioned, the Commission finds that the proposed project does not create or contribute significantly to erosion and conforms to the policies of the certified LCP and Coastal Act that require new development to assure structural integrity and geologic stability.

The Commission staff engineer and geologist affirm that, as conditioned, the proposed project assures stability and structural integrity, and neither creates nor contributes significantly to erosion, geologic instability, or destruction of the site or the surrounding area, consistent with the requirements of LCP Land Use Plan Policy 26 / Coastal Act Section 30253. The Commission accordingly finds that the proposed project, as conditioned, is consistent with LCP Policy 26 / Coastal Act Section 30253.

Conclusion

The proposed revetment was constructed to prevent further erosion of a coastal bluff. By decreasing bluff retreat at the project site, the revetment protects two remaining private residences, a public road, public bluff-top property, and public-serving utilities from damage or destruction. The information presented by the City demonstrates that the proposed project will not create further erosion or instability of the bluff. Re-direction of bluff-top drainage away from the existing beach outfall consistent with the Revised Drainage Plan required by **Special Condition 5** assures that the project will also not contribute to beach erosion. Therefore, as conditioned, the Commission finds that the project assures stability and structural integrity and neither creates nor contributes significantly to erosion, geologic instability, or destruction of the site or the surrounding area and is consistent with LCP Policy 26 / Coastal Act Section 30253.

3.5 Shoreline Protection and Alternatives Analysis

Issue Summary

The proposed revetment is the least environmentally damaging feasible alternative that protects existing structures in danger from bluff retreat. The geotechnical information provided by the City considers all the necessary criteria for shoreline protection required by LUP Policy 16 / Coastal Act Section 30235 and indicates that the proposed project is required to protect existing structures in danger from erosion and designed to eliminate or mitigate impacts to local shoreline sand supply. However, the proposed project does not conform to the requirements of LCP Zoning Code Ordinance 9-4.4406 to provide maintenance. Therefore, **Special Condition 1** requires the City to maintain the revetment to remove or redeposit dislodged rock from the beach. As conditioned, the Commission finds that the proposed project conforms to the LCP and Coastal Act policies for development on the shoreline.

LCP and Coastal Act Policies

LCP Land Use Plan Policy 16 / Coastal Act Section 30235 states in applicable part:

> *Revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls, and other such construction that alters natural shoreline processes shall be permitted when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion, and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply.*

LCP Zoning Code Ordinance 9-4.4406 (Shoreline Protection) states in relevant part:

> *(c) Development standards. The following standards shall apply to all new development along the shoreline and on coastal bluffs.*
>
> *(1) alteration of the shoreline, including diking, dredging, filling, and placement or erection of a shoreline protection device, shall not be permitted unless the device has been designed to eliminate or mitigate adverse impacts on local shoreline sand supply and it is necessary to protect existing development or to serve coastal-dependent uses or public beaches in danger from erosion or unless, without such measures, the property at issue will be rendered undevelopable for any economically viable use;*
>
> …
>
> *(3) Required shoreline protection devices shall be designed and sited to consider and reflect:*
>
> *(i) maximum expected wave height;*
>
> *(ii) estimated frequency of overtopping;*
>
> *(iii) normal and maximum tidal ranges;*
>
> *(iv) projected erosion rates with and without a shoreline protection device;*
>
> *(v) impact on adjoining properties;*
>
> *(vi) design life of the device;*
>
> *(vii) maintenance provisions, including methods and materials; and*
>
> *(viii) alternative methods of shoreline protection, including "no project".*
>
> *(4) the impact on beach scouring and sand replenishment shall be minimized;*

(5) water runoff from beneath existing seawalls shall be minimized;

(6) existing unauthorized rubble or protective devices shall be removed prior to the approval of additional development in such areas; and

(7) a geotechnical engineer shall certify that the shoreline protection device will withstand storms comparable to the major winter storms of 1982 and 1983 along the California coast.

…

Discussion

In reviewing requests for shoreline protection projects, the Commission must assess both the need to protect existing development and the potential adverse impacts to public resources. A number of adverse impacts to public resources are associated with the construction of shoreline protective devices. These include the loss of public beach displaced by the structure, "permanently" fixing the back of the beach that halts the landward migration of the bluff and beach, the narrowing and potential elimination of beach in front of the structure, a reduction or elimination of sand contribution to the beach from adjacent bluffs, sand loss from the beach due to wave reflection and scour, accelerated erosion on adjacent unprotected properties, and visual impacts associated with the construction of a shoreline protection device on the natural bluffs.

The applicants have made a showing that existing, bluff-top structures are in danger from erosion, and that shoreline protection in some form is necessary to protect these structures. In the interim since the May 2001 hearing, the City's engineering consultant, Cotton, Shires and Associates (CSA), has provided a detailed slope stability analysis of the bluff in relation to structures on the bluff top. This analysis has been reviewed by the Commission's staff geologist, who concurs that it adequately describes the stability of the site. The western edge of Esplanade Drive ranges from 40 to 80 feet from the bluff top. Contained within the Esplanade Drive right-of-way is important infrastructure including a trunk sewer line, water main, natural gas line power and telephone lines. Esplanade Drive provides access to 11 homes along the eastern side of the street and coastal bluff top access along its length. The revetment protects all of these structures. In addition, the two remaining homes west of the street at 528 and 532 Esplanade Drive are protected by the revetment.

The slope stability analysis provided by the City's consultant, CSA, models the static stability of the bluff without regard to bluff retreat processes such as wave erosion and evaluates the likelihood of failure of the bluff along failure planes at angles from the foot of the bluff, assuming the revetment had not been constructed. The study is based on geologic conditions and assumptions concerning soil cohesion and peak friction angle in the strata of poorly consolidated alluvial deposits and underlying Greenstone bedrock composing the bluff. Generally, a factor of safety (FS) of 1.5 is considered adequate to protect new development from geologic instability.[3] The study prepared shows that Esplanade Avenue lies east of and behind the 1.5 FOS failure plane for the length of the revetment (**Exhibit 10**). The study also shows that only the existing house at 532 Esplanade Drive is intersected by the 1.5 FS failure plane (**Exhibit 10**). As the factor of safety decreases is below 1.5, structures are at increased risk from geologic instability, and when the factor of safety approaches 1.0, the degree of threat becomes imminent. Parts of the coastal bluff at the site have a calculated factor of safety of only 1.0 or slightly greater (without the revetment in place), indicating that failure of the bluff would be

[3] FOS is a ratio based on weight of bluff above the failure plane and the frictional and static forces opposing this weight. An FOS of 1.0 indicates these forces are equal.

imminent. Without the revetment in place, these areas would be at heightened risk of damage from slope failure. The study emphasizes that the slope stability analysis is based on static stability, and does not address additional instability that might be expected during an earthquake. Further, if the present profile of the bluff were to be allowed to be undercut by wave attack, slope stability would decrease and the 1.5 FS contour line will advance eastward, undercutting Esplanade Avenue. Nevertheless, at the present time no structures are imminently threatened by slope instability.

The retreat of the bluff in response to wave attack provides additional information concerning the length of time that might pass before structures are threatened by slope instability. The City has provided additional information concerning long-term erosion rate and episodic retreat rate. Long term bluff retreat rates have been estimated at approximately two feet per year based on an analysis of 11 aerial photographs taken between 1946 and 1999. Skelly Engineering, an engineering consultant for the City, calculates the average retreat rate between 1997 and 1999 at 15.5 feet per year. This is not a long-term bluff retreat rate, but rather an indication of the amount of retreat that can be expected at this site during an extreme erosion event. As noted by the City's consultant, CSA long-term average annual retreat rate does not adequately describe bluff retreat or evaluate danger to bluff-top structures from erosion. The Commission's staff geologist concurs with this assessment. During the 1997-98 winter storms, retreat ranging from 25 to up to 50 feet occurred along the bluff, with average retreat in excess of 35 feet, and a discrete episode of 30 feet in one location during a two-week period in February 1998. The City's consultant notes that episodic retreat is linked to frequency of especially heavy storm years and in particular El Niño conditions, which occur based on review of NOA-designated El Niño events over the last 50 years on average every 7 years. The frequency of heavy storm seasons gives some insight into the probability of bluff failure, since retreat results from undermining of the exposed, friable bluff base by storm waves. However, it is not possible to predict episodic retreat accurately. For purposes of assessing risk to bluff top structures, both the Commission staff geologist and engineer concur that given historic episodic bluff retreat in this area, existing bluff-top structures including even those portions of Esplanade Drive presently farthest from the bluff edge could be damaged in one to two years, if an erosion event comparable to the 1997-1998 El Nino were to recur. Therefore, based on the existence of structures on the blufftop seaward of the 1.5 FOS failure plane and the history of episodic bluff retreat at the site, the Commission finds that existing structures located on the bluff would be at risk from damage due to erosion if there were no shoreline protection.

Alternatives Analysis

The policies of the certified LCP and the Coastal Act further require the design of any shoreline protective device to be the least environmentally damaging alternative, and to be the most protective of shoreline processes. After the City's action had been appealed to the Commission, the City provided the Commission with an alternatives analysis for construction of the revetment. Since the May 2001 hearing, the City has provided additional analysis of project alternatives, including managed retreat, construction of a vertical seawall, sand replenishment, and a revetment of reduced length protecting only the two remaining homes west of Esplanade Drive.

Managed Retreat

The managed retreat alternative would include the removal and relocation of homes, Esplanade Drive, and utilities within the Esplanade Drive right-of-way, as well as removal of the revetment itself. Access to 11 homes on the east side of Esplanade Drive would also be lost, impacting those properties. With no shoreline protection in place, wave forces would gradually erode the bluff top and could, based on observed episodic retreat rates, undermine both the two remaining and those portions of Esplanade

Drive closest to the bluff edge within a matter of as little as one to two storm seasons. The relocation of the bluff-top infrastructure would incur significant costs and take several months to accomplish. The City has provided a revised cost estimate of removing the existing revetment of more than $4 million, not counting the value of the property and improvements which would eventually be lost. The City concluded that the excessive cost of this alternative renders the managed retreat alternative infeasible. Given the significant costs of revetment removal coupled with the impacts to existing structures and associated costs, the managed retreat alternative is not a feasible, less environmentally damaging alternative to the proposed project as conditioned.

Seawall Alternative

A steel-reinforced concrete, vertical seawall would be an alternative, effective means of stabilizing the entire bluff. The City discusses a seawall at the project site to reach 40-45 feet MSL (about 20 feet taller than the existing revetment) to retain the unstable bluff behind it. A vertical seawall would have a reduced footprint compared to the existing revetment and would reduce impacts to beach and public access accordingly. However, the cost of such a seawall is estimated to be at least $2 million and as much as $4 million. Assuming costs of removal of the existing revetment of about $4 million, the total construction cost including revetment removal would range from $6 million to $8 million. No funding is available for the City to remove the revetment and construct a seawall. The City concluded that the excessive cost of this alternative renders the vertical seawall alternative infeasible. Furthermore, the construction of the wall would require significantly more modification of the existing landform due to the size of the footing excavation and the necessary drilling of stabilization into the bluff. Additional resource impacts would likely occur during the removal of the revetment. Also, the vertical seawall reflects almost all of the incoming wave energy. The reflected energy may interact with incoming wave energy and may exacerbate erosion on unprotected adjacent portions of shoreline. In comparison, the proposed revetment dissipates about 40-50% of the incoming wave energy and causes fewer impacts to adjacent bluffs and beach. A vertical seawall is accordingly not a feasible, less environmentally damaging alternative to the proposed project as conditioned because of excessive cost constraints and the significant adverse impacts to the bluffs and other coastal resources.

Sand Replenishment Alternative

The City's consultant, Skelly Engineering, concludes that the viability of sand replenishment as an alternative to the existing revetment could only be clearly determined after extensive oceanographic and geologic studies of the area, at very significant expense, and that such an alternative would be prohibitively costly and ultimately ineffective in slowing the rate of bluff retreat. Sand replenishment is generally not suited to shorter lengths of shoreline of a few hundred feet and would require ongoing replenishment program and continuing costs. Any sand replenishment program also would result in additional environmental impacts from hundreds of truck trips required to deliver sand. As a result, based on available information, sand replenishment is not a feasible less environmentally damaging alternative to the proposed revetment as conditioned.

Reduced Footprint Alternative

At the May 2001 hearing, the Commission directed staff to consider a reduced footprint alterative which would remove all revetment except that directly protecting the two, remaining homes west of Esplanade Drive. At present, the southern end of revetment is keyed into relatively erosion-resistant bedrock. Reduction of the length of the revetment would leave the exposed southern end of the revetment vulnerable to outflanking, and would likely resulting in severe incursion of erosion south of the reduced revetment. This alternative would not protect Esplanade Drive and associated

infrastructure or preserve access to the bluff top and homes east of Esplanade Drive. The reduced footprint alternative would result in essentially the same disadvantages as the managed retreat alternative along the area of unprotected bluff. For these reasons, the reduced footprint alternative is not a feasible, less environmentally damaging alternative to the proposed project as conditioned.

The Commission finds that the history of the project site and the Pacifica shoreline in general provide evidence that the existing bluff-top development in the project area, including the existing residential structures along Esplanade Avenue, the infrastructure improvements within the Esplanade Avenue right of way and Esplanade Avenue itself, is in danger from erosion and that some form of shoreline protection is necessary. The Commission finds that the project alternatives discussed above, including removal of the revetment and construction of a vertical seawall, are not less environmentally damaging feasible alternatives to the proposed project as conditioned, but that the alternatives of revetment removal and/or replacement with another type of shoreline protective work should be reconsidered after a period of time has elapsed. The Commission accordingly imposes **Special Condition 6**, which limits the time period for which development is authorized to 5 years from the date of permit approval and requires the City to file a new application at the end of that period. The 5-year time period in which development is authorized will allow the City time to re-explore feasible, less environmentally damaging alternatives, including formation of a Special Assessment District for construction of the seawall alternative, as well as provide opportunity to monitor and evaluate the revetment and the conditions on the site and determine if circumstances warranting the revetment have changed. The Commission notes that the City is in agreement with the Commission's imposition of this condition. So conditioned, the Commission finds that the revetment is required at this time to protect existing structures, including Esplanade Drive itself, the infrastructure within the public right-of-way, and the existing houses at 528 and 532 Esplanade Drive.

Effect on Sand Supply

Although the need for the proposed revetment has been documented, the policies of the LCP and Coastal Act further require the determination of whether the proposed project alters natural shoreline processes. If significant adverse impacts are identified, the project must mitigate or eliminate adverse effects on local shoreline sand supply. Any revetment that attempts to stabilize bluffs and halt natural bluff retreat may significantly alter natural shoreline processes, since the bluffs are a source of material that makes up the beach substrate. The inability for the bluff to nourish the sand supply with the installation of a revetment can lead to progressive loss of sand on the beach.

The proposed revetment prevents storm waves from hitting the bluff toe, thereby preventing landward retreat of the entire bluff. However, the proposed revetment does not prevent the gradual erosion of the upper portion of the bluff by wind and rain. Thus, the upper bluff continues to supply material to the beach. Since the proposed revetment covers approximately 20 feet of the 60 to 70- foot tall bluffs, the surrounding beaches will experience only a minor loss to the local sand supply. Furthermore, in quantifying total sand supply in the project area, the City's consulting engineer indicates that the bluff consists mainly of greenstone bedrock, relic dune sands, and alluvium. The bedrock weathers to clay and silt and does not contribute sand to the beach. The relic dune sand contains about 90% sand but is only about 10 feet thick. Alluvium in the bluff is about 30 feet thick and weathers to gravel and 35% sand. Based on an estimated bluff retreat rate of two feet per year, the shoreline behind the revetment contributes about 335 cubic yards of sand to the beach per year. The City has also indicated that the primary sources of local sand for the beach are San Pedro Creek, Laguna Salada, Milagra Creek and Big Inch Creek, as well as bluff erosion. In comparison to the potential longshore sand transport of

about 100,000 cubic yards annually (Battalio 1996), the sand lost from the local sand supply is insignificant. Therefore, as proposed, the project avoids significant adverse impacts to sand supply.

As discussed above, however, the existing drainage of the bluff-top area and Esplanade Drive through storm drains emptying through a culvert onto the beach below the revetment could result in at least seasonal erosion of beach sand below the storm drain outfall. To address such impacts, the Commission imposes **Special Condition 5**, which requires that the City submit a Revised Drainage Plan for review and approval of the Executive Director prior to permit issuance and further requires the City to redirect the existing bluff-top runoff away from the beach in accordance with the approved plan.

LCP Zoning Code Ordinance 9-4.4406 lists specific information that the City needs to consider in the design and siting of the revetment, including provisions for maintenance and the methods and materials used. **Special Condition 1** requires the City to inspect the revetment after all major storm events and at least twice a year to look for specific signs of potential revetment failure or impacts to coastal resources. If the City finds signs of potential failure, a monitoring report must be prepared that includes recommendations for repair or maintenance of the project. **Special Condition 1** also requires the City to submit a monitoring report every year for the life of the structure to evaluate the condition and performance of the revetment, analyze erosion trends of the bluff, and recommend repair, maintenance, modifications, or other work to the revetment. If the recommended measures constitute development under the Coastal Act, a CDP or permit amendment is required.

Special Condition 1 further requires the City to remove, redeposit, or reposition rock that becomes dislodged from the revetment, remove debris and trash from the revetment, and clean the 6-inch perforated pipe under the fill buttress. Best Management Practices must be used to maintain the fill buttress. In addition, the City must maintain the access road in a stable and non-eroded condition to allow maintenance activities to occur. At present, the lower portion of the access road has eroded. These monitoring and maintenance measures are necessary to ensure that the proposed project minimizes the risk to life and property.

The Commission finds that, as conditioned, the proposed project is consistent with LCP Land Use Plan Policy 16 / Coastal Act Section 30235 requiring shoreline protection structures to mitigate or eliminate adverse impacts to local shoreline sand supply.

Conclusion

Bluff retreat of the project area threatened a public road, public utilities, public property, and private residences. An analysis of alternatives to the proposed revetment demonstrates that the revetment is the least environmentally damaging feasible alternative method to protect these structures and is therefore required to protect the existing structures. As conditioned, the proposed project will not significantly alter natural shoreline processes or impact the local shoreline sand supply. Pursuant to **Special Condition 1**, the City is required to maintain the revetment in fulfillment of Zoning Code LCP Zoning Code Ordinance 9-4.4406. Pursuant to **Special Condition 5**, the City must redirect bluff-top drainage away from the beach in accordance with an approved Revised Drainage Plan. Therefore, the Commission finds that as conditioned the proposed project is consistent with LCP Land Use Plan Policy 16 / Coastal Act Section 30235 and LCP Zoning Code Ordinance 9-4.4406.

3.6 Hazards

Issue Summary

To minimize the risk of hazards associated with the project, **Special Condition 1** requires the City to inspect and maintain the revetment regularly. Maintenance of the revetment includes the removal or redeposit of dislodged rock as soon as possible after displacement occurs and the removal of debris and trash from the revetment. The City must also maintain the fill buttress and maintenance access road. **Special Condition 1** further requires the submission of a monitoring report at least once a year that evaluates the condition and performance of the revetment and makes recommendations for the structure's repair and maintenance. As conditioned, the Commission finds that the proposed project conforms with the LCP and Coastal Act policies for the minimization of risks and assurance of geologic stability in areas of high geologic hazard.

Although intended to protect private property and public infrastructure from hazards associated with bluff erosion, the proposed revetment and associated development may create hazards to the public. For example, if not properly maintained, rock from the revetment could tumble into the surf zone where it would be hazardous to beach users or surfers. Sloughing or erosion of the maintenance access road or the fill buttress could also pose a safety risk to people at the base of the bluff or on the bluf top. Despite its hazardous nature, the City has voluntarily chosen to carry out the proposed project. The Commission therefore imposes **Special Condition 2** requiring the City to assume the risks of development, waive any claim of liability against the Commission for such losses, and indemnify and hold the Commission harmless against third party claims against the Commission as a result of any hazards associated with the proposed project.

LCP and Coastal Act Policies

LCP Land Use Plan Policy 26 / Coastal Act Section 30253 in relevant part states:

> *New development shall:*
> *(1) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.*
> *(2) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.*

Discussion

To minimize hazards caused by the proposed project, the City proposes to monitor and maintain the revetment and associated development. To reduce the potential for hazards, the Commission imposes **Special Condition 1** to require the City to inspect the revetment after all major storm events and at least twice a year to look for specific signs of potential revetment failure or impacts to coastal resources. If the City finds signs of potential failure, a monitoring report must be prepared that includes recommendations for repair or maintenance of the project. If the recommended measures constitute development under the Coastal Act, a CDP amendment is required. **Special Condition 1** requires the City to submit a monitoring report every year for the life of the structure to evaluate the condition and performance of the revetment, to analyze erosion trends of the bluff, and to recommend repair, maintenance, modifications, or other work to the revetment.

Special Condition 1 further requires the City to remove, redeposit, or reposition rock that becomes dislodged from the revetment, remove debris and trash from the revetment, and clean the 6-inch perforated pipe under the fill buttress. Best Management Practices must be used to maintain the fill

buttress. In addition, the City must maintain the access road in a non-erosive condition to allow maintenance activities to occur. These monitoring and maintenance measures are necessary to ensure that the proposed project minimizes the risk to life and property.

Despite the monitoring and maintenance requirements imposed by **Special Condition 1**, the revetment, fill buttress, and associated development may still constitute potentially hazardous development. The proposed project could pose safety risks for members of the public using the beach or the top of the bluff. For instance, rock from the revetment could dislodge and move onto the beach or into the surf zone and become hazardous to beach users or surfers. The applicant has voluntarily chosen to implement the project despite the risk of hazards. The Commission therefore imposes **Special Condition 2** to require the City to assume the risks of any loss or damage associated with or arising out of the proposed development, waive any claim of liability against the Commission for such damage or loss, and indemnify the Commission against third party claims brought against the Commission in connection with or arising out of the approved development.

Conclusion

The proposed development may pose hazards to people on the bluf top or on the beach. To assure that the project minimizes such risks, **Special Condition 1** requires the City to frequently monitor and maintain the proposed revetment, fill buttress, and access road.

Because the applicants propose potentially hazardous development, **Special Condition 2** requires the City to assume the risk of any loss or damage associated with or arising out of the proposed development. The Commission finds that as conditioned, the project minimizes risks to life and property in areas of high geologic hazard, consistent with LCP Policy 26/Coastal Act Policy 30253.

3.7 Public Access and Public Recreation

Issue Summary

As proposed, the revetment and fill buttress will occupy 32,000 square feet of public sandy beach. The proposed project impedes lateral access along the coast under certain beach profiles and tide conditions. To minimize the proposed project's impacts to lateral public access and public recreation on the beach, **Special Condition 1** requires the City to maintain the revetment, fill buttress, and access road to minimize intrusions of dislodged rock or fill on the public beach. To mitigate for the loss of public beach, **Special Condition 3** requires the City to provide public access improvements on 24,000 square feet of property currently owned by the City within one year of issuance of the CDP. To fully offset the 32,000 square feet of lost public beach, **Special Condition 3** also requires the City to provide additional public access improvements on 8,000 sq. ft. of additional property if the City acquires more bluff-top property in the future.. As conditioned, the proposed project is consistent with the LCP and Coastal Act policies protecting public access along the coast and public recreation.

LCP and Coastal Act Policies

Coastal Act Section 30210 states:

> *In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.*

LCP Land Use Plan Policy 1 states:

Maximum access shall be conspicuously posted and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of property owners, and natural resource areas from overuse.

LCP Land Use Plan Policy 2 / Coastal Act Section 30211 states:

Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.

LCP Land Use Plan Policy 3 / Coastal Act Policy 30212 states in applicable part:

(a) Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where

(1) it is inconsistent with public safety, military security needs, or the protection of fragile coastal resources,

(2) adequate access exists nearby, or,

…

LCP Zoning Code Ordinance 9-4.4404 (Geotechnical Suitability) states in relevant part:

(b) Required Survey. A geotechnical survey, consistent with the City's Administrative Policy #34 and prepared by a registered geologist or geotechnical engineer, shall be submitted to the Director pursuant to Section 9-4.4304, Coastal Development Permit Procedures and Findings, for all new development located in the following settings:

(1) Areas showing evidence of landslides or landslide potential;

(2) Areas showing evidence of ground shaking or earth movement;

(3) Within fifty (50) feet of a coastal bluff;

(4) On all slopes greater than fifteen (15) percent; or

(5) Within sand dune habitats.

…

(d) Development Standards. The following standards shall apply to new development in areas identified in Section 9-4.4404(b).

…

(3) The density of new development shall be based on the net development developable area, as established in the required geotechnical survey;

…

(5) Consistent with the City's Seismic Safety and Safety Element, new development shall be set back from the coastal bluffs an adequate distance to accommodate a 100-year event, whether caused by seismic, geotechnical, or storm conditions, unless such a setback renders the site undevelopable. In such case, the setback may be reduced to the minimum extent necessary to permit economically viable development of the site, provided a qualified geologist determines that there would be no threat to public safety and health.

…

LCP Zoning Code Ordinance 9-4.4406 (Shoreline Protection) states in relevant part:

(c) Development standards. The following standards shall apply to all new development along the shoreline and on coastal bluffs.

…

(8) The seawall shall be designed to minimize impacts upon existing lateral and vertical access and in any case shall not result in the blocking of an accessway. In cases where it is not possible to engineer a wall without blocking access, then appropriate mitigation measures shall be incorporated into the design. These measures can include a stairway over the seawall to provide continuous vertical access or a platform over the seawall to provide continuous lateral access.

LCP Zoning Code Ordinance 9-4.4407 (Public Shoreline Access) states in relevant part:

(b) Development standards. The following standards shall apply to all new access provisions.

(1) to provide separation between shoreline access and residential uses and to protect the privacy and security of residents and homes, any required access easements shall comply with the following setbacks, where feasible:

(i) the inland edge of lateral shoreline trails shall be at least twenty-five (25) feet from any occupied or proposed residence. However, in the event a 25' access buffer will not provide adequate lateral public access in compliance with the access provisions of the Coastal Act or with the Access Component of the LCP Land Use Plan, a narrower access buffer may be required. In no event shall the lateral accessway extend any closer than 10' from the residence in question; and

…

(3) public shoreline access improvements such as trails, ramps, railings, viewing areas, restrooms, and parking facilities shall be sited and designed to be accessible to people of limited mobility to the maximum extent feasible;

(4) public shoreline access improvements such as trails, ramps, railings, viewing areas, restrooms, and parking facilities shall be sited and designed to be compatible with the natural character of the shoreline;

(5) public shoreline access signage shall identify access location, destination areas, environmentally sensitive habitat, and hazardous conditions, and be compatible with the natural appearance and character of the shoreline by using appropriate color, size, form, and material; and

…

(7) with respect to lateral bluff top access, the easement shall be adjusted inland from the current bluff edge if it recedes inland, but in no event shall the trail be closer than ten (10') feet to an occupied or proposed residence. Such an inland adjustment shall not occur in the event it would prohibit private use of a site or would render use or development of the site economically infeasible.

Discussion

The coast in the proposed project area is popular and draws greater-than-local users. Formalized public vertical access to the City-owned beach is available at two points in the vicinity of the project area. A wooden stairway extends from Esplanade Drive to the beach and is located about 0.4 miles north of the proposed project area. Another accessway is located approximately 0.25 miles south of the project area on Palmetto Avenue. A paved 20-space public parking lot at this location leads to a dirt path that ends on the top of the proposed riprap and the culverted Milagra Creek.

On the bluff top of the project site, a 5-foot tall chain-link fence is located about 40 feet from the bluff edge. Slats in the lower two feet of fence serve to prevent sand from blowing onto the street. A concrete k-rail barrier fronts the one-way Esplanade Drive about 60 feet from the edge of the bluff. Aside from the placement of base rock within the Esplanade Drive right-of-way and fill placed south of the intersection of Esplanade and Avalon Drives west of the k-rail barrier, there are no other improvements to the bluff top in the location of the former residences.

At low tides, the public can traverse the beach from the northern boundary of the City almost to the Pacifica pier. The proposed project area falls between these two points and constitutes an important link for lateral access along the coast. At high tides, much of the beach at the proposed project site is covered in water, with water sometimes reaching the revetment. Although a portion of coastal bluff juts out south of the project area and may limit lateral passage by the public during high tide, lateral public access along the beach is available under most conditions.

As constructed, the revetment extends approximately 40 feet seaward of the base of the bluff. With a length of about 700 feet, the revetment occupies about 28,000 square feet of public beach, directly reducing the amount of beach available for public access and recreational use. The fill buttress in the southern part of the project site covers an additional approximately 4,000 square feet of public beach. Thus, the proposed development would result in the direct loss of approximately 32,000 square feet of public beach. The area lost may have provided the only lateral access available in front of the revetment during high tides and winter beach conditions. In addition, the revetment would affect the beach profile and decrease the area available for public use by reducing the beach seaward of the ordinary high water mark. Rocks falling or migrating further on the beach and into the surf zone may exacerbate those impacts. Because the proposed revetment would result in significant adverse impacts to the public's ability to laterally access the beach, the proposed project does not conform with the LCP and Coastal Act policies for public access and public recreation.

LCP Zoning Code Ordinance 9-4406(c)(8) entitled "Shoreline Protection" requires seawalls to minimize impacts on existing access and avoid blocking accessways. The zoning code provision uses the term *seawall* in its requirement for shoreline development to provide the incorporation of appropriate mitigation measures into the seawall design when it is not possible to engineer a wall to avoid blocking access. Because the City uses *seawall* interchangeably to describe other shoreline protection devices, including revetments, in documents such as the General Plan and the City's May 26, 1998 City Council Summary Report giving City staff direction on the construction of the revetment, the ordinance applies to the proposed project.

To minimize impacts to public access on the beach, **Special Condition 1** requires the City to maintain the development to keep material from the revetment or fill buttress from falling onto the beach, thereby minimizing the proposed development's impact on lateral public access and public recreation. Under **Special Condition 1**, the City must remove any rock that migrates from the revetment further onto the beach or into the surf zone.

Special Condition 3 requires the City to provide for bluff-top public access improvements and mitigate the loss of sandy beach due to the construction of the proposed revetment and fill buttress. The requirements of **Special Condition 3** are consistent with the LCP and City's plans to establish lateral access on the bluf top. The City's Land Use Plan acknowledges the potential removal of bluff-top residences due to bluff retreat on the 500-block of Esplanade Drive and contemplates, if conditions permit, the provision of public access and viewpoints on the top of the bluff in the event the homes are removed. As noted in the City's March 20, 2000 staff report, the bluff-top lots "will not be redeveloped, except possibly for public open space and/or passive recreational improvements (benches, etc…)". Furthermore, the City has communicated with Commission staff in correspondence dated October 13, 2000 that "City acquisition of the 8 vacant bluff top properties, for purposes of preservation and possibly passive use in the future, will add to the public's ability to access and enjoy unobstructed panoramic views of the shoreline and Pacific Ocean." Since the City is currently planning a bike trail at the top of the bluff, and the proposed revetment will result in significant adverse impacts to the public's ability to laterally access the beach, the Commission finds that the project presents an opportunity to provide public access where such a need is already recognized.

The provision of bluff-top lateral access is also consistent with the March 2000 Pacifica Bicycle Plan, approved by the City Council in 2000. The bike plan states that south of the intersection of Esplanade and Manor Drives (that is, at the project site), the bikeway shifts off-street onto an unpaved trail surface and continues to the south end of Esplanade Drive. The previous bikeway on Esplanade Drive was a Class III bike route that was unstriped and part of the road shared with motor vehicle traffic. The plan identifies the need to close the gap in the existing north/south bicycle route in the area south of Manor Drive with a Class I, 8-foot wide bikeway with 5,600 square feet of paved path. The California Department of Transportation *Highway Design Manual* defines a Class I bikeway as a path that "provides a completely separated right-of-way for the exclusive use of bicycles and pedestrians with crossflow minimized." The Class I bikeway contemplated is the top priority in the plan's list of Bicycle Facilities Improvements and Priorities. The plan proposes that the existing dirt trail on the west side of Esplanade Drive would be paved to connect with additional Class I bikeway contemplated through the recreational vehicle park south of the project area to the parking lot and vertical accessway on Palmetto Drive. The plan also calls for signage improvements in this area.

Accordingly, to mitigate the loss of about 32,000 square feet of public beach and the significant adverse impacts of the proposed revetment on the public's ability to laterally access the beach, **Special Condition 3** requires the City to provide public access improvements on the approximately 24,000 square feet of City-owned property on the bluff top. In addition, **Special Condition 3** requires that if the City acquires additional property at APNs 009-161-010, 009-161-020, 009-161-100, and 009-161-110 adjacent to the property currently owned by the City, the City shall also provide up to 8,000 square feet of additional public access and public passive recreation improvements on the acquired property. By providing for the provision of at least 24,000 and up to 32,000 square feet of improved public access, **Special Condition 3** is adequate to offset the loss of 32,000 square feet of public beach covered by the proposed development. The required public access improvements shall include a trail for pedestrians, persons of limited mobility, and bicycles separated from Esplanade Drive signage, overlook point(s), benches, native landscaping and the removal of the concrete k-rail barrier, chain link fence on the 500-block of Esplanade Drive and fence separating APN 009-161-140 from the adjacent City-owned property. The inland edge of the trail must be at least 10 feet from all occupied residences. The required signage must identify the location of vertical and lateral public accessways, bicycle routes, destination areas, environmentally sensitive habitat, and

hazardous conditions. The public access improvements shall be sited and designed for compatibility with the natural appearance and character of the shoreline. **Special Condition 3** also requires the City to submit to the Executive Director for review and approval the public access plan depicting the required public access improvements within 90 days of the Commission's action on this permit application and a schedule for the construction of the required improvements within one year of issuance of the CDPs. The public access improvements depicted on the final approved plans shall be constructed within one year of the issuance of this coastal development permit.

The provision of public access improvements on the bluff top further requires the removal of the chain-link fence along the 500-block of Esplanade Drive. The 5-foot tall, 550-foot long chain-link fence currently impedes access to the top of the bluff. To protect public safety, **Special Condition 3** requires the installation of a new fence as close to the bluff edge as feasible. The new fence shall be of an open design, compatible with the natural character of the site, and shall not obstruct views.

The City currently owns about 24,000 square feet of the bluff-top property formerly occupied by single-family residences. **Exhibit 8** shows the locations of City-owned and private property in the project area. To allow for public access improvements on the bluff top consistent with public safety needs, **Special Condition 3** requires a licensed geologist or geotechnical engineer to determine the net developable area of the bluff-top property. The City defines *net developable area* in the Land Use Plan as "the portion of a site determined by a geologist to remain useable throughout the design life of the project and determined to be adequate to withstand a 100-year hazard event". **Special Condition 3** also requires a licensed geologist or geotechnical engineer to determine the development setback from the edge of the bluff sufficient to protect the public access improvements for the design life of the improvements.

The remaining property on the top of the bluff in private ownership totals approximately 13,500 square feet comprised of 4,500 square feet of vacant property and about 9,000 square feet of property on which two residences are located. **Special Condition 3** requires the City to provide public access improvements on up to 8,000 square feet of the bluff-top properties currently in private ownership in the event that the City acquires the properties in the future. As required by **Special Condition 3**, a licensed geologist or geotechnical engineer must determine the net developable area and development setback of any bluff-top property acquired, and the City must submit a public access improvement plan for these properties. As conditioned, the 24,000 square feet of City-owned property and the 8,000 square feet contemplated for future acquisition total 32,000 square feet, the same area of public beach covered by the revetment.

The provision of public access and passive recreation improvements required by **Special Condition 3** mitigates the loss of public recreation uses on the beach caused by the occupation of public beach by the proposed development. Although the mitigation would ideally require the City to provide public access equal in place and manner to that lost (that is, public access on the beach), the Commission finds that the requirements of **Special Condition 3** to provide public shoreline access improvements on the top of the bluff is related to the impacts of the proposed revetment on the public's ability to use the beach. Because many bluff-top areas in Pacifica are in private ownership and inaccessible to the public, the provision of public access improvements at the project site allows for one of the few opportunities to walk along the open bluff top in the City. Therefore, the requirements of **Special Condition 3** appropriately mitigate the loss of sandy beach caused by the construction of the proposed revetment and fill buttress.

Conclusion

The proposed project will occupy 32,000 square feet of public beach and interfere with lateral public access along the shoreline. **Special Condition 1** requires the City to minimize the impact to lateral access by maintaining the revetment to remove dislodged rock from the surf zone. The provision of public access improvements on the bluff-top property as required by **Special Condition 3** is adequate to offset the encroachment of the revetment on public beach. Therefore, the Commission finds that as conditioned, the proposed development is consistent with the public access and public recreation policies of the City's LCP and the Coastal Act.

3.8 Environmentally Sensitive Habitats and Marine Biological Resources

Issue Summary

Because the city constructed the revetment under emergency conditions, there was not sufficient time to conduct a thorough assessment of potential impacts to sensitive marine and terrestrial habitats. However, in 1998, the City did consult with State and federal agencies, including the California Department of Fish and Game and the U.S. Fish and Wildlife Service prior to constructing the revetment. None of these agencies expressed concerns regarding potential significant impacts to sensitive habitats at that time. After the project was appealed to the Commission, and consistent with the Zoning Code requirement to obtain a biological survey, the City conducted a more complete reconnaissance of biological resources in the area. This study found no evidence of sensitive habitat in the project area. Therefore, based on the biological survey required by the certified LCP, the Commission finds that the proposed development will not impact environmentally sensitive habitat areas or marine biological resources and is consistent with the LCP and Coastal Act policies in place to protect them.

LCP and Coastal Act Policies

LCP Land Use Plan Policy 18 states:

> *Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas. Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of such habitat areas.*

Zoning Code Ordinance 9-4.4403 (Habitat Preservation) states in relevant part:

(b) Required Survey. A habitat survey, prepared by a qualified biologist or botanist, may be required to determine the exact location of environmentally sensitive habitat areas and to recommend mitigation measures that minimize potential impacts to the habitat. This survey shall be submitted to and approved by the Director pursuant to Section 9-4.4304, Coastal Development Permit Procedures and Findings, for all new development that meets one (1) or more of the following criteria:

(1) The project is located within an environmentally sensitive habitat area as documented in the LCP Land Use Plan, or through the Director's on-site investigation and review of resource information; or

(2) The project site is or may be located within one hundred (100) feet of an environmentally sensitive habitat area and/or has the potential to negatively impact the long-term maintenance of the habitat.

…

Coastal Act Section 30240 states:

(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.

(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.

Discussion

In correspondence with Commission staff on April 19, 2000 and October 16, 2000, the City states that it consulted with the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (DFG), U.S. Army Corps of Engineers, U.S. National Marine Fisheries Service, and the Gulf of the Farallones National Marine Sanctuary before the construction of the project in 1998. The City states that the agencies' representatives did not express concerns with the proposed revetment. In subsequent communication with the City dated January 17, 2001, the USFWS reaffirms that the project does not adversely affect federally-listed species.

On October 13, 2000, consistent with the requirement in Zoning Code Ordinance 9-4.4403 to obtain a biological assessment from a qualified biologist, the City submitted to the Commission a June 30, 2000 biological assessment of the project site by Ecosystems West, the City's biological consultant. A literature search of special-status plant and wildlife species known to occur or with the potential to occur in the project area revealed that the site does not contain suitable habitat for any special, rare, threatened, or endangered species. The assessment included a site reconnaissance by the consultant, conducted by visually examining the bluff face and beach area. The consultant did not observe any special-status plants or wildlife in the project area during the reconnaissance. The assessment states that the bluff in the area of the project contains a seeping sandstone layer, and that the bluff face exhibits rills and slides from erosion. Because the bluff consists of extremely soft sandstone, and because the bluff lacks ledges or crevices, the consultant concludes that it is unlikely that the bluff ever supported habitat for cliff nesting species. Furthermore, the assessment states that the federally threatened western snowy plover requires light-colored sand beaches with semi-protected dunes for nesting, and that it is unlikely plovers nest in the project vicinity because the beach is a dark color and contains no dune habitat.

Based on the information obtained through a biological assessment prepared by a qualified biologist, the proposed project does not adversely impact environmentally sensitive habitat areas. Since the proposed project site does not contain environmentally sensitive habitat areas and is not adjacent to any such areas, the project is consistent with Land Use Plan Policy 18, Coastal Act Section 30240, and Zoning Code Ordinance 9-4.403 which prohibit the disruption of habitat values.

Conclusion

The biological assessment of the project site found no evidence that the project site contains habitat for special status plants or wildlife. The biological assessment furthermore did not record any occurrences of environmentally sensitive species on the project site or on adjacent property. Therefore, as proposed, the project will not adversely impact environmentally sensitive areas, consistent with LCP Policy 18/Coastal Act Policy 30240.

3.9 Visual Resources

Issue Summary

The proposed project alters the natural landform and does not blend into the natural setting of the surrounding bluffs and beach. To minimize the visual impact of the proposed development, **Special Condition 1** requires the applicant to frequently and thoroughly monitor and maintain the revetment to identify potential problems, remove displaced revetment rocks from the beach, and remove debris from the revetment. To remove the existing, unsightly storm drain outfall, **Special Condition 5** requires the City to redirect bluff-top drainage consistent with an approved Revised Drainage Plan within 365 days of permit issuance. As conditioned, the impacts of the proposed development to the scenic qualities of the coast will be mitigated to the maximum extent feasible.

LCP and Coastal Act Policies

LCP Land Use Plan Policy 24 / Coastal Act Section 30251 states:

> *The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect public views to and along the ocean and scenic coastal areas, to minimize the alteration of natural landforms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.*

LCP Zoning Code Ordinance 9.4-4408 (Coastal View Corridors) states in relevant part:

> *(b) Development standards. The following standards shall apply to new development within coastal view corridors.*
>
> *(1) structures shall be sited in order to minimize alteration of natural topography and landforms, tree removal, and grading only to the extent necessary to construct buildings and access roads;*
>
> *(2) structures shall be sited on the least visible area of the property and screened from public view using native vegetation, as feasible;*
>
> *(3) structures shall incorporate natural materials and otherwise shall blend into the natural setting;*
>
> …
>
> *(5) landscape screening and restoration shall be required to minimize the visual impact of the new development; and*
>
> …

Discussion

The proposed revetment, fill buttress, and access road significantly alter the appearance of the beach and shoreline. Some of the smaller rocks have already shifted and scattered seaward. Litter and debris such as shopping carts and concrete blocks are noticeable on the revetment. Rilling and erosion of the access road and fill buttress further degrade the natural look of the shoreline. **Exhibit 7** illustrates the visual impact of the proposed project.

A vertical seawall can be colorized and textured to match the existing bluffs in ways that are not possible with rock. Such techniques have been successful in other coastal areas, such as the Del Monte Forest Area of Monterey County. However, as discussed in Section 0, a vertical seawall is not a feasible alternative.

To minimize the visual impacts of the proposed development, the Commission imposes **Special Condition 1** to require the City to inspect and maintain the revetment on a regular basis. **Special Condition 1** requires the City, consistent with Coastal Act permit requirements, to remove, redeposit or reposition rock that becomes dislodged from the revetment as soon as possible after displacement occurs. The condition also requires the removal of debris, trash and any unpermitted material from the revetment. The City must take all actions necessary to discourage the placement of such material on the project site. In addition, the City must prevent any sloughing or erosion that would make the fill buttress and access road unsightly.

To remove the existing, unsightly storm drain outfall at the base of the access road, the Commission also imposes **Special Condition 5**. This condition requires the City to submit for the Executive Director's approval a Revised Drainage Plan prior to permit issuance for re-routing the existing drainage from the bluff top away from the beach and to redirect bluff-top drainage consistent with the approved plan within 365 days of permit issuance.

These measures will minimize the significant adverse visual impacts of the proposed project or the scenic quality of the coastal area to the maximum extent feasible. Therefore, the Commission finds that as conditioned, the proposed development is consistent with the visual resource protection policies of the Pacifica LCP and the Coastal Act.

3.10 Alleged Violation

Development consisting of the construction of the revetment, fill buttress, maintenance access road, and other associated improvements has taken place without the benefit of a regular coastal development permit from the Commission. Although development has taken place prior to submission of this permit application, consideration of the application by the Commission for the portion of the development located in the Commission's original permit jurisdiction has been based solely upon the policies of the Coastal Act. Approval of the permit does not constitute a waiver of any legal action with regard to the alleged violation, nor does it constitute an admission as to the legality of any development undertaken on the subject site without a coastal development permit.

4.0 CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Section 13096 of the California Code of Regulations requires Commission approval of Coastal Development Permit applications to be supported by a finding showing the application, as conditioned by any conditions of approval, to be consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(A) of CEQA prohibits a proposed development from being approved if there are feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse effects which the activity may have on the environment.

The Commission incorporates its findings on Local Coastal Program and Coastal Act consistency by reference at this point as if set forth in full. As discussed above, as conditioned, there are no feasible alternatives or feasible mitigation measures available, beyond those required herein, that would substantially lessen any significant adverse impacts that the development may have on the

environment. The findings address and respond to all public comments regarding potentially significant adverse environmental effects of the project that were received prior to preparation of the staff report. Therefore, the Commission finds that the proposed project has been conditioned to mitigate the identified impacts and can be found consistent with Local Coastal Program and Coastal Act requirements to conform to CEQA.

EXHIBITS

1. Regional map
2. Vicinity map
3. Assessor parcel map
4. Appeal by Commissioners Wan and Potter
5. Existing or historic shoreline protection in vicinity of project
6. Site plan
7. Photos of project site showing visual impact of proposed project
8. Assessor parcel map showing City and private property ownership
9. March 26, 2001 letter from David Carmany, City Manager, to Steve Scholl with enclosed plans for bluff-top improvements
10. CSA February 2002 Slope Stability Analysis

CORRESPONDENCE

1. February 13, 2001 letter from James Vreeland Jr., Mayor, to Sara Wan.

2. July 12, 2002 letter from Mary Devitt to Sara Wan

APPENDIX A: LIST OF SUBSTANTIVE FILE DOCUMENTS

California Coastal Commission 1998. Staff report, CDP application A-3-PSB-98-049 (Tokyo Masuiwaya California Corporation), October 15, 1998.

California Coastal Commission 1999. *Beach Erosion and Response Guidance Document*, December, 1999.

Carmany 2001. Letter from David Carmany, City Manager, to Steve Scholl, March 26, 2001.

Carmany 2002a. Letter from David Carmany, City Manager, to Peter T. Imhof. March 28, 2002.

Carmany 2002b. Letter from David Carmany, City Manager, to Peter T. Imhof. July 11, 2002.

City of Pacifica, 1998a. Application for Emergency Permit, March 20, 1998.

City of Pacifica, 1998b. Council Agenda Summary Report. March 9, 1998.

City of Pacifica, 1998c. Minutes of the City Council, March 9, 1998.

City of Pacifica, 1998d. Minutes of the City Council, May 26, 1998.

City of Pacifica, 2000a. Address list of parties notified of project.

City of Pacifica, 2000b. Application for Coastal Development Permit, March 22, 2000.

City of Pacifica, 2000c. Assessor Parcel Numbers of properties within 100 feet of the project.

City of Pacifica, 2000d. Disaster Response & Recovery at Esplanade Drive, Pacifica Fire Department Building Division, February 2000.

City of Pacifica, 2000g. Grant memo regarding Planning Commission approval, March 21, 2000.

City of Pacifica, 2000h. Minutes of the Planning Commission, March 20, 2000.

City of Pacifica, 2000i. Notice of Action. March 21, 2000.

City of Pacifica, 2000j. Notice of Exemption for California Environmental Quality Act (CEQA) Process to Office of Planning and Research and Office of County Clerk, March 21, 2000.

City of Pacifica, 2000k. Notice of Hearing on Proposed Permit, March 10, 2000.

City of Pacifica, 2000l. Notice of Pending Permit, posted March 22, 2000.

City of Pacifica, 2000m. Planning Commission Staff Report, March 20, 2000.

City of Pacifica, 2000n. Project plans, 11" x 17".

City of Pacifica, 2000o. Property owner list and location map.

City of Pacifica, 2000p. Property ownership documents.

City of Pacifica, 2000q. Reduced site plan.

City of Pacifica 2001. General Plan. Updated March 2001.

Clinton 1998. Letter from President Clinton to James Witt, Director, Federal Emergency Management Agency re: Declaration of major disaster in the State of California, February 9, 1998.

Cotton, Shires, & Associates 1998a. Summary Report of Earthwork Observations, Esplanade Drive Coastal Protection Project. October 1998.

Cotton, Shires, & Associates 1998b. Vicinity Map, General Notes, Specifications and List of Sheets, Esplanade Drive Coastal Protection Project, As-Built Plans. October 26, 1998.

Cotton, Shires, & Associates 2000. Response to Coastal Commission Appeal & Supplemental Information Request. October, 2000.

Cotton, Shires, & Associates 2001a. Letter from Ted Sayre, Supervising Engineering Geologist, and Patrick Shires, Principal Geotechnical Engineer, to Scott Holmes. January 17, 2001.

Cotton, Shires & Associates 2001b. Supplemental Reply to Coastal Commission Questions. September 18, 2001.

Cotton, Shires & Associates 2002. Supplemental Response to the Coastal Commission regarding the Esplanade Revetment. February 2002.

Crabtree 2000a. Letter from Michael Crabtree, City Planner, to Chris Kern. April 19, 2000.

Crabtree 2000b. Letter from Michael Crabtree, City Planner, to Steve Scholl. May 4, 2000.

Crabtree 2000c. Letter from Michael Crabtree, City Planner, to Steve Scholl. May 9, 2000.

Crabtree 2001. Letter from Michael Crabtree, City Planner, to Virginia Esperanza re: Pedestrian Walkway CDP-2-00-041. February 1, 2001.

Cull 2000. Letter from Rebecca Cull, Wildlife Biologist, EcoSystems West Consulting, to Ted Sayer re: biological review and impact assessment of Esplanade Drive Revetment Project, June 30, 2000.

Esperanza 2000a. Letter from Virginia A. Esperanza to Scott Holmes and Ken Solomon, City of Pacifica, April 20, 2000.

Esperanza 2000b. Letter from Virginia A. Esperanza to Ken Solomon, June 6, 2000.

Esperanza 2000c. Letter from Virginia A. Esperanza to Ken Solomon, November 15, 2000.

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L.C. Lee & Associates 2002. Background Documentation for Coastal Bluff Ecosystem Restoration. March 7, 2002.

Lindberg 2001. Letter from Ken Lindberg, President, Power Engineering Contractors, to Patrick Shires, CSA. November 13, 2001.

Miller 2001. Letter from Karen Miller, Chief, Endangered Species Devision, U.S. Fish and Wildlife Service, to Ken Solomon, January 17, 2001.

San Francisco Bay Regional Water Quality Control Board, 1998. Letter from Loretta K. Barsamian to Ken Solomon, April 10, 1998.

Scholl 2000. Letter from Steve Scholl to Michael Crabtree, City Planner, June 23, 2000.

Scholl 2001. Letter from Steve Scholl to David Carmany, City Manager, March 6, 2001.

Shimko 2001. Memorandum from Anna Shimko to Cecilia Quick, City Attorney. September 20, 2001.

Silva 2000. Letter from Betty Silva, State Lands Commission, Division of Environmental Planning and Management, to Ken Solomon, March 14, 2000.

Skelly 2001. Letter from David Skelly, Skelly Engineering to Ted Sayre, CSA. November 28, 2001.

Smith 2000. Letter from Nanci Smith, Public Land Management Specialist, State Lands Commission, to Chris Kern, February 15, 2000.

Solomon 2000a. Letter from Ken Solomon, Senior Planner, to Chris Kern, March 22, 2000.

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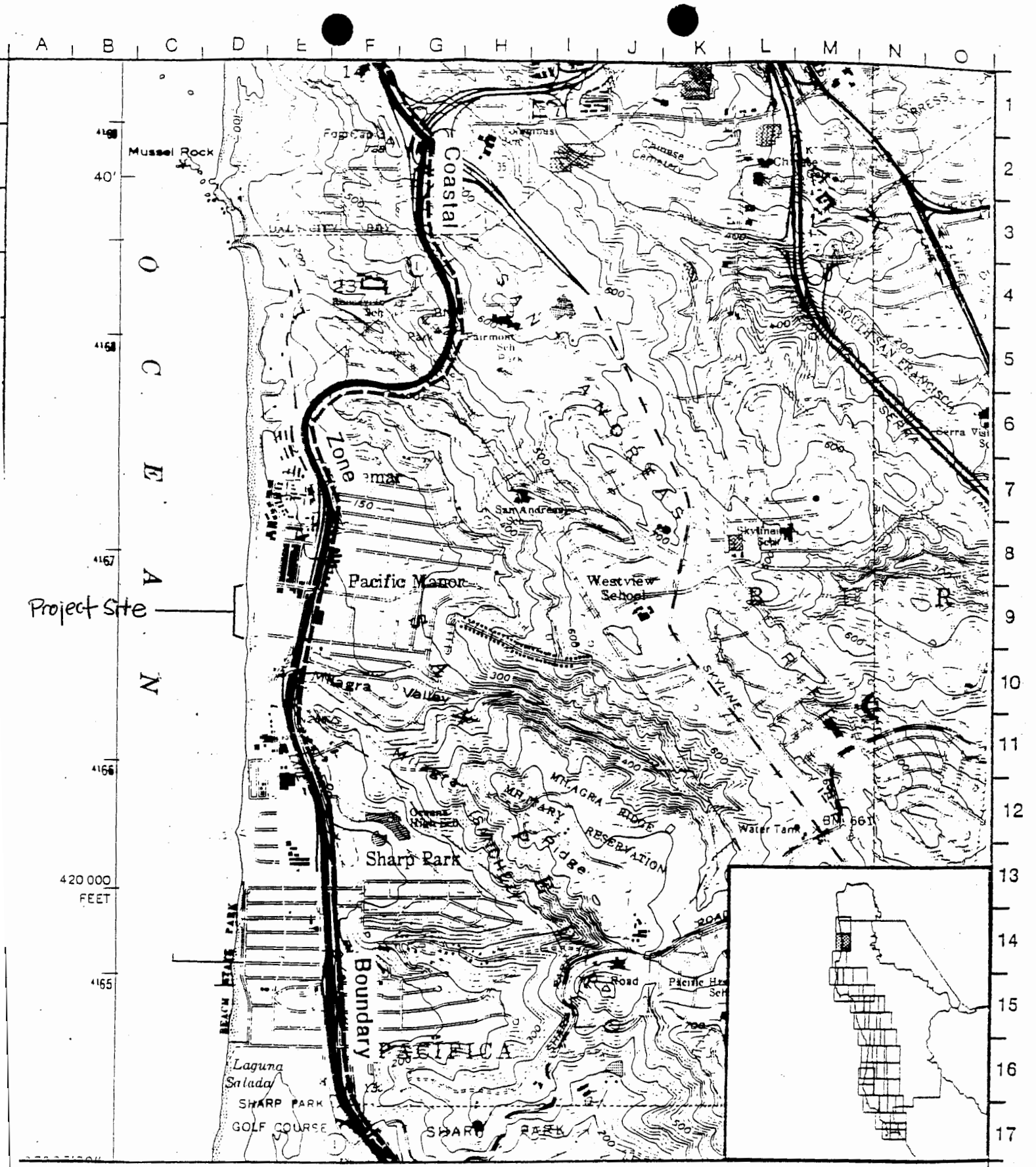

EXHIBIT NO. 1
APPLICATION NO. A-2-PAC-00-010 and 2-00-009
CITY OF PACIFICA
Regional map

California Coastal Commission

County of San Mateo

Sheet 2 of 35

Exhibit No. 1
Application No. 2-07-038
City of Pacifica
Page 37 of 56

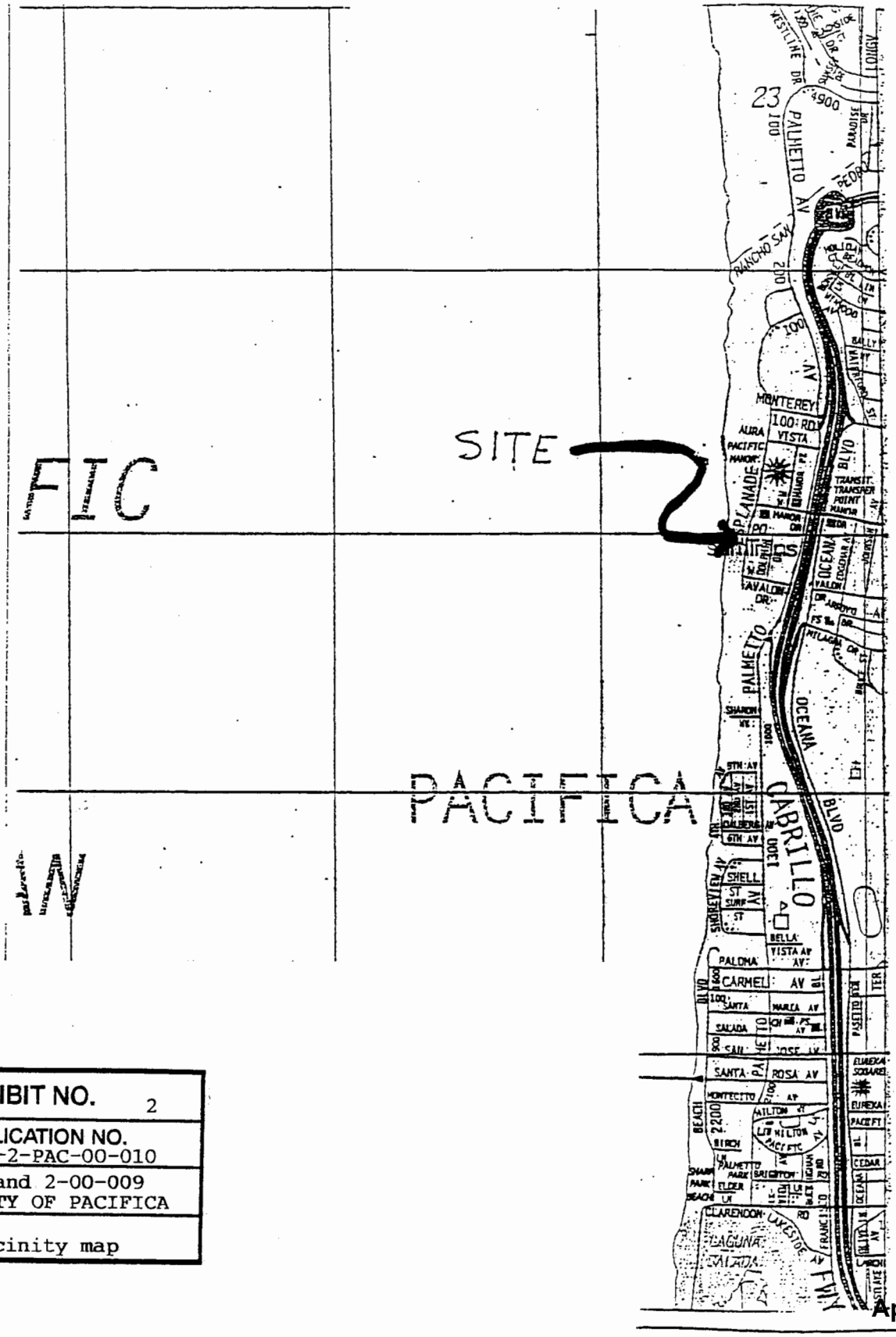

EXHIBIT NO. 2
APPLICATION NO. A-2-PAC-00-010
and 2-00-009 CITY OF PACIFICA
Vicinity map

Attachment 3

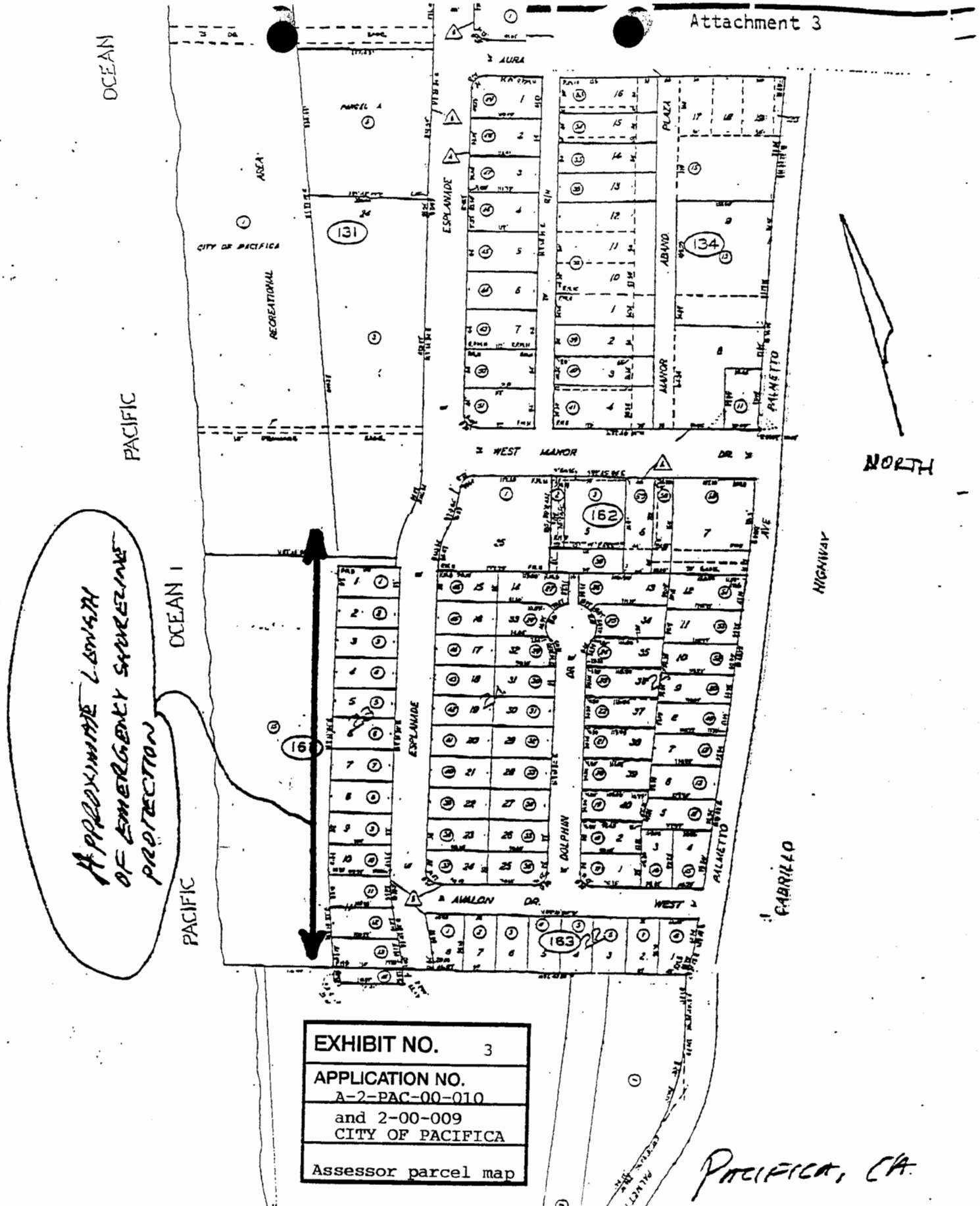

EXHIBIT NO. 3
APPLICATION NO. A-2-PAC-00-010 and 2-00-009 CITY OF PACIFICA
Assessor parcel map

PACIFICA, CA.

CALIFORNIA COASTAL COMMISSION
NORTH CENTRAL COAST DISTRICT
45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105- 2219
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EXHIBIT NO. 4
APPLICATION NO. A-2-PAC-00-010 and 2-00-009 CITY OF PACIFICA
Appeal by Comm. Wan and Potter (4 pages)

April 5, 2000

TO: Peter Douglas, Executive Director

FROM: Sara Wan, Chair
Dave Potter, Vice Chair

SUBJECT: **Appeal of City of Pacifica Local Coastal Permit CDP-130-98 (Esplanade Revetment)**

1.0 LOCAL APPROVAL

Commissioners Wan and Potter are appealing the City of Pacifica's approval of Local Coastal Development Permit CDP-130-98. The City of Pacifica approved Coastal Development Permit CDP-130-98 to permanently authorize a portion of an approximately 1,000-foot long, 40-foot wide and 20 to 60-foot high rip-rap revetment installed under emergency authorization to protect existing structures from bluff failure in 1998. The revetment straddles the coastal development permitting jurisdictional boundary of the City and the Coastal Commission. The City recently submitted a CDP application to the Commission for the portion of the revetment that is located seaward of the Mean High Tide Line. The City-approved project does not include any modifications to the revetment as originally constructed under the emergency permits.

Since the time that emergency work was authorized, 10 of the 12 homes threatened by the bluff failure have been demolished. FEMA provided funding to the City to purchase these lots. The City now owns 11 vacant bluff-top lots between Esplanade Drive and the revetment. The City contemplates that this area will be designated for low intensity passive recreational use in the future.

2.0 REASONS FOR APPEAL

The approved development raises a substantial issue of conformance with the policies of the certified City of Pacifica LCP concerning public access, visual resources, environmentally sensitive habitat areas, marine biological resources, hazards and shoreline protection projects and with the coastal access policies of the Coastal Act.

2.1 Public Access

The approved project may significantly interfere with the public access along the shoreline raising a substantial issue of conformance with LUP Policy 2 and Coastal Act Section 30211.

2.2 Visual Resources

The approved project is a 1,000-foot long 20 to 60-foot high rock revetment. Few shoreline protection projects in the State are as massive as this. This comprises a significant alteration of

the face of the bluff raising a substantial issue of conformance with LUP Policies 24 and 26 which restrict the alteration of natural land forms along cliffs and bluffs.

2.3 Environmentally Sensitive Habitat and Marine Biological Resources

Prior to construction of the revetment, the project site may have provided habitat for cliff swallows, snowy plovers, and/or other sensitive animal or plant species. The City's findings contain no assessment of whether the project site may contain environmentally sensitive habitat areas or whether the project may adversely affect marine biological resources. This raises a substantial issue under LUP Policies 11, 12, and 18.

2.4 Hazards/Shoreline Erosion

The approved project was constructed under emergency conditions. It is not clear in the findings for the City's approval whether the revetment was properly engineered to protect against further bluff failure. The City's findings do not include an assessment of whether the approved project will accelerate bluff erosion in the areas adjacent to the revetment. This uncertainty raises a substantial issue of conformity with LUP Policy 26.

2.5 Shoreline Protection/Alternatives Analysis

Policy 16 of the Land Use Plan (LUP) allows construction of revetments and other shoreline protection projects when necessary to protect existing structures. Because 10 of the 12 homes have been removed, a substantial issue is raised whether the approved project conforms with LUP Policy 16. City staff has stated that the purpose of the proposed revetment is to protect Esplanade Drive and infrastructure beneath the road. However, the findings for the City's approval states only that "The bluff repair is needed to retard further erosion and loss of property," and contains no analysis of potential alternatives to support a finding that the revetment is necessary to protect the road or infrastructure.

The approved project also raises a substantial issue under the provision of LUP Policy 16 that specifies that shoreline protection projects to protect existing structures must be designed to eliminate or mitigate adverse impacts to local shoreline sand supply. There is no evidence in the findings that the City considered potential impacts to sand supply.

APPEAL FROM COASTAL PERMI [redacted]SION OF LOCAL GOVERNMENT ([redacted]3)

State briefly your reasons for this appeal. Include a summary description of Local Coastal Program, Land Use Plan, or Port Master Plan policies and requirements in which you believe the project is inconsistent and the reasons the decision warrants a new hearing. (Use additional paper as necessary.)

Note: The above description need not be a complete or exhaustive statement of your reasons of appeal; however, there must be sufficient discussion for staff to determine that the appeal is allowed by law. The appellant, subsequent to filing the appeal, may submit additional information to the staff and/or Commission to support the appeal request.

SECTION V. Certification

The information and facts stated above are correct to the best of my/our knowledge.

Signature of Appellant(s) or Authorized Agent

Date April 5, 2000

NOTE: If signed by agent, appellant(s) must also sign below.

Section VI. Agent Authorization

I/We hereby authorize _____ to act as my/our representative and to bind me/us in all matters concerning this appeal.

Signature of Appellant(s)

Date _____

Exhibit No. 1
Application No.
2-07-038
City of Pacifica
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State briefly your reasons for this appeal. Include a summary description of Local Coastal Program, Land Use Plan, or Port Master Plan policies and requirements in which you believe the project is inconsistent and the reasons the decision warrants a new hearing. (Use additional paper as necessary.)

Note: The above description need not be a complete or exhaustive statement of your reasons of appeal; however, there must be sufficient discussion for staff to determine that the appeal is allowed by law. The appellant, subsequent to filing the appeal, may submit additional information to the staff and/or Commission to support the appeal request.

SECTION V. Certification

The information and facts stated above are correct to the best of my/our knowledge.

Dave Potter

Signature of Appellant(s) or Authorized Agent

Date April 5, 2000

NOTE: If signed by agent, appellant(s) must also sign below.

Section VI. Agent Authorization

I/We hereby authorize _____ to act as my/our representative and to bind me/us in all matters concerning this appeal.

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Signature of Appellant(s)

Date _____

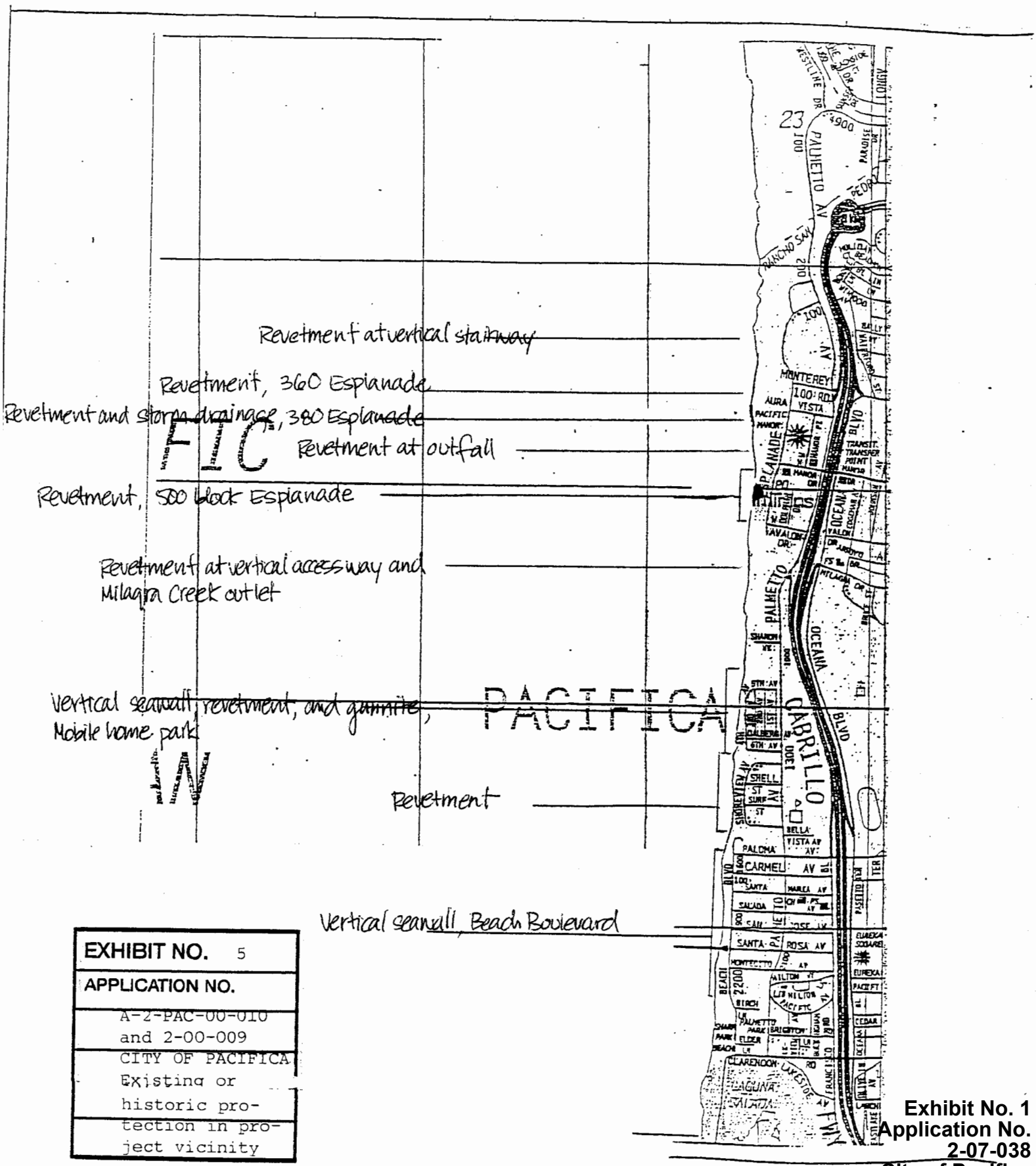
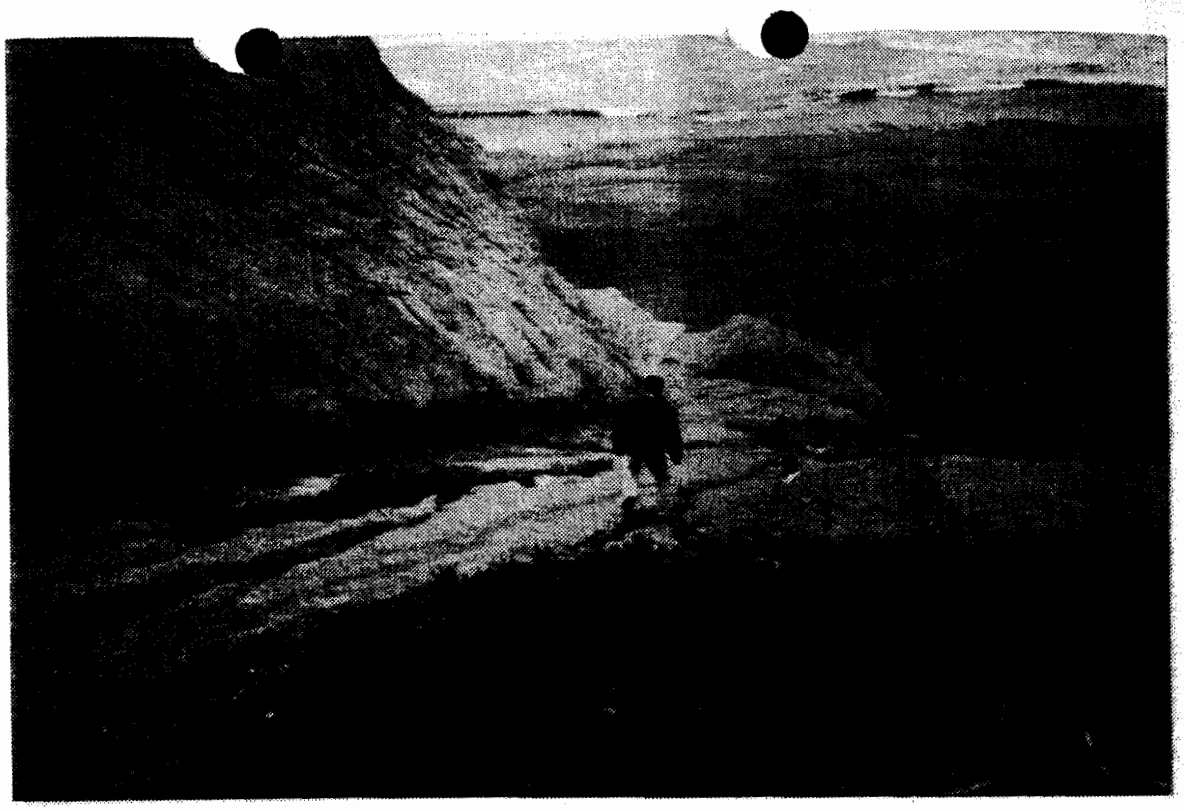


EXHIBIT NO. 5
APPLICATION NO.
A-2-PAC-00-010 and 2-00-009
CITY OF PACIFICA
Existing or historic protection in project vicinity

EXHIBIT NO. 6
APPLICATION NO. A-2-PAC-00-010 and 2-00-009 CITY OF PACIFICA
Site plan



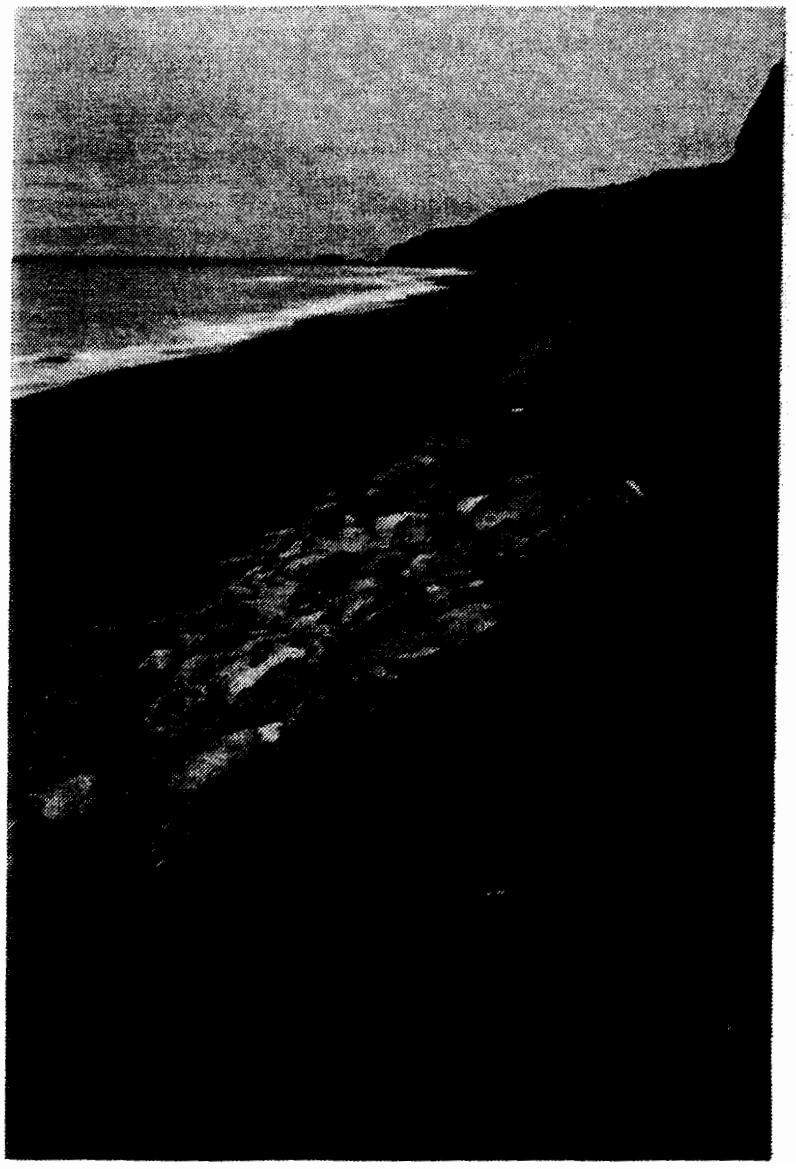
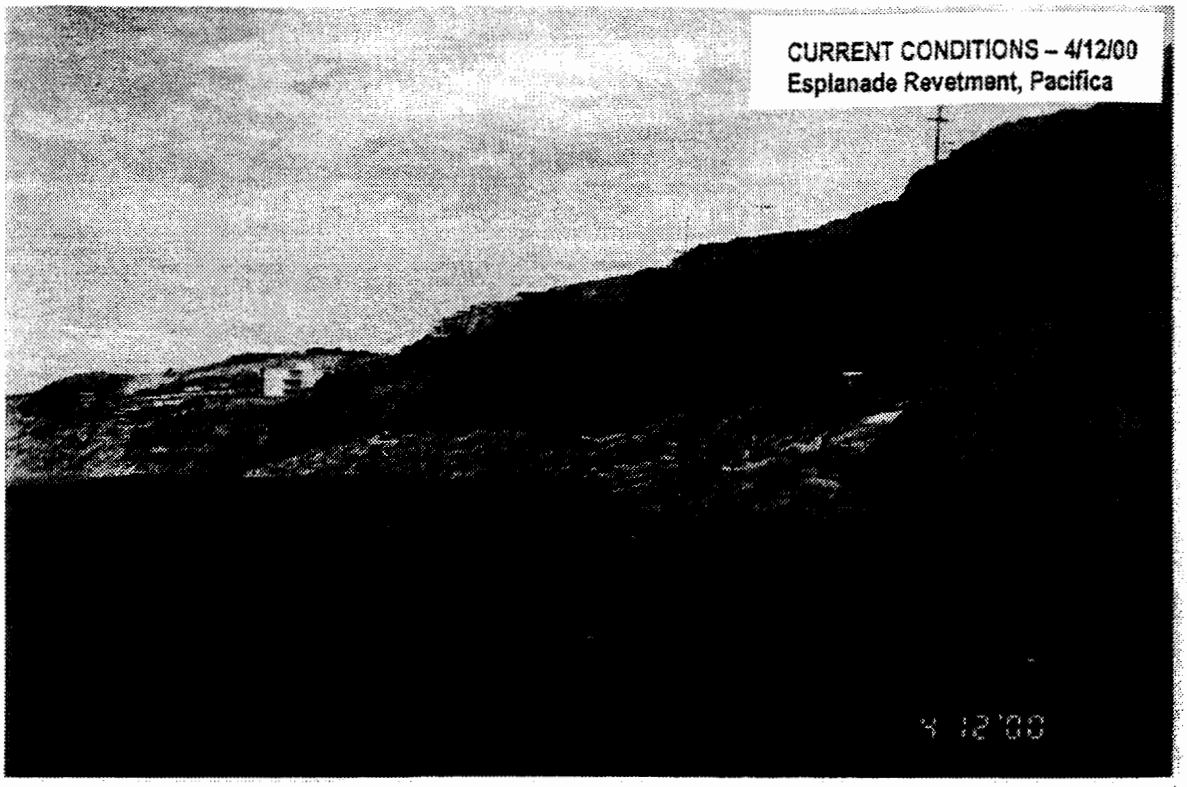
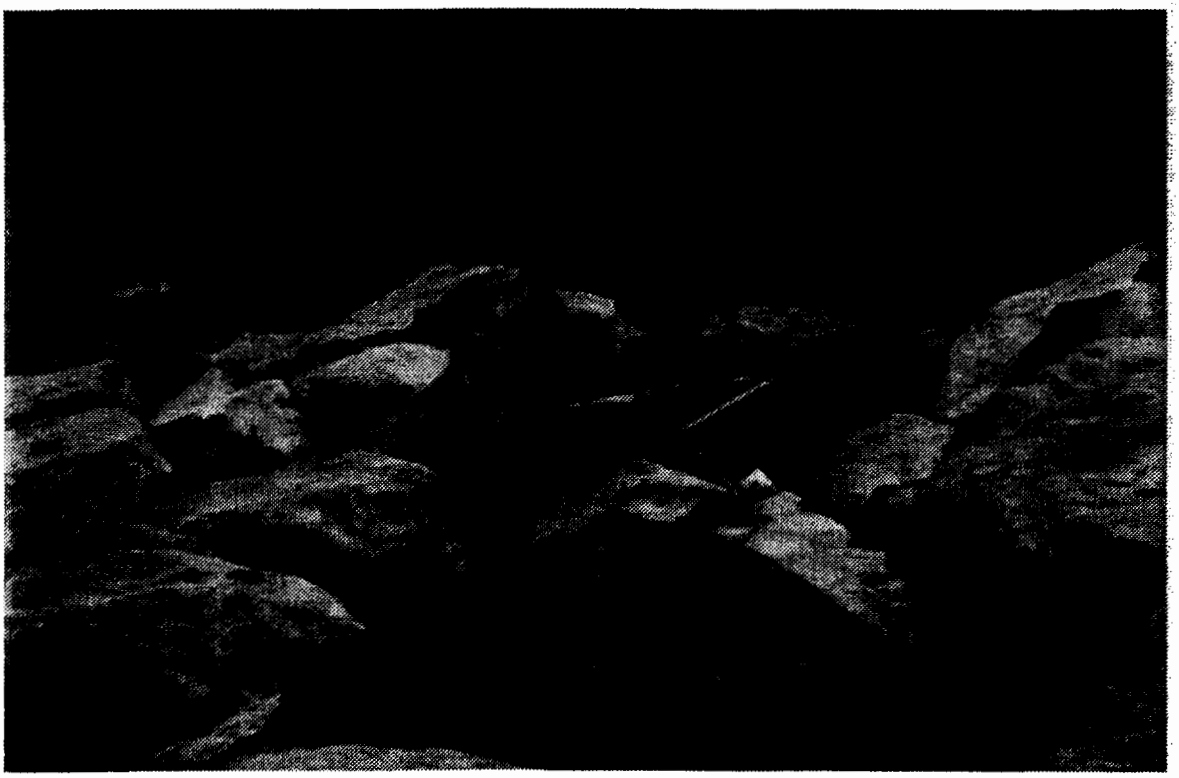
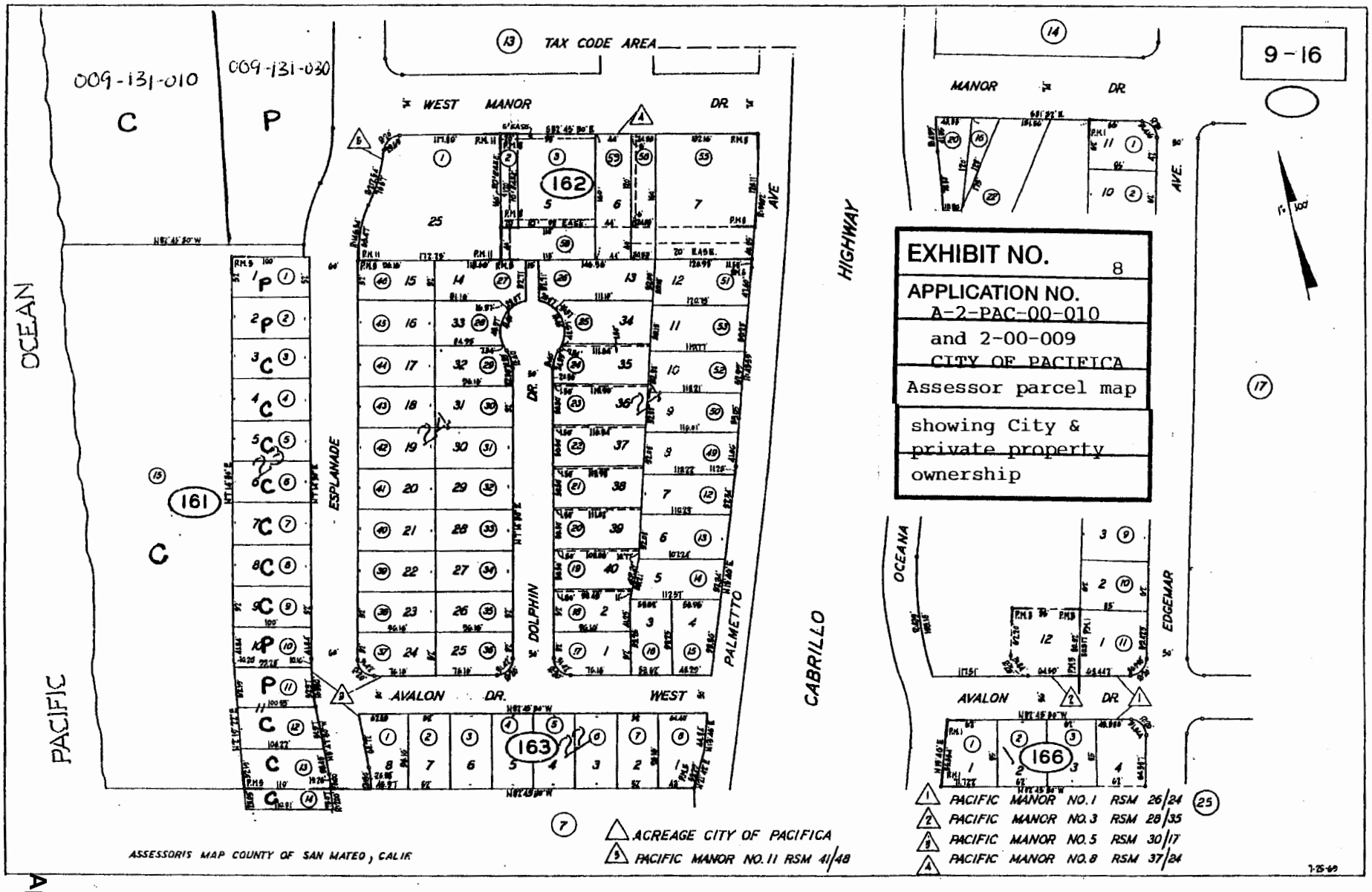


EXHIBIT NO. 7
APPLICATION NO. A-2-PAC-00-010 and 2-00-009 CITY OF PACIFICA
Photos of project site showing visual impact of proposed project
(2 pages)


CURRENT CONDITIONS – 4/12/00
Esplanade Revetment, Pacifica
4 12'00



C = Property owned by City of Pacifica
P = Property owned by private party



CITY HALL
170 Santa Maria Avenue • Pacifica, California 94044-2506
Telephone (650) 738-7300 • Fax (650) 359-6038
www.ci.pacifica.ca.us

March 26, 2001

Mr. Steve Scholl
California Coastal Commission
45 Fremont, Suite 2000
San Francisco, CA 94105-2219

Subject: Response to our February 27 meeting and your March 6 letter.

Dear Mr. Scholl:

Thank you for taking the time to meet with us and review the site on February 27th. The City is working with the residents along Esplanade for passive use and access to the beach. Beach access is currently possible but not for the faint hearted. It will be difficult to maintain a safe access point at this location due to the height of the bluff, the bank steepness and the wave impact at the bottom of the bluff. However we are open to considering this. The City is currently planning a bike lane and or trail at the top of the bluff.

The revetment was constructed in the manner as shown on the plans. This is reflected in the final as-built drawings. The project report refers to using large rock (8-10 tons as key-way and for shield rock). Smaller rock 4-6 ton were to be used as wall filler behind the shield rock. This was determined to be the only practical method of construction because of the lack of availability of 8 to 10 rock. This was how the system was designed and how the revetment was built. The project report did not make this clear and it appears to have been misinterpreted to as a change made during construction. It should be noted that we exceeded the specifications and placed rock in the 10 to 12 ton range in the keyway and the 6-8 ton range as filler. This is some of the largest rock placed in any revetment along the coast. We also have keyed the rock into bedrock. As a result, the wall has not shifted in the last two winters. There was some concern about the revetment slope. The revetment slope is a minimum of 2:1 and 3:1 in some locations. This is reflected in the as-built drawings. The 1.5:1 slope referred to in the project report is the engineered fill in the south end of the project. The slope is restricted to this value because of the proximity of the road and the location of the revetment.

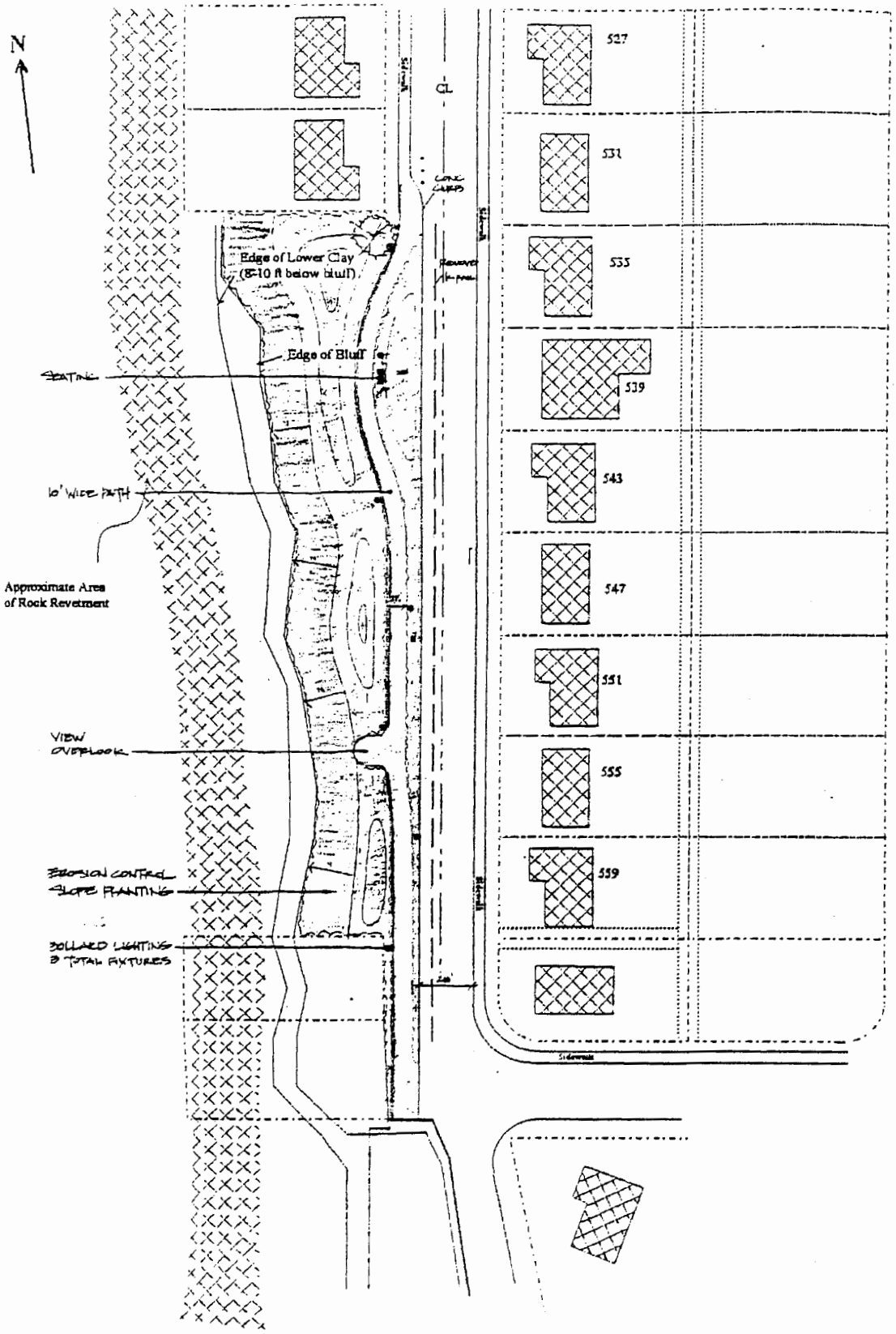
If I can provide any additional information or be of assistance please contact me at (650) 738-7301.

Sincerely,

David Carmany
City Manager

CC City Council/Exec team

EXHIBIT NO. 9
APPLICATION NO. A-2-PAC-00-010 and 2-00-009 CITY OF PACIFICA
March 26, 2001 letter from David Carmany, City Manager, to Steve Scholl with enclosed plans for blufftop. (3 pages)



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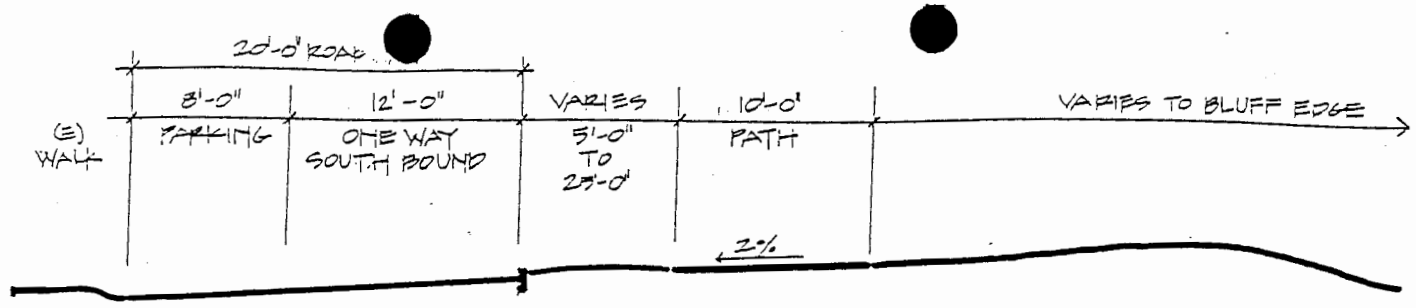
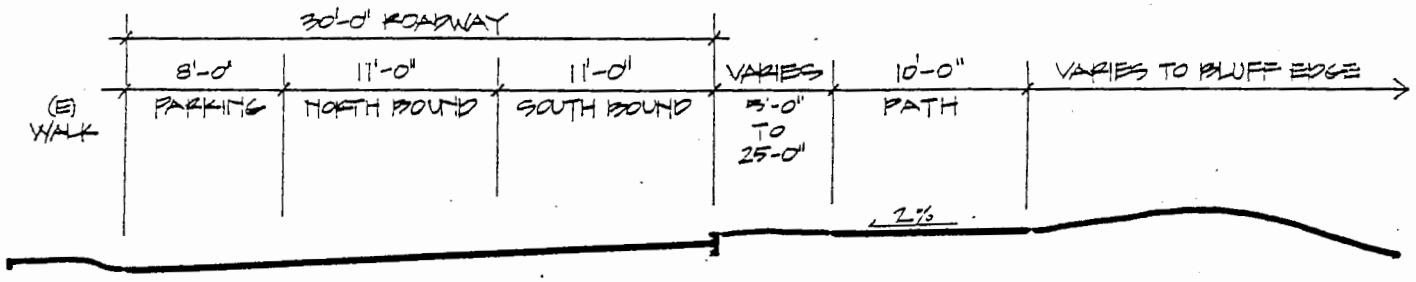
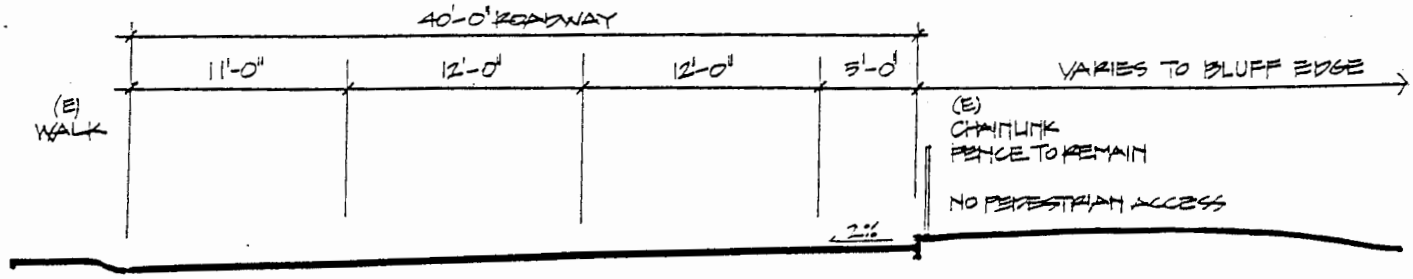


PREFERRED 20' WIDE ROADWAY



ACCEPTABLE 30' WIDE ROADWAY



NACCEPTABLE 40' WIDE ROADWAY STAFF PROPOSAL

ESPLANADE ROADWAY SECTIONS

EXHIBIT NO. 10
APPLICATION NO. A-2-PAC-00-010 and 2-00-009
CITY OF PACIFICA
CSA 2/2002 Slope Stability Analysis
Page 1 of 5

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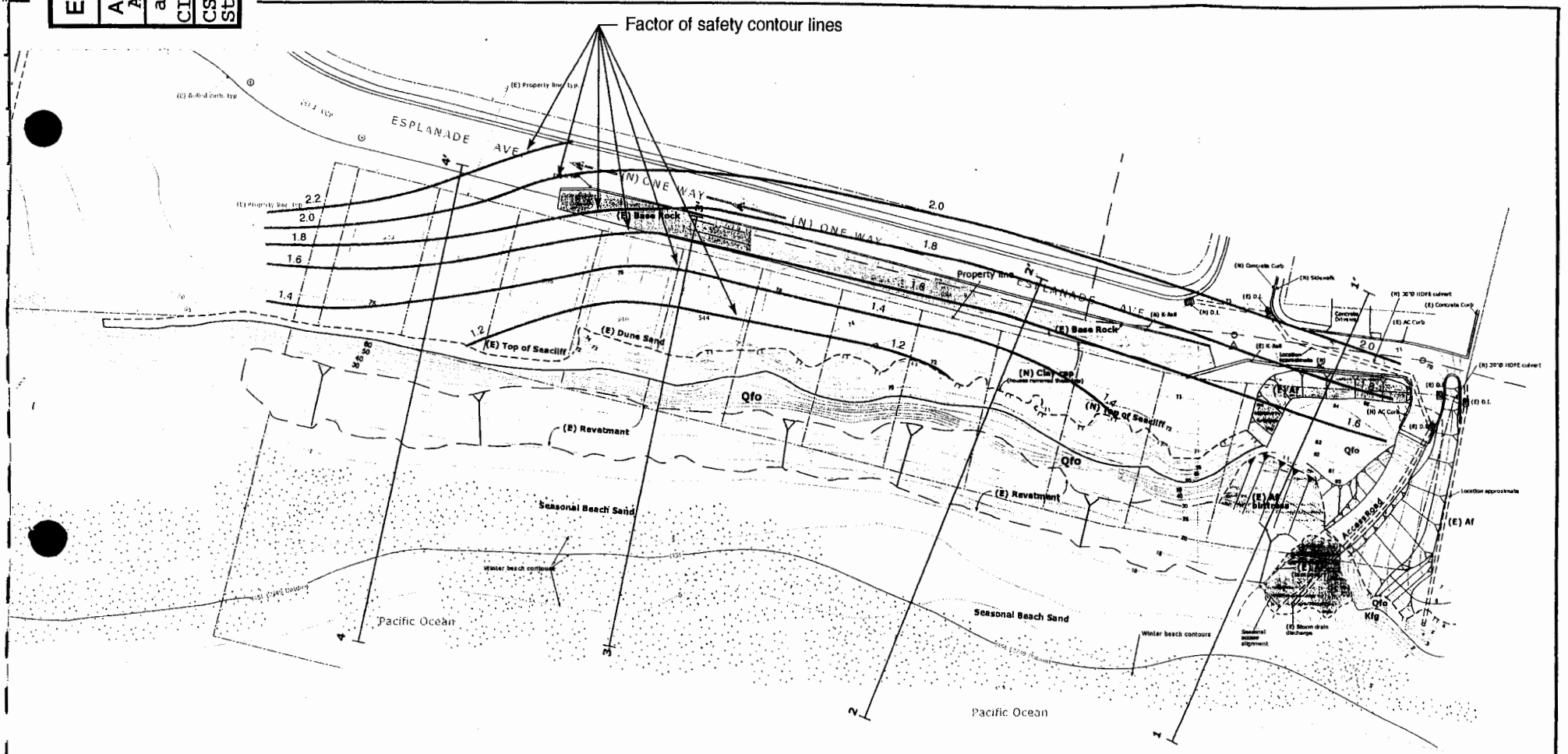
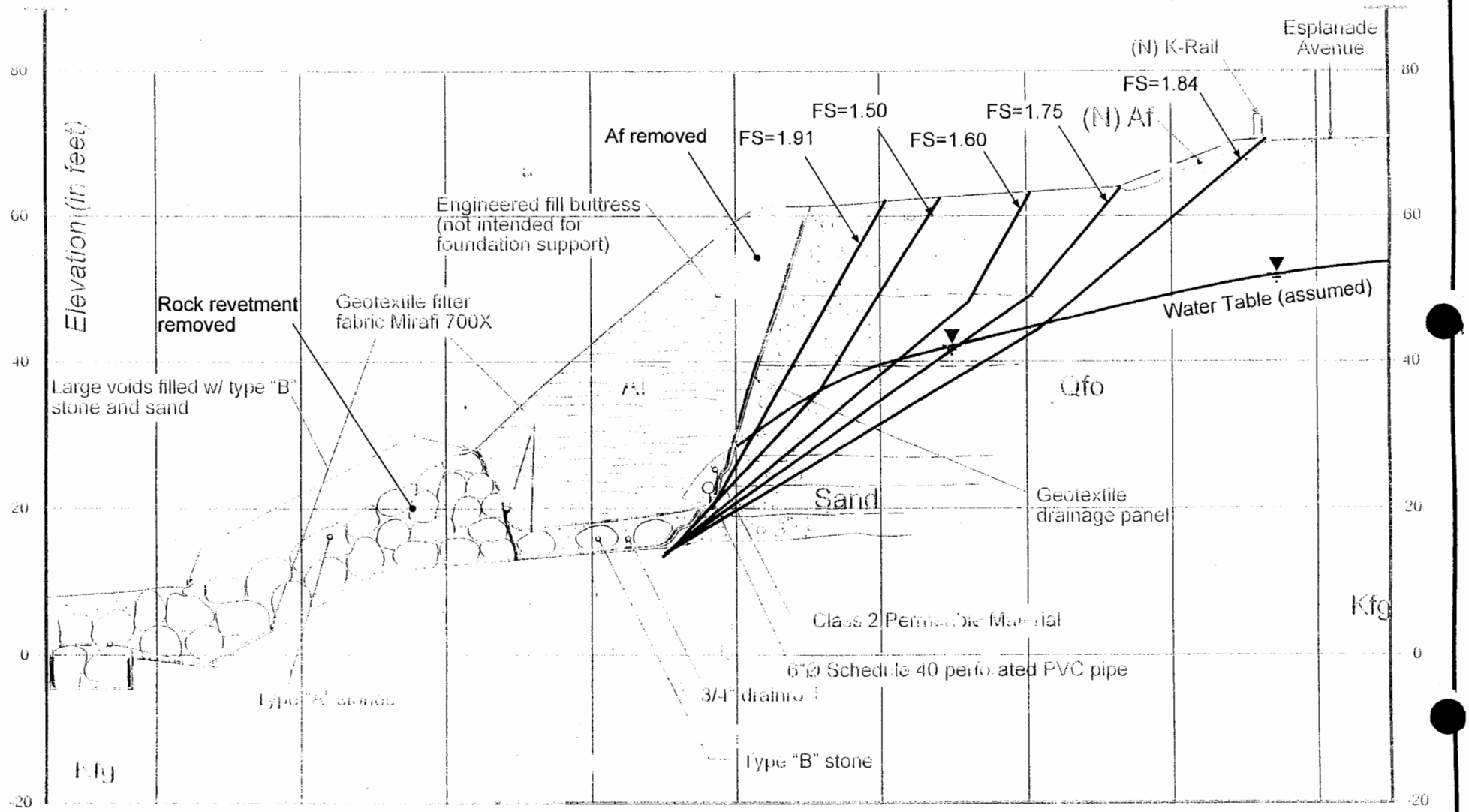


0 30 60 feet

COTTON, SHIRES & ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

FACTOR OF SAFETY CONTOUR LINES
ESPLANADE AVENUE PUBLIC ACCESS IMPROVEMENT
PACIFICA, CALIFORNIA

GEO/ENG. BY	SCALE	PROJECT NO.
TS	1" = 60'	E4220A
APPROVED BY	DATE	FIGURE NO.



20 0 20 FEET

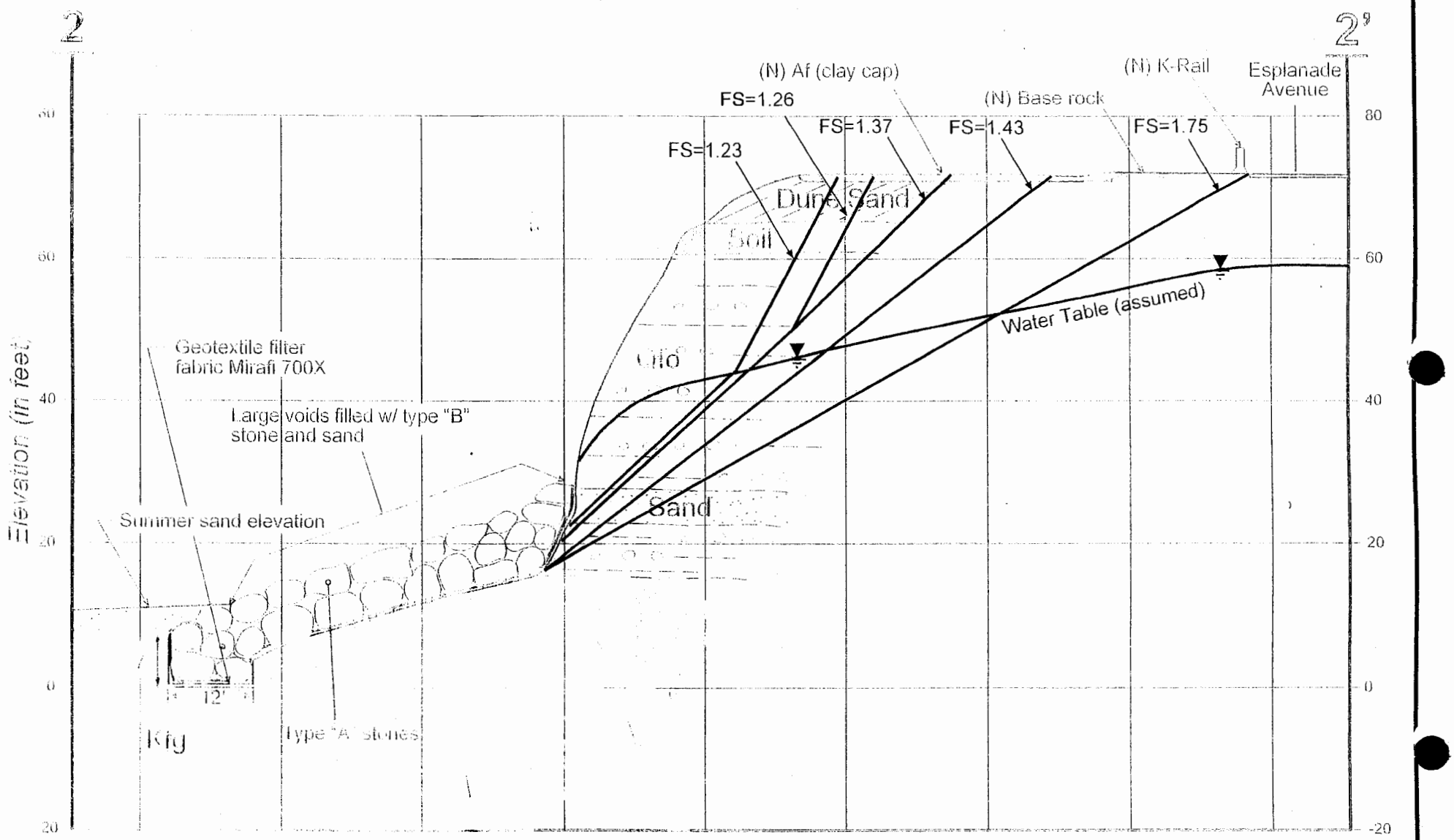
Hypothetical Failure Surface with indicated Factors of Safety (FS)

COTTON, SHIRES & ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

SLOPE STABILITY CROSS SECTION 1 - 1'

ESPLANADE AVENUE PUBLIC ACCCESS IMPROVEMENT
PACIFICA, CALIFORNIA

GEO/ENG. BY	SCALE	PROJECT NO.
TS	1"=20'	E4420A
APPROVED BY	DATE	FIGURE NO.
POS	FEBRUARY, 2002	3



Hypothetical Failure Surface with indicated Factors of Safety (FS)

20 0 20 FEET

FEET

COTTON, SHIRES & ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

SLOPE STABILITY CROSS SECTION 2 - 2'

ESPLANADE AVENUE PUBLIC ACCCESS IMPROVEMENT
PACIFICA, CALIFORNIA

GEO/ENG. BY	SCALE	PROJECT NO.
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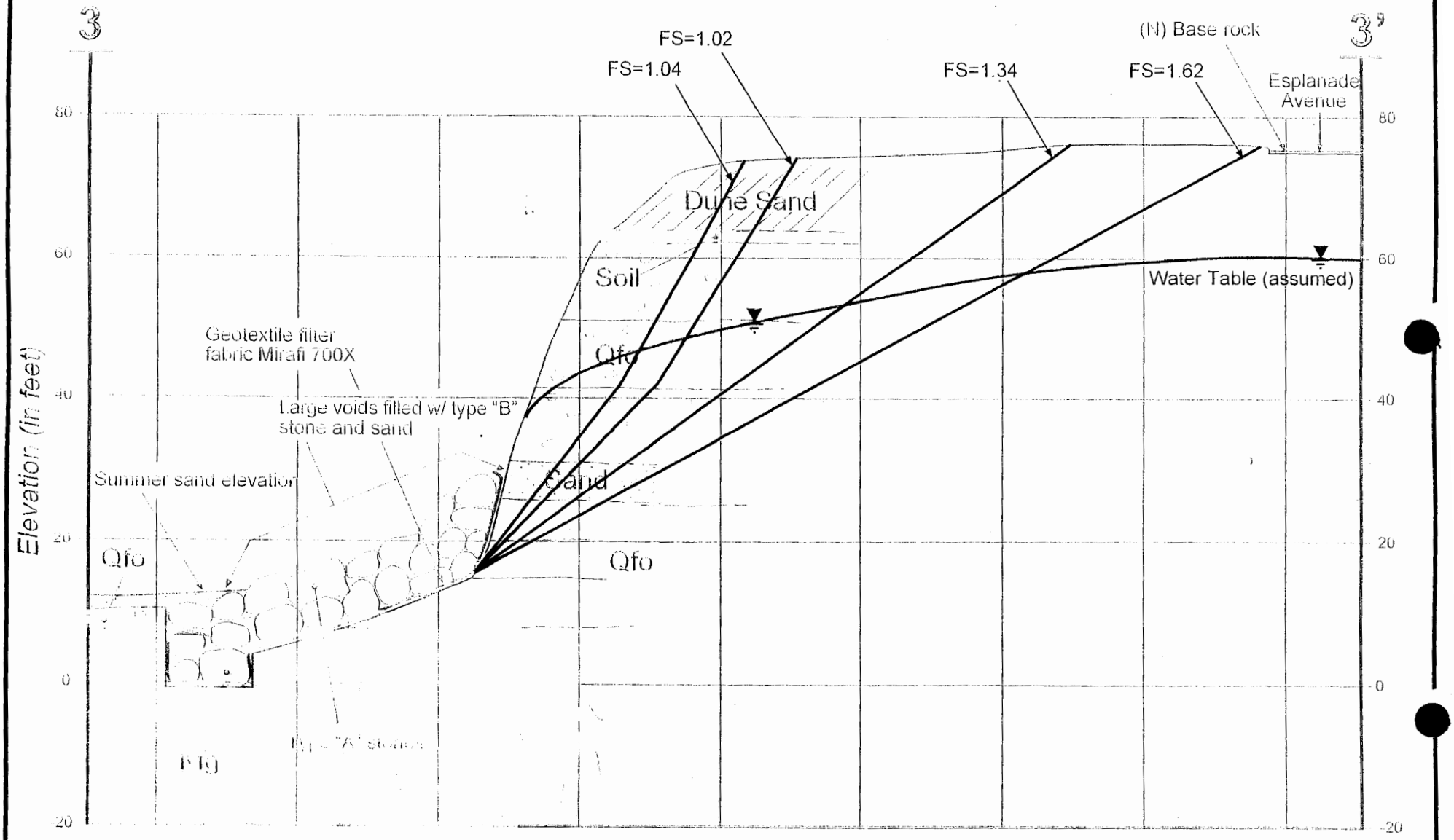
APPROVED BY	DATE	FIGURE NO.
POS	FEBRUARY, 2002	4



Hypothetical Failure Surface with indicated Factors of Safety (FS)

20 FEET 20 FEET

COTTON, SHIRES & ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

SLOPE STABILITY CROSS SECTION 3 - 3'
ESPLANADE AVENUE PUBLIC ACCESS IMPROVEMENT
PACIFICA, CALIFORNIA

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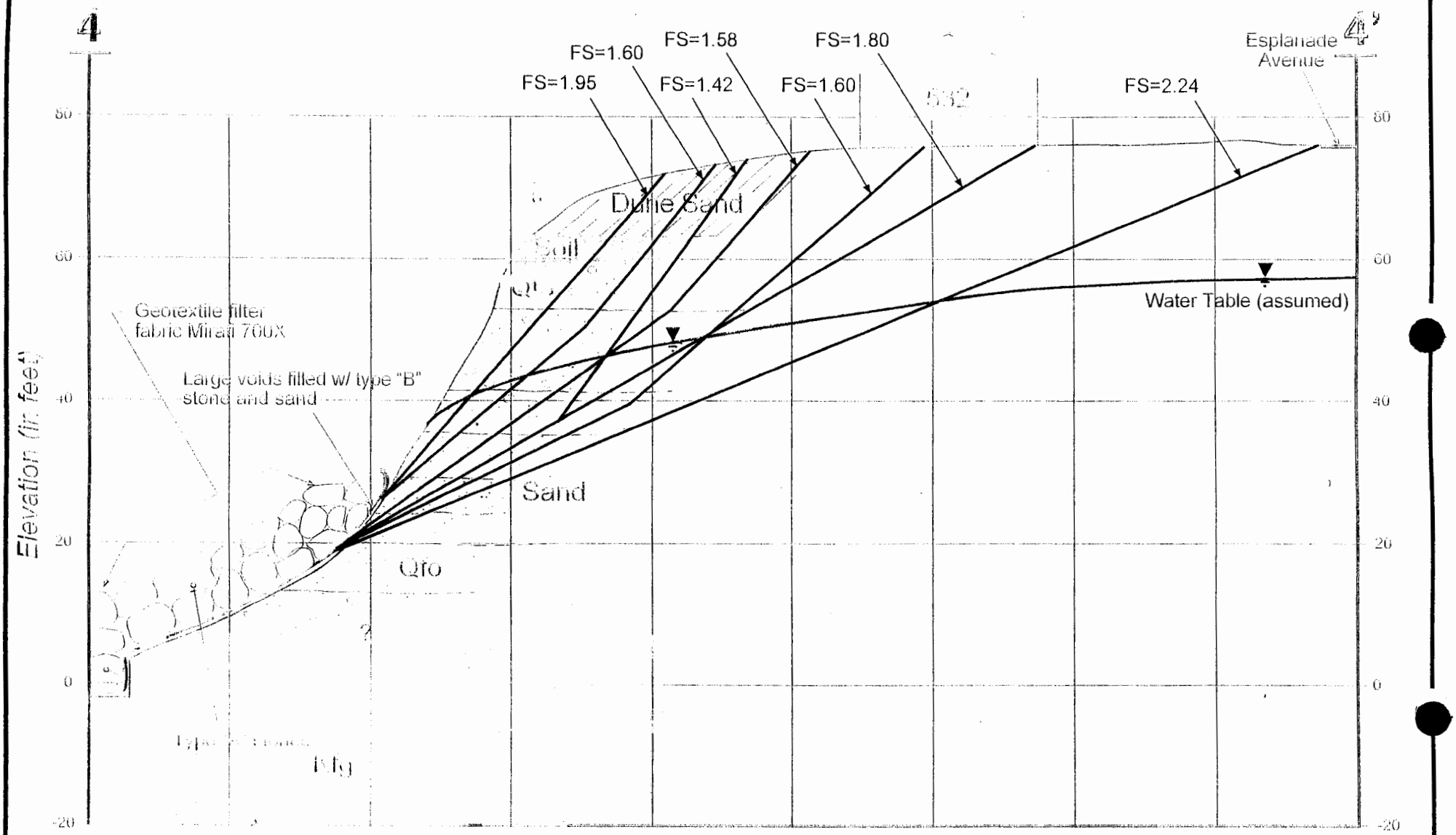
APPROVED BY	DATE	FIGURE NO.
POS	FEBRUARY, 2002	5



Hypothetical Failure Surface with indicated Factors of Safety (FS)

20 FEET 20

FEET

COTTON, SHIRES & ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS

SLOPE STABILITY CROSS SECTION 4 - 4'

ESPLANADE AVENUE PUBLIC ACCESS IMPROVEMENT
PACIFICA, CALIFORNIA

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APPROVED BY	DATE	FIGURE NO.
POS	FEBRUARY, 2002	6

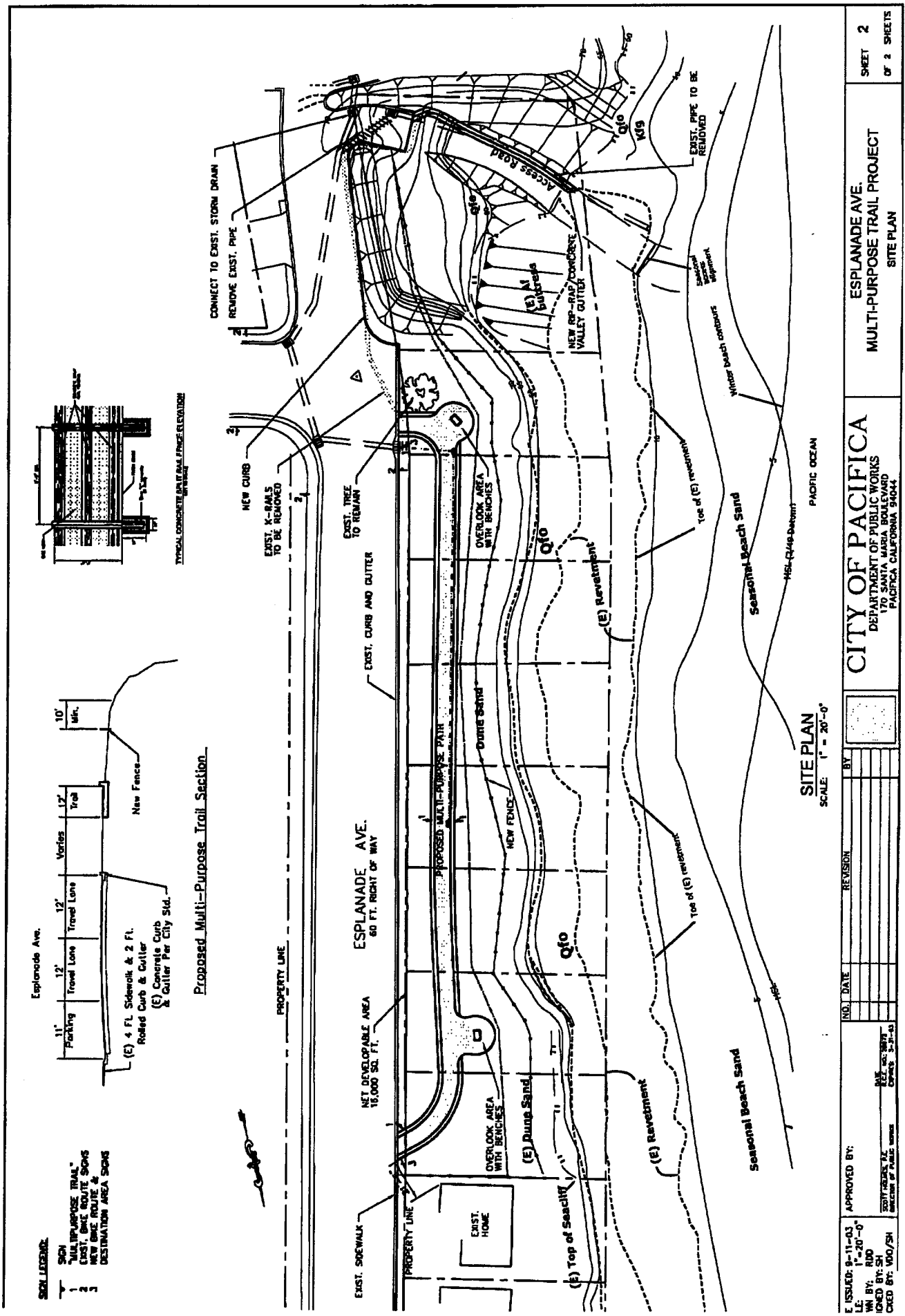

Exhibit No. 2
Application No. 2-07-038
City of Pacifica