CALIFORNIA COASTAL COMMISSION
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REGULAR CALENDAR
STAFF REPORT AND PRELIMINARY RECOMMENDATION

Application No.: 6-04-83

Applicant: John Cumming and Lee Johnson Agent: Walt Crampton

Description: Construction of an approximately 138 ft.-long, 35 ft. high, 2 ft.-wide colored and textured concrete tiedback seawall with concrete upper return wall on the south side and construction of a geogrid reinforced fill slope on the bluff below two residential structures. The applicants also propose to pay an in-lieu fee to mitigate the adverse effects of the seawall on the local sand supply.

Site: On the public beach and bluff face below 371 and 403 Pacific Avenue, Solana Beach. APNs: 263-301-02 and 263-051-07

Substantive File Documents: City of Solana Beach General Plan and Zoning Ordinance; City Resolution No. 2004-97(R), Case No. 17-04-06;"Alternative Analyis for Coastal Bluff Stabilization 371 Pacific Avenue"by TerraCosta Consulting Group, Inc. dated January 24, 2002;"Geotechnical Basis of Design Shoreline Stabilization Project"by TerraCosta Consulting Group, Inc., dated February 6, 2004; Coastal Development Permits Nos. F9818/Blackburn, 6-97-159-G/Blackburn, 6-98-21-G/Blackburn, 6-93-156/Johnson, 6-98-13-G/Johnson, 6-98-137/Johnson; 6-00-9/Del Mar Beach Club, 6-99-100/Presnell (et. al), 6-99-103/ Coastal Preservation Association, 6-00-66/Pierce, Monroe, 6-02-02/Gregg, Santina, 6-02-84/Scism and 6-03-33/Surfsong.

STAFF NOTES:

Summary of Staff's Preliminary Recommendation: Staff is recommending approval of the subject development as the applicant has demonstrated that the existing blufftop residential structures are in danger from erosion. Due to a recent bluff collapse and exposure of the clean sand layer below one of the residences, the applicant's geotechnical representative has performed a slope stability analysis of the overall site and concluded

that the two blufftop structures are in danger from erosion. Based on the applicant's geotechnical reports, the seawall, perpendicular return wall on the south side of the seawall and geogrid structure are necessary to protect the structures at the top of the bluff. The Commission's staff engineer and geologist have reviewed the applicant's geotechnical assessment and concur with its conclusions.

The proposed development has been conditioned to mitigate its impact on coastal resources such as scenic quality, public access and recreation opportunities, and shoreline sand supply. A special condition has been attached which requires the applicant to acknowledge that should additional stabilization be proposed in the future, the applicant will be required to identify and address the feasibility of all alternative measures which would avoid additional alteration of the natural landform of the public beach or coastal bluffs, and would reduce the risk to the blufftop structures and provide reasonable use of the property. Other conditions involve the timing of construction, the appearance of the seawall s and approval from other agencies.

I. PRELIMINARY STAFF RECOMMENDATION:

The staff recommends the Commission adopt the following resolution:

MOTION: ***I move that the Commission approve Coastal Development Permit No. 6-04-83 pursuant to the staff recommendation.***

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 below on grounds that the development as conditioned will be in conformity with the policies of Chapter 3 of the Coastal Act and will not prejudice the ability of the local government having jurisdiction over the area to prepare a Local Coastal Program conforming to the provisions of Chapter 3. 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.

II. Standard Conditions.

See attached page.

III. Special Conditions.

The permit is subject to the following conditions:

The permit is subject to the following conditions:

1. Final Revised Plans. **PRIOR TO THE ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT**, the applicants shall submit for review and written approval of the Executive Director, final plans for the seawall, concrete return wall and reconstructed slope in substantial conformance with the submitted plans dated October 19, 2004 by TerraCosta Consulting. Said plans shall first be approved by the City of Solana Beach and be revised to include the following:

a. Sufficient detail regarding the construction method and technology utilized for constructing the seawall so as to gradually blend into the adjacent natural bluff. The north and south sides of the seawall shall be designed and constructed to minimize the erosive effects of the approved seawall on the adjacent bluffs.

b. Sufficient detail regarding the construction method and technology utilized for constructing the perpendicular return wall located on the upper south side of the seawall so as to gradually blend into the adjacent natural bluff.

c. Sufficient detail regarding the construction method and technology utilized for texturing and coloring the seawall and return wall. Said plans shall confirm, and be of sufficient detail to verify, that the seawall and return wall's color and texture closely matches the adjacent natural bluffs, including provision of a color board indicating the color of the fill material.

d. Sufficient detail regarding the construction method and technology utilized for constructing the geogrid reconstructed bluff area that appears undulating or more natural in its slope so as to blend with the adjacent natural bluff.

e. Any existing permanent irrigation system located on the bluff top site shall be removed or capped.

f. All runoff from impervious surfaces on the top of the bluff shall be collected and directed away from the bluff edge towards the street.

g. Existing accessory improvements (i.e., decks, patios, walls, etc.) located in the geologic setback area on the site shall be detailed and drawn to scale on the final approved site plan and shall include measurements of the distance between the accessory improvements and the bluff edge (as defined by Section 13577 of the

California Code of Regulations) taken at 3 or more locations. The locations for these measurements shall be identified through permanent markers, benchmarks, survey position, written description, or other method that enables accurate determination of the location of structures on the site. All existing and proposed accessory improvements shall be located no closer than 5 feet landward of the natural bluff edge or approved reconstructed bluff edge. Any existing improvements located within 5 feet landward of the reconstructed or natural bluff edge shall be removed within 60 days of issuance of the coastal development permit.

The permittees shall undertake the development in accordance with the approved plans. Any proposed changes to the approved plans shall be reported to the Executive Director. No changes to the plans shall occur without a Coastal Commission approved amendment to this coastal development permit unless the Executive Director determines that no amendment is legally required.

2. Landscape Plan. **PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT**, the applicants shall submit, for the review and written approval of the Executive Director, a plan for landscaping to vegetate the reconstructed bluff slope. The plan shall be prepared by a licensed landscape architect and shall demonstrate that:

(a) all vegetation planted on the site will consist of native, drought-tolerant plants,

(b) all planting will be completed by within 60 days after construction of the reconstructed bluff area,

(c) all required plantings will be maintained in good growing conditions throughout the life of the project, and, whenever necessary, shall be replaced with new plant materials to ensure continued compliance with the landscape plan.

In addition, the plan shall include, at a minimum, the following components:

(a) the type, size, and location of all plant materials that will be on the reconstructed bluff area and any proposed temporary and limited irrigation for the proposed landscaping.

The permittees shall undertake development in accordance with the approved final landscape plan. 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.

3. Mitigation for Impacts to Sand Supply. **PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT**, the applicants shall provide evidence, in a form and content acceptable to the Executive Director, that a fee of $57,670.00 has been deposited in an interest bearing account designated by the Executive Director, in-lieu of providing the total amount of sand to replace the sand and beach area that will be lost due to the impacts of the proposed protective structure. All interest earned by the account shall be payable to the account for the purposes stated below.

The developed mitigation plan covers impacts only through the identified 30-year design life of the seawall. No later than 29 years after the issuance of this permit, the permittees or their successor in interest shall apply for and obtain an amendment to this permit that either requires the removal of the seawall within its initial design life or requires mitigation for the effects of the seawall on shoreline sand supply for the expected life of the seawall beyond the initial 30 year design life. If within the initial design life of the seawall the permittees or their successor in interest obtain a coastal development permit or an amendment to this permit to enlarge or reconstruct the seawall or perform repair work that extends the expected life of the seawall, the permittee shall provide mitigation for the effects of the seawall on shoreline sand supply for the expected life of the seawall beyond the initial 30 year design life.

The purpose of the account shall be to establish a beach sand replenishment fund to aid SANDAG, or a Commission-approved alternate entity, in the restoration of the beaches within San Diego County. The funds shall be used solely to implement projects which provide sand to the region's beaches, not to fund operations, maintenance or planning studies. The funds shall be released only upon approval of an appropriate project by the Executive Director of the Coastal Commission. The funds shall be released as provided for in a MOA between SANDAG, or a Commission-approved alternate entity and the Commission, setting forth terms and conditions to assure that the in-lieu fee will be expended in the manner intended by the Commission. If the MOA is terminated, the Commission can appoint an alternative entity to administer the fund.

4. Monitoring Program. **PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT**, the applicants shall submit to the Executive Director for review and written approval, a monitoring program prepared by a licensed civil engineer or geotechnical engineer to monitor the performance of the seawall, return walls and reconstructed slope which requires the following:

a. An annual evaluation of the condition and performance of the seawall, return wall and geogrid slope addressing whether any significant weathering or damage has occurred that would adversely impact the future performance of the structures. This evaluation shall include an assessment of the color and texture of the seawall and return wall comparing the appearance of the structures to the surrounding native bluffs. In addition, the evaluation shall include an assessment of the appearance of the geogrid slope structure.

b. Annual measurements of any differential retreat between the natural bluff face and the seawall face, at the north and south ends of the seawall and at 20-foot intervals (maximum) along the top of the seawall face/bluff face intersection. The program shall describe the method by which such measurements shall be taken.

c. Provisions for submittal of a report to the Executive Director of the Coastal Commission by May 1 of each year (beginning the first year after construction of the project is completed) for a period of three years and then, each third year following the last the annual report, for the life of the approved seawall and upper bluff retention system. However, reports shall be submitted in the Spring immediately following either:

1. An 'El Niño' storm event–comparable to or greater than a 20-year storm.

2. An earthquake of magnitude 5.5 or greater with an epicenter in San Diego County.

Thus reports may be submitted more frequently depending on the occurrence of the above events in any given year.

d. Each report shall be prepared by a licensed civil, geotechnical engineer or geologist. The report shall contain the measurements and evaluation required in sections a, and b above. The report shall also summarize all measurements and analyze trends such as erosion of the bluffs or changes in sea level and the stability of the overall bluff face, including the upper bluff area, and the impact of the seawall on the bluffs to either side of the wall. In addition, each report shall contain recommendations, if any, for necessary maintenance, repair, changes or modifications to the project.

e. An agreement that the permittee shall apply for a coastal development permit within 90 days of submission of the report required in subsection c. above for any necessary maintenance, repair, changes or modifications to the project recommended by the report that require a coastal development permit.

The permittee shall undertake monitoring in accordance with the approved monitoring program. Any proposed changes to the approved monitoring program shall be reported to the Executive Director. No changes to the monitoring program shall occur without a Coastal Commission approved amendment to this coastal development permit unless the Executive Director determines that no amendment is legally required.

5. Storage and Staging Areas/Access Corridors. PRIOR TO THE ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, the applicant shall submit to the Executive Director for review and written approval, final plans indicating the location of access corridors to the construction site and staging areas. The final plans shall indicate that:

a. No overnight storage of equipment or materials shall occur on sandy beach or public parking spaces at Fletcher Cove. During the construction stages of the project, the permittee shall not store any construction materials or waste where it will be or could potentially be subject to wave erosion and dispersion. In addition, no machinery shall be placed, stored or otherwise located in the intertidal zone at any time, except for the minimum necessary to construct the notch fill. Construction equipment shall not be washed on the beach or in the Fletcher Cove parking lot.

b. Access corridors shall be located in a manner that has the least impact on public access to and along the shoreline.

c. No work shall occur on the beach on weekends, holidays or between Memorial Day weekend and Labor Day of any year.

d. The applicant shall submit evidence that the approved plans/notes have been incorporated into construction bid documents. The staging site shall be removed and/or restored immediately following completion of the development.

The permittee shall undertake the development in accordance with the approved plans. Any proposed changes to the approved plans shall be reported to the Executive Director. No changes to the plans shall occur without a Coastal Commission approved amendment to this coastal development permit unless the Executive Director determines that no amendment is legally required.

6. Storm Design/Certified Plans. **PRIOR TO THE ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT**, the applicant shall submit certification by a registered civil engineer that the proposed shoreline protective devices are designed to withstand storms comparable to the winter storms of 1982-83.

In addition, **within 60 days following construction**, the permittee shall submit certification by a registered civil engineer, acceptable to the Executive Director, verifying the seawall, return walls and reconstructed slope have been constructed in conformance with the approved plans for the project.

7. Future Response to Erosion. If in the future the permittees seek a coastal development permit to construct additional bluff or shoreline protective devices, the permittees will be required to include in the permit application information concerning alternatives to the proposed bluff or shoreline protection that will eliminate impacts to scenic visual resources, recreation and shoreline processes. Alternatives shall include but not be limited to: relocation of all or portions of the principle structure that are threatened, structural underpinning, and other remedial measures capable of protecting the principal structure and providing reasonable use of the property, without constructing bluff or shoreline stabilization devices. The information concerning these alternatives

must be sufficiently detailed to enable the Coastal Commission or the applicable certified local government to evaluate the feasibility of each alternative, and whether each alternative is capable of protecting existing structures that are in danger from erosion. No additional bluff or shoreline protective devices shall be constructed on the adjacent public bluff face above the approved seawall or on the beach in front of the proposed seawall unless the alternatives required above are demonstrated to be infeasible. No shoreline protective devices shall be constructed in order to protect ancillary improvements (patios, decks, fences, landscaping, etc.) located between the principal residential structures and the ocean.

8. Future Maintenance. The permittee shall maintain the permitted seawall, return wall and reconstructed slope in its approved state. Maintenance of the seawall and return wall shall include maintaining the color, texture and integrity. Maintenance of the reconstructed slope shall include an assessment of the appearance of the geogrid slope structure. Any change in the design of the project or future additions/reinforcement of the seawall, return walls and/or reconstructed slope beyond exempt maintenance as defined in Section 13252 of the California Code of Regulations to restore the structure to its original condition as approved herein, will require a coastal development permit. **However, in all cases, if after inspection, it is apparent that repair and maintenance is necessary, including maintenance of the color of the structures to ensure a continued match with the surrounding native bluffs, the permittee shall contact the Executive Director to determine whether a coastal development permit or an amendment to this permit is legally required, and, if required, shall subsequently apply for a coastal development permit or permit amendment for the required maintenance.**

9. Other Permits. PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, the permittee shall provide to the Executive Director copies of all other required local, state or federal discretionary permits for the development authorized by CDP #6-04-83. The applicant shall inform the Executive Director of any changes to the project required by other local, state or federal agencies. Such changes shall not be incorporated into the project until the applicant obtains a Commission amendment to this permit, unless the Executive Director determines that no amendment is legally required.

10. State Lands Commission Approval. **PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT**, the applicants shall submit to the Executive Director for review and written approval, a written determination from the State Lands Commission that:

a) No state lands are involved in the development; or

b) State lands are involved in the development, and all permits required by the State Lands Commission have been obtained; or

c) State lands may be involved in the development, but pending a final determination of state lands involvement, an agreement has been made by the

applicant with the State Lands Commission for the project to proceed without prejudice to the determination.

11. Public Rights. The Coastal Commission's approval of this permit shall not constitute a waiver of any public rights that exist or may exist on the property. The permittee shall not use this permit as evidence of a waiver of any public rights that exist or may exist on the property.

12. Assumption of Risk, Waiver of Liability and Indemnity Agreement. By acceptance of this permit, the applicant acknowledges and agrees (i) that the site may be subject to hazards from erosion and coastal bluff collapse; (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.

13. Deed Restriction. **PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT,** the applicants shall submit to the Executive Director for review and approval documentation demonstrating that the landowners have executed and recorded a deed restriction, in a form and content acceptable to the Executive Director: (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 applicant's entire parcel or parcels. The deed restriction shall also indicate that, in the event of an extinguishment or termination of the deed restriction for any reason, the terms and 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.

14. 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.

IV. Findings and Declarations.

The Commission finds and declares as follows:

1. Detailed Project Description\Permit History. Proposed is the construction of an approximately 138 ft.-long, 35 ft. high, 2 ft.-wide colored and textured concrete tiedback seawall on the public beach below two residential structures on Pacific Avenue in the City of Solana Beach. In addition, the applicant proposes to reconstruct a portion of the bluff below 371 Pacific in order to prevent continued upper bluff failures. The reconstructed bluff work involves fill of the bluff area behind the southern portion of the seawall with an erodible concrete material up to approximately 5 ft. above the height of the seawall. The concrete fill will also serve as a platform to construct a geogrid soil structure leading to the top of the bluff below 371 Pacific Avenue and will be landscaped with native plants. The residence at 371 Pacific Avenue is located approximately 18 feet from the edge of the bluff and the residence at 403 Pacific is located approximately 11 from the bluff edge. The applicants also propose to pay an in-lieu fee to mitigate the adverse effects of the shoreline protective devices on the local sand supply.

The property at 371 Pacific Avenue received Commission authorization to construct a one-story addition to the existing residence in May of 1981 (CDP #F9818/Blackburn). In December 24, 1997, the Executive Director approved an emergency permit for the fill of two seacaves (#6-97-156-G/Blackburn) and a subsequent emergency permit granted February 23, 1998 to fill both the caves and the surrounding undercut area at least 3 feet deep and 12 feet high (#6-98-21-G/Blackburn). On December 10, 1998, the Commission approved a regular coastal development permit as the required follow-up permit to the emergency actions, subject to Special Conditions, authorizing the filling a 94-foot wide, 12-foot high, maximum 18-foot deep sea cave and undercut area at the base of the bluff below the existing single-family residence, with a colored and textured erodible concrete mixture and riprap (ref. CDP #6-98-21/Blackburn). To date, the applicant has not satisfied all of the Special Conditions of approval for the 94 ft. of infill, the permit has not been issued and the infill is unpermitted. Following satisfaction of the prior-to-issuance conditions of the subject permit, the conditions of the unissued coastal development permit will be effectively satisfied and the permit issued.

The property at 403 Pacific has also been subject of several permits including a second story addition approved in November of 1993 (ref. CDP #6-93-156/Johnson), an emergency permit to fill approximately 50 ft. of seacave/undercut area with concrete and a regular follow-up coastal development permit for the 50 ft. of seacave/undercut area of concrete fill (ref. Emerg. Permit #6-98-13-G/Johnson and CDP #6-98-137/Johnson). However, because the Special Conditions of approval have not been satisfied, the regular coastal development permit (ref. CDP #6-98-137) has not been issued and the infill is unpermitted. Following satisfaction of the prior-to-issuance conditions of the subject permit, the conditions of the unissued coastal development permit will be effectively satisfied and the permit issued. The proposed approximately 138 ft.-long seawall will located be at the base of the bluff and will effectively cover the seaward face of the unpermitted infill below 371 and 403 Pacific Avenues.

The proposed project will be located approximately 400 feet south of Tide Beach Park public access stairway and Fletcher Cove, the City's central beach access park, is located approximately ½ mile to the south. The City of Solana Beach does not yet have a certified LCP. Therefore, Chapter 3 policies of the Coastal Act is the standard of review.

2. Geologic Conditions and Hazards. Section 30235 of the Coastal Act states, in 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.

In addition, Section 30253 of the Coastal Act states, in part:

> New development shall:
>
> (l) 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...

The proposed project involves the construction of an approximately 138 ft.-long, 35 ft.-high tiedback seawall, concrete return wall and concrete infill behind the seawall to a level of approximately 5 ft. above the seawall. Below 371 Pacific Avenue, the applicant proposes to reconstruct the collapsed bluff using a geogrid reinforced slope at an inclination of 1:1 that will be planted with native plants. The threatened structures are located between 11 and 18 ft. from the edge of the bluff.

The applicants' geotechnical report indicates that the project is required to protect two residential structures threatened by erosion due largely to the mid and upper-bluff failures resulting from the exposure of a "clean sands" lens below the residences in approximately 1998. The applicants' geotechnical report documents that before the seacave/notch fills authorized by Emergency Permits 6-98-13-G and 6-98-21-G could be completed, portions of the seacave/notches collapsed exposing a "clean sands" lens which over time has lead to the upper bluff collapses that currently threaten the subject residences:

> Although the sea caves and basal notches below these properties were infilled in early 1998, the upper sloping coastal bluff had now been destabilized, with progressive upper bluff failures starting to encroach on bluff-top improvements and

expanding laterally, affecting all three properties. (ref. Page 4 of "Geotechnical Basis of Design" by TerraCosta Consulting Group, Inc., dated February 6, 2004)

[The reference to a third property involves a property at 367 Pacific Avenue which is not a party to the subject application.]

The subject properties experienced upwards of 10 feet of lower bluff retreat prior to the placement of concrete infill in the sea caves and interconnected notches at the base of the bluff. However, despite the placement of the concrete infill, the exposed clean sand layer at the base of the upper sloping terrace deposits has resulted in the significant loss of upper bluff material, in excess of 1500 cubic yards, since June 1998. (ref. Page 14 of "Geotechnical Basis of Design" by TerraCosta Consulting Group, Inc., dated February 6, 2004)

The applicant's geotechnical report describes the clean sands lens as being located between the Torrey Sandstone and Marine Terrace deposits at approximately elevation 25-35 ft. MSL. To protect the residences, the applicants are proposing to construct a seawall up to 35 ft. MSL which will effectively cover the exposed section of the clean sands lens and prevent collapse of the upper bluff area above the clean sands layer. Above the seawall where the upper bluff has already collapsed (below 371 Pacific Avenue) the applicant proposes to reconstruct the bluff area using an erodible concrete fill up to 5 ft. above the seawall and an approximately 40 ft. high geogrid/soil structure up to the top of the 80 ft. high coastal bluff.

According to the Commission's staff geologist, the clean sand lens consists of a layer of sand with a limited amount of capillary tension and a very minor amount of cohesion, which causes the material to erode easily, making this clean sand layer, once exposed, susceptible to wind blown erosion and continued sloughing as the sand dries out and loses the capillary tension that initially held the materials together. Geotechnical reports associated with developments near this site have stated that gentle sea breezes and any other perturbations, such as landing birds or vibrations from low-flying helicopters, can be sufficient triggers of small- or large-volume bluff collapses, since the loss of the clean sands eliminates the support for the overlying, slightly more cemented, terrace deposits.

The presence of this clean sand layer within the bluffs along the Solana Beach shoreline has previously been identified in geotechnical reports submitted in conjunction with seawall, seacave and notch infill projects in Solana Beach (ref. CDP 6-00-9/Del Mar Beach Club, CDP #6-99-100/Presnell, et. al, #6-99-103/ Coastal Preservation Association, #6-00-66/Pierce, Monroe, #6-02-02/Gregg, Santina, #6-02-84/Scism and #6-03-33/Surfsong). According to the Commission's staff geologist, the typical mechanism of sea cliff retreat along the Solana Beach shoreline involves the slow abrasion and undercutting of the Torrey Sandstone bedrock, which forms the sea cliff at the base of the bluffs, from wave action which becomes more pronounced in periods of storms, high surf and high tides. Other contributing factors to sea cliff retreat include fracturing, jointing, sea cave and overhang collapse and the lack of sand along the shoreline. When the lower sea cliff is undercut sufficiently, it commonly fails in blocks.

The weaker terrace deposits are then unsupported, resulting in the collapse of the terrace deposits through circular failures. Such paired, episodic failures eventually result in a reduction in the steepness of the upper bluff, and the landward retreat of the bluff edge. Such retreat may threaten structures at the top of the slope. When failures of the upper bluff have sufficiently reduced the overall gradient of the upper bluff, a period of relative stability ensues, which persists until the lower bluff becomes sufficiently undercut to initiate a block failure once more, triggering a repetition of the entire process.

The mechanism of bluff retreat that occurs in conjunction with the exposure of the clean sand layer is somewhat different than the paired, episodic failure model described above. Because of the cohesionless character of the clean sands, once they are exposed they continue to slump on an ongoing basis as a result of very small triggers such as traffic vibrations or wind erosion. Continued sloughage results in the further exposure of more clean sand, and ongoing upper bluff collapse. This cycle occurs so quickly (over months or days, rather than years) that the upper bluff may never achieve a stable angle of repose. In 1998, following the exposure of the clean sands layer below 261 Pacific Avenue (south of the subject site), a section of the bluff collapsed suddenly and without warning, leaving a vertical head scarp 25 feet in height at the top of the bluff. Unless the base of the bluff is afforded shoreline protection, additional bluff failures can further expose the layer of clean sands and result in a potential upper bluff failure and an immediate threat to the structures at the top of the bluff.

The subject geotechnical report indicates that the long-term average sea cliff erosion rate for Solana Beach is approximately 0.3 ft. per year. According to the Commission's staff geologist, the best regional estimate of historical long-term bluff retreat for Solana Beach is from a FEMA-funded study summarized in Benumof and Griggs (1999). These authors report an average long-term retreat rate of 0.27 ft/yr for the Solana Beach area over the period 1932 - 1994. Episodic erosion events such as sea cave or notch overhang collapses, and erosion related to severe winter storms, can lead to short-term bluff retreat rates well above the long-term average. These short-term retreat rates are inherently included in the estimation of the long-term retreat rate for Solana Beach and, therefore, are included in the methodology used for the in-lieu fee sand replenishment calculations.

Although the geotechnical information supplied by the applicant identifies that the historical long-term average erosion rate is 0.3 ft. per year, the applicant identifies that the subject site has recently experienced erosion that greatly exceeds this long-term average. Since 1998, the applicants' representative estimates that upwards of 8 to 10 feet of marine erosion has occurred along the Solana Beach Shoreline. Since exposure of the clean sands lens below 371 Pacific Avenue, there have been progressive upper bluff failures below the residence occurring in July 1999, July 2001 and September 2004.

While the existing residences are set back from the bluff edge between 11 and 18 feet, the slope stability analysis performed by the applicant's engineer indicates that further collapse of the upper bluff would threaten both residences at the top of the bluff. The factor of safety against sliding along the most likely slide plane was estimated to be at approximately 1.20 for the property at 371 Pacific Avenue and approximately 1.03–1.18

for the property at 403 Pacific Avenue. (The factor of safety is an indicator of slope stability where a value of 1.5 is the industry-standard value for new development. In theory, failure should occur when the factor of safety drops to 1.0, and no slope should have a factor of safety less than 1.0.)

Thus, given the significant bluff collapses that have occurred since 1998, the presence of the clean sand layer, the extreme erodibility of these sands once exposed, and the low factor of safety on the subject bluffs, substantial evidence has been provided to document that the existing primary blufftop structures are in danger from erosion. However, there are a variety of ways in which the threat from erosion could be addressed. Under the policies of the Coastal Act, the project must eliminate or mitigate adverse effects on shoreline sand supply and minimize adverse effects on public access, recreation, and the visual quality of the shoreline.

Alternatives

The applicant's engineer has performed an alternatives analysis to demonstrate that no other feasible less-enviromentally-damaging alternatives exist to address the threats to the structures at the top of the bluff. The applicant's engineer has identified that removal or relocation of the residential structures is not feasible or practical because of the expense and the lack of available area on the lots to setback the structures so as to not be threatened by the ongoing erosion. Maintenance of the existing seacave/notch fills will also not effectively protect the residence since the upper bluff failures have occurred even with concrete fill of the seacaves/notches exposing the clean sands lens. Control of groundwater and irrigation restriction while recommended by the applicants' representative as a way of reducing bluff sloughage, will not prevent the bluff collapses that occur at the subject site. Underpinning of the existing residences has also been examined by the applicant, however without controlling the ongoing failures, the underpinnings would soon be exposed. In the case of the seawall, the applicant's engineer has also identified that the height of the wall at 35 ft. is the minimum size necessary to protect the toe of the bluff from marine erosion and contain the layer of clean sands which has been determined to be located between 25 ft. and 35 ft. MSL.

In summary, the exposure of the clean sands layer presents a threat of rapid erosion and bluff collapses that must be addressed by a solution that effectively contains the clean sands and affords protection to the residences at the top of the bluff. Given the substantial amount of documented erosion on the site over the last few years, the presence of the clean sands, the extreme erodibility of these sands, and the low factor of safety on the subject bluffs, substantial evidence has been provided to document that the existing primary blufftop structures are in danger from erosion and that the proposed seawall, return walls and geogrid reconstructed bluff are necessary to protect the structures at the top of the bluff from the danger of erosion. In addition, the above-described alternatives presented by the applicant does not suggest there is a less-environmentally-damaging feasible alternative. The Commission's staff geologist and coastal engineer have reviewed the applicant's geotechnical assessment of the site along with their alternatives analysis and concur with its conclusions and recommendations.

Therefore, the Commission finds that the proposed seawall, return walls and geogrid reconstructed bluff structure are the least environmentally damaging feasible alternative.

Sand Supply/In Lieu Mitigation Fee

Although construction of a seawall is required to protect the existing principle structures on the site, Section 30235 of the Coastal Act requires that the shoreline protection be designed to eliminate or mitigate adverse impacts on local shoreline sand supply. There are a number of adverse impacts to public resources associated with the construction of shoreline protection. The natural shoreline processes referenced in Section 30235, such as the formation and retention of sandy beaches, can be significantly altered by construction of a seawall, since bluff retreat is one of several ways that beach area and beach quality sand is added to the shoreline. This retreat is a natural process resulting from many different factors such as erosion by wave action causing cave formation, enlargement and eventual collapse, saturation of the bluff soil from ground water causing the bluff to slough off and natural bluff deterioration. When a seawall is constructed on the beach at the toe of the bluff, it directly impedes these natural processes.

Some of the effects of a shoreline protective structure on the beach such as scour, end effects and modification to the beach profile are temporary or difficult to distinguish from all the other actions which modify the shoreline. Seawalls also have non-quantifiable effects to the character of the shoreline and visual quality. However, some of the effects which a structure may have on natural shoreline processes can be quantified. Three of the effects from a shoreline protective device which can be quantified are: 1) loss of the beach area on which the structure is located; 2) the long-term loss of beach which will result when the back beach location is fixed on an eroding shoreline; and 3) the amount of material which would have been supplied to the beach if the back beach or bluff were to erode naturally.

Loss of beach material and loss of beach area are two separate concerns. A beach is the result of both sandy material and a physical area between the water and the back beach. Thus, beach area is not simply a factor of the quantity of sandy beach material. In Solana Beach, the shoreline is a shallow bedrock layer covered by a thin veneer of sand. The bedrock layer provides an area for collection of sandy material. The sand material is important to the overall beach experience, but even without the sand, the bedrock layer provides an area for coastal access between the coastal bluff and the ocean. The loss of beach material that will be a direct result of this project can be balanced or mitigated by obtaining similar quality and quantity of sediment from outside the littoral cell and adding this sediment to the littoral cell. There are sources of beach quality sediment that can be drawn upon to obtain new sediment for the littoral cell. Unfortunately there is not a source of extra beach land that can be used to add new land area to the littoral cell. Beach nourishment is a method that allows us to shift the shore profile seaward and create a new area of dry beach. This will not create new coastal land, but will provide many of the same benefits that will be lost when the beach area is covered by a seawall or 'lost' through passive erosion when the back bluff location is fixed.

The volume of sand that is calculated by the Beach Sand In-lieu Mitigation Program currently utilized by the Commission is the quantification of the direct impacts to the existing recreational beach from the proposed seawall project. The mitigation program that has been proposed by the applicant and recommended as a special condition for this project includes quantification of the impacts from wall and infill encroachments, denial of sand to the littoral cell and passive erosion, as discussed herein. The purpose of the Beach Sand In-Lieu Fee Mitigation Program is to mitigate for the small, persistent loss of recreational beach such as will result from the proposed project by placing funds into a program that will be used for placement of sand on the beach in this area. This Beach Sand In-Lieu Fee Mitigation Program is administered by the San Diego Association of Governments (SANDAG) and has been in place in San Diego County for many years.

It is possible to estimate the volume of sand needed to create a given area of dry beach through beach nourishment. The proposed project will result in a loss of 345 sq. ft. of beach due to the long-term physical encroachment of the seawall (based on a 138-foot length and 2.5 foot width). In addition, there will be 1,242 sq. ft. of beach area that will no longer be formed because the back of the beach will be fixed. This 1,242 sq. ft. of beach area [345 + 1,242] cannot be directly replaced by land, but a comparable area can be built through the one-time placement of 1,117.8 cubic yards of sand on the beach seaward of the seawall as beach nourishment. Further explanation of this calculation is provided below. Thus, the impact of the seawall on beach area can be quantified as 1,117.8 cubic yards of sand. This estimate is only a "rough approximation" of the impact of the seawall on beach area because a one-time placement of this *volume* of sand cannot result in creation of beach *area* over the long term.

In addition to the impact on beach area, there is the amount of beach material that would have been added to the beach if natural erosion had been allowed to continue at the site, which can be calculated at a volume of 2,691 cubic yards. The applicant is also proposing to mitigate for the continued placement of the (as yet) unpermitted concrete/riprap infill which lies behind the proposed seawall. The applicant estimates this amount to be approximately 310.5 cubic yards. This 310.5 cubic yards added to the 2,691 cubic yards of sand that would have been added to the littoral cell, plus the 1,117.8 cubic yards of sand associated with the impact to beach area, totals 4,119 cubic yards of sand that are needed to balance the quantifiable impacts from the entire project. Special Condition #3 requires the applicant to deposit an in-lieu fee to fund beach sand replenishment of 4,119.3 cubic yards of sand, as mitigation for impacts of the proposed shoreline protective device on beach sand supply and shoreline processes.

In the case of the proposed project, the fee calculates to be $57,670.00, based on 4,119.3 cubic yards of sand multiplied by the cost of obtaining a cubic yard of sand, as proposed by the applicants' engineer at $14.00 yd.

The following is the methodology used by Commission staff in developing the in-lieu fee amount. The methodology uses site-specific information provided by the applicant as well as estimates, derived from region-specific criteria, of both the loss of beach material and beach area which could occur over the life the structure, and of the cost to purchase

an equivalent amount of beach quality material and to deliver this material to beaches in the project vicinity.

The following is a description of the methodology. The actual calculations which utilize values that are applicable to the subject sites, and were used as the basis for calculating the estimated range of the mitigation fee, are attached as Exhibit #X to this report.

Fee = (Volume of sand for mitigation) x (unit cost to buy and deliver sand)

$$M = V_t \times C$$

where

M = Mitigation Fee

$\mathbf{V_t}$ = Total volume of sand required to replace losses due to the structure, through reduction in material from the bluff, reduction in nearshore area and loss of available beach area (cubic yards). Derived from calculations provided below.

C = Cost, per cubic yard of sand, of purchasing and transporting beach quality material to the project vicinity ($ per cubic yard). Derived from the average of three written estimates from sand supply companies within the project vicinity that would be capable of transporting beach quality material to the subject beach, and placing it on the beach or in the near shore area.

$$V_t = V_b + V_w + V_e$$

where

$\mathbf{V_b}$ = Volume of beach material that would have been supplied to the beach if natural erosion continued, based on the long-term regional bluff retreat rate, design life of the structure, percent of beach quality material in the bluff, and bluff geometry (cubic yards). This is equivalent to the long-term reduction in the supply of bluff material to the beach resulting from the structure.

$\mathbf{V_w}$ = Volume of sand necessary to replace the beach area that would have been created by the natural landward migration of the beach profile without the seawall, based on the long-term regional bluff retreat rate, and beach and nearshore profiles (cubic yards)

$\mathbf{V_e}$ = Volume of sand necessary to replace the area of beach lost due to encroachment by the seawall; based on the seawall design and beach and nearshore profiles (cubic yards)

$$\mathbf{V_b} = (S \times W \times L/27) \times [(R\ h_s) + (\mathbf{h_u}/2 \times (R + (R_{cu} - \mathbf{R_{cs}})))]$$

where

R = Long-term regional bluff retreat rate (ft./yr.), based on historic erosion, erosion trends, aerial photographs, land surveys, or other accepted techniques. For the Solana Beach area, this regional retreat has been estimated by the applicants' representative to be 0.3 ft./year. The use of any alternative retreat rates must be documented by the applicant and should be the same as the predicted retreat rate used to estimate the need for shoreline armoring.

L = Design life of armoring without maintenance (yr.) If maintenance is proposed and extends the life of the seawall beyond the initial estimated design life, a revised fee shall be determined through the coastal development permit process.

W = Width of property to be armored (ft.)

h = Total height of armored bluff (ft.)

S = Fraction of beach quality material in the bluff material, based on analysis of bluff material to be provided by the applicant

h_s = Height of the seawall from the base to the top (ft)

h_u = Height of the unprotected upper bluff, from the top of the seawall to the crest of the bluff (ft)

R_{cu} = Predicted rate of retreat of the crest of the bluff, during the period that the seawall would be in place, assuming no seawall were installed (ft/yr). This value can be assumed to be the same as R unless

the applicant provides site-specific geotechnical information supporting a different value.

R_{CS} = Predicted rate of retreat of the crest of the bluff, during the period that the seawall would be in place, assuming the seawall has been installed (ft/yr). This value will be assumed to be zero unless the applicant provides site-specific geotechnical information supporting a different value.

NOTE: For conditions where the upper bluff retreat will closely follow the lower bluff, this volume will approach a volume of material equal to the height of the total bluff, the width of the property and a thickness equal to the total bluff retreat that would have occurred if the seawall had not been constructed. For conditions where the upper bluff has retreated significantly and would not be expected to retreat further during the time that the seawall is in place, this volume would approach the volume of material immediately behind the seawall, with a thickness equal to the total bluff retreat that would have occurred if the seawall had not been constructed.

$\mathbf{V_W = R \times L \times v \times W}$

where

R = Long-term regional bluff retreat rate (ft./yr.), based on historic erosion, erosion trends, aerial photographs, land surveys, or other accepted techniques. For the Solana Beach area, this regional retreat has been estimated by the applicants' representative to be 0.3 ft./year. The use of any alternative retreat rates must be documented by the applicant and should be the same as the predicted retreat rate used to estimate the need for shoreline armoring.

L = Design life of armoring without maintenance (yr.) If maintenance is proposed and extends the life of the seawall beyond the initial estimated design life, a revised fee shall be determined through the coastal development permit process.

v = Volume of material required, per unit width of beach, to replace or reestablish one foot of beach seaward of the seawall; based on the vertical distance from the top of the beach berm to the seaward limit of reversible sediment movement (cubic yards/ft of width and ft. of retreat). The value of v is often taken to be 1 cubic yard per square foot of beach. In

the report, Oceanside Littoral Cell Preliminary Sediment Budget Report" (December 1987, part of the Coast of California Storm and Tide Wave Study, Document #87-4), a value for v of 0.9 cubic yards/square foot was suggested. If a vertical distance of 40 feet is used for the range of reversible sediment movement, v would have a value of 1.5 cubic yards/square foot (40 feet x 1 foot x 1 foot / 27 cubic feet per cubic yard). These different approaches yield a range of values for v from 0.9 to 1.5 cubic yards per square foot. The value for v would be valid for a region, and would not vary from one property to the adjoining one. Until further technical information is available for a more exact value of v, any value within the range of 0.9 to 1.5 cubic yards per square foot could be used by the applicant without additional documentation. Values below or above this range would require additional technical support.

W = Width of property to be armored (ft.)

$$V_e = E \times W \times v$$

where

E = Encroachment by seawall, measured from the toe of the bluff or back beach (ft.)

W = Width of property to be armored (ft.)

v = Volume of material required, per unit width of beach, to replace or reestablish one foot of beach seaward of the seawall, as described above;

The San Diego Association of Governments (SANDAG) has adopted the Shoreline Preservation Strategy for the San Diego region and is currently working on techniques toward its implementation. The Strategy considers a full range of shoreline management tactics, but emphasizes beach replenishment to preserve and enhance the environmental quality, recreational capacity, and property protection benefits of the region's shoreline. Funding from a variety of sources will be required to implement the beach replenishment and maintenance programs identified in the SANDAG Strategy. In this particular case, SANDAG has agreed to administer a program which would identify projects which may be appropriate for support from the beach sand replenishment fund, through input from the Shoreline Erosion Committee which is made up of representatives from all the coastal jurisdictions in San Diego County. The Shoreline Erosion Committee is currently monitoring several large scale projects, both in and out of the coastal zone, they term "opportunistic sand projects", that will generate large quantities of beach quality material

suitable for replenishing the region's beaches. The purpose of the account is to aid in the restoration of the beaches within San Diego County. One means to do this would be to provide funds necessary to get such "opportunistic" sources of sand to the shoreline.

The applicant is being required to pay a fee in-lieu of directly depositing the sand on the beach, because the benefit/cost ratio of such an approach would be too low. Many of the adverse effects of the seawall on sand supply will occur gradually. In addition, the adverse effects impact the entire littoral cell but to different degrees in different locations throughout the cell (based upon wave action, submarine canyons, etc.) Therefore, mitigation of the adverse effects on sand supply is most effective if it is part of a larger project that can take advantage of the economies of scale and result in quantities of sand at appropriate locations in the affected littoral cell in which it is located. The funds will be used only to implement projects which benefit the area where the fee was derived, and provide sand to the region's beaches, not to fund operations, maintenance or planning studies. Such a fund will aid in the long-term goal of increasing the sand supply and thereby reduce the need for additional armoring of the shoreline in the future. The fund also will insure available sandy beach for recreational uses. The methodology, as proposed, ensures that the fee is roughly proportional to the impacts to sand supply attributable to the proposed seawall. The methodology provides a means to quantify the sand and beach area that would be available for public use, were it not for the presence of the seawall.

The above-described impacts on the beach and sand supply have previously been found to result from seawalls in other areas of North County. In March of 1993, the Commission approved CDP #6-93-85/Auerbach, et al for the construction of a seawall fronting six non-continuous properties located in the City of Encinitas north of the subject site. In its finding for approval, the Commission found the proposed shoreline protection would have specific adverse impacts on the beach and sand supply and required mitigation for such impacts as a condition of approval. The Commission made a similar finding for several other seawall developments within San Diego County including an August 1999 approval (ref. CDP No. 6-99-100/Presnell, et. al) for the approximately 352-foot-long seawall project located approximately ¼ mile south of the subject development and a March 2003 approval (ref. CDP No. 6-02-84/Scism located 2 lots south of the subject site. (Also ref. CDP Nos. 6-93-36-G/Clayton, 6-93-131/Richards, et al, 6-93-136/Favero, 6-95-66/Hann, 6-98-39/Denver/Canter and 6-99-41/Bradley; 6-00-138/Kinzel, Greenberg; 6-02-02/Gregg, Santina and 6-03-33/Surfsong).

In addition to the adverse impacts the seawall will have on the beach as detailed above, the Commission finds that the proposed seawall could also have adverse impacts on adjacent unprotected properties caused by wave reflection, which leads to accelerated erosion. Numerous studies have indicated that when continuous protection is not provided, unprotected adjacent properties experience a greater retreat rate than would occur if the protective device were not present. This is due primarily to wave reflection off the protective structure and from increased turbulence at the terminus of the seawall. According to James F. Tait and Gary B. Griggs in Beach Response to the Presence of a Seawall (A Comparison of Field Observations) "[t]he most prominent example of lasting

impacts of seawalls on the shore is the creation of end scour via updrift sand impoundment and downdrift wave reflection. Such end scour exposes the back beach, bluff, or dune areas to higher swash energies and wave erosion." As such, as the base of the bluff continues to erode on the unprotected adjacent properties, failure of the bluff is likely. Thus, future failures could "spill over" onto other adjacent unprotected properties, prompting requests for much more substantial and environmentally damaging seawalls to protect the residences. This then starts a "domino" effect of individual requests for protection.

According to information contained in the Planners Handbook (dated March 1993), which is included as Technical Appendix III of the Shoreline Preservation Strategy adopted by the San Diego Association of Governments (SANDAG) on October 10, 1993, "[a] longer return wall will increase the magnitude of the reflected wave energy. On a coast where the shoreline is retreating, there will be strong incentives to extend the length of the return wall landward as adjacent property is eroded, thereby increasing the return wall, and its effects on neighboring property, with time."

The plans for the subject seawall submitted by the applicant do not address the design of the north and south ends of the seawall in terms of how the design will mitigate these known effects. Therefore, Special Condition #1 has been attached which requires the submission of revised final plans that reflect the end design of the proposed seawall. The condition requires that the returns incorporate a feathered design or other design to gradually blend into the adjacent natural bluffs which will help to reduce the turbulence at the end of the wall that can lead to accelerated erosion of adjacent unprotected bluffs. However, although the proposed seawall must be designed to reduce impacts of the wall on adjacent properties, at best, the impacts can be reduced, but not eliminated. Regardless of whether accelerated erosion will occur on the adjacent unprotected properties, the adjacent bluffs will continue to erode due to the same forces that are causing them to erode currently. As this occurs, more surface area of the feathered edges will be exposed to wave attack leading to increased turbulence and accelerated erosion of the adjacent unprotected bluff. These impacts are particularly problematic in the case of the proposed project, as the seawall will be an isolated structure in a stretch of largely unprotected shoreline.

If the proposed wall were damaged in the future (e.g. as a result of wave action, storms, etc.) it could threaten the stability of the site, which could lead to need for more bluff alteration. In addition, damage to the seawall could adversely affect the beach by resulting in debris on the beach and/or creating a hazard to the public using the beach. In addition, excessive wear of the seawall could result in the loss of or damage to the color or texture of the seawall resulting in adverse visual impacts (discussed in more detail in a subsequent section of this report). Therefore, in order to find the proposed seawall consistent with the Coastal Act, the Commission finds that the condition of the seawall in its approved state must be maintained for the life of the seawall. Further, in order to ensure that the permittee and the Commission know when repairs or maintenance are required, the permittee must monitor the condition of the seawall annually, for three years and at three-year intervals after that, unless a major storm event occurs. The monitoring

will ensure that the permittee and the Commission are aware of any damage to or weathering of the seawall wall and can determine whether repairs or other actions are necessary to maintain the seawall in its approved state.

Therefore, Special Condition #4 requires the applicant to submit a monitoring report which evaluates the condition and performance of the seawall and other shoreline protective structures and overall site stability, and submit an annual report with recommendations, if any, for necessary maintenance, repair, changes or modifications to the project. In addition, the condition requires the applicant to perform the necessary repairs through the coastal development permit process.

Special Condition #7 requires that feasible alternative measures must be implemented on the applicant's blufftop property in the future, should additional stabilization be required, which would avoid additional alteration of the natural landform of the public beach or coastal bluffs, but would reduce risk to the principle residential structures and provide reasonable use of the property. The condition will ensure that future property owners will be aware that any future proposals for additional shoreline protection, such as upper bluff stabilization, will require an alternative analysis similar to one required for the subject project. If there are feasible alternatives to shoreline protection that would have less impact on visual quality, sand supply, or public access, the Commission (or, where applicable, the City of Solana Beach after the effective certification of its Local Coastal Program) will require implementation of those alternatives. The condition also states that no shore or bluff protection shall be permitted for ancillary improvements located within the blufftop setback area. Through this condition, the property owner is required to acknowledge the risks inherent in the subject property and that there are limits to the structural protective measures that may be permitted on the adjacent public property in order to protect the existing development in its current location.

Special Condition #1 requires the applicant to submit final plans for the project indicating that the seawall conforms to the bluff contours, details the design of the return wall and reconstructed bluff area and that demonstrate that any existing irrigation systems on the blufftop have been removed, as these would impact the ability of the seawall and other shoreline protection devices to adequately stabilize the site. Submission of final plans will ensure that overall site conditions which could adversely impact the stability of the bluff have been addressed.

Special Condition #8 notifies the applicants that they are responsible for maintenance of the herein approved shore and bluff protection. The condition also indicates that, should it be determined that maintenance of the proposed structures are required in the future, including maintenance of the color and texture, the applicant shall contact the Commission to determine if permits are required.

To assure the proposed shore/bluff protection has been constructed properly, Special Condition #6 has been proposed. This condition requires that, within 60 days of completion of the project, as built-plans and certification by a registered civil engineer be

submitted that verifies the proposed seawall has been constructed in accordance with the approved plans.

Special Conditions #9 requires the applicant to submit a copy of any required permits from other local, state or federal agencies to ensure that no additional requirements are placed on the applicant that could require an amendment to this permit.

Also, due to the inherent risk of shoreline development, Special Condition #12 requires the applicant to waive liability and indemnify the Commission against damages that might result from the proposed shoreline devices or their construction. The risks of the proposed development include that the proposed shoreline devices will not protect against damage to the residences from bluff failure and erosion. In addition, the structures themselves may cause damage either to the applicants' residence or to neighboring properties by increasing erosion of the bluffs. Such damage may also result from wave action that damages the seawall. Although the Commission has sought to minimize these risks, the risks cannot be eliminated entirely. Given that the applicants have chosen to construct the proposed shoreline devices despite these risks, the applicants must assume the risks. Special Condition #13 requires the applicant to record a deed restriction imposing the conditions of this permit as covenants, conditions and restrictions on the use and enjoyment of the property. Only as conditioned can the proposed project be found consistent with Sections 30235 and 30253 of the Coastal Act.

In summary, the applicant has documented that the existing blufftop primary structures are in danger from erosion and subsequent bluff collapse. In addition, even with the construction of the seawall, the upper bluff will continue to erode and soon will threaten the blufftop home. Thus, the concrete return walls, backfill and reconstructed bluff area using a geogrid/soil structure are also necessary to assure full protection for the existing blufftop residences. As conditioned, there are no other less damaging alternatives available to reduce the risk from bluff erosion. Thus, the Commission is required to approve the proposed protection for the residential structures. Since the proposed seawall will contribute to erosion and geologic instability over time and also deplete sand supply, occupy public beach and fix the back of the beach, Special Condition #3 requires the applicant to require pay an in-lieu mitigation fee to offset this impact. Therefore, as conditioned, the Commission finds that the proposed seawall is consistent with Sections 30235 and 30253 of the Coastal Act.

3. Visual Resources/Alteration of Natural Landforms. Section 30240 (b) of the Coastal Act is applicable and states:

> (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.

In addition, Section 30251 of the Coastal Act states, in part:

> 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 views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas . . .

As stated above, the proposed development will occur on the face of a coastal bluff and on the public beach. An approximately 50 ft.-long seawall has been constructed approximately 100 ft. to the south of the subject site (ref. CDP Nos. 6-02-84/Scism). However, the bluffs to the north side of the subject site remain in their natural state although some contain concrete notch fills at their base. With a proposed 138 ft.-long, approximately 35 ft.-high seawall, concrete return wall and geogrid backfill structure, the potential for adverse impacts on visual resources of the adjacent natural bluffs resulting from the proposed development could be significant.

The applicant is proposing to construct an approximately 138-ft. long, 35-ft. high tied-back concrete seawall and concrete return wall/backfill along south side and behind the seawall. In addition, the applicant proposes to construct a reinforced backfill behind the seawall on top the concrete fill consisting of soil with geogrid support constructed at an approximately 1:1 slope inclination. To mitigate the visual impacts of the proposed seawall, the applicant proposes to color and texture the seawall and the concrete return walls. The visual treatment proposed is similar to the visual treatment approved by the Commission in recent years for seawalls along the Solana Beach shoreline. (ref. CDP #6-02-84/Scism; 6-02-02/Gregg, Santina; 6-03-33/Surfsong). However, based on the plans submitted for the proposed reinforced backfill, it appears the slope will be a flat 1:1 slope which is not the character of a natural bluff. Therefore, Special Condition #1 requires the applicant to submit revised plans for the proposed reconstructed bluff that incorporates the use of an undulating or more natural appearing slope.

In addition, to address other potential adverse visual impacts, Special Conditions Nos. 4 and 8 have been attached which require the applicant to monitor and maintain the proposed seawall, reinforced slope and concrete return wall in their approved state. In addition, although the applicant proposes to color and texture treat the proposed seawall and concrete return wall, specific information regarding the treatment has not been submitted. Therefore, Special Condition #1 requires the submittal of detailed plans, color samples, and information on construction methods and technology for the surface treatment of the structures. Finally, Special Condition #2 has been attached to require the applicant to plant the proposed geogrid based slope with native, drought tolerant species and to maintain the plants in good condition over the lifetime of the project. In this way, the Commission can be assured that the proposed seawall, concrete return wall and geogrid slope will maintained so as to effectively mitigate their visual prominence.

Therefore, as conditioned, the Commission finds that potential visual impacts associated with the proposed development have been reduced to the maximum extent feasible and

the proposed development will include measures to prevent impacts that would significantly degrade the adjacent park and recreation area (beach area). Thus, the project can be found consistent with Sections 30240 and 30251 of the Coastal Act.

4. Public Access/Recreation. Pursuant to Section 30604 (c), the Coastal Act emphasizes the need to protect public recreational opportunities and to provide public access to and along the coast. Section 30210 of the Coastal Act is applicable to the proposed development and 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.

In addition, Section 30212 of the Act is applicable and states, in 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....

Additionally, Section 30220 of the Coastal Act provides:

> Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.

The project site is located on a public beach utilized by local residents and visitors for a variety of recreational activities. The site is located approximately 400 feet south of the Tide Beach public access stairway and approximately ½ mile north of Fletcher Cove the main public and vehicle beach access ramp in the City of Solana Beach. The proposed seawall will be constructed on sandy beach area that is currently available to the public. The project will have several adverse impacts on public access.

Although the proposed seawall has been designed to be as narrow as feasible, it will project approximately 2.5 feet seaward of the toe of the bluff. Although the seaward encroachment of the wall appears at first glance to be minimal, the beach along this area of the coast is narrow and at high tides and winter beach profiles, the public may be forced to walk virtually at the toe of the bluff or the area would be impassable. As such, an encroachment of any amount, including 2.5 feet for a length of 138 feet onto the sandy beach, reduces the beach area available for public use and is therefore a significant adverse impact. This is particularly true given the existing beach profiles and relatively narrow beach where access is sometimes only available at high tides.

In addition to the above-described direct interference with public access by the proposed seawall, there are a number of indirect effects as well. Shoreline processes, and sand supply and beach erosion rates are affected by shoreline structures as described in Section 2 of this report, and thus alter public access and recreational opportunities.

Development along the shoreline which may burden public access in several respects has been approved by the Commission. However, mitigation for any adverse impacts of the development on access and public resources is always required. The Commission's permit history reflects the experience that development can physically impede public access directly, through construction adjacent to the mean high tide line in areas of narrow beaches, or through the placement or construction of protective devices seawalls, rip-rap, and revetments. Since physical impediments adversely impact public access and create private benefit for the property owners, the Commission has found in such cases (in permit findings of CDP #4-87-161 [Pierce Family Trust and Morgan], #6-87-371 [Van Buskirk], #5-87-576 [Miser and Cooper]) that a public benefit must arise through mitigation conditions in order that the development will be consistent with the access policies of the Coastal Act, as stated in Sections 30210, 30211, and 30212.

The development proposed in this application is the construction of a vertical seawall, concrete return wall and a mid-bluff protection. Although the proposed seawall adheres closely to the contour of the natural bluff, the seawall will reduce lateral beach access by encroaching onto the beach and will have adverse impacts on the natural shoreline processes.

As stated elsewhere in these findings, Section 30235 of the Act allows for the use of such a device where it is required to protect existing development and where it has been designed to mitigate adverse impacts upon shoreline sand supply. In order to mitigate the known adverse impacts, the Commission has in the past required an offer of dedication of lateral public access in order to balance the burden placed on the public with a public benefit. In this particular case, the beach and bluff are in public ownership and will remain as such. Therefore, a dedication of lateral public access is not an available mitigation option. However, Special Condition #3, discussed in a previous section of the staff report, requires the applicant to provide mitigation for adverse impacts on beach and sand area resulting from placement of the proposed seawall, which will also serve to mitigate the impact of the loss of beach access. The mitigation will be an in-lieu fee which will be utilized for beach replenishment projects within San Diego County.

The development proposed in this application involves the construction of a vertical seawall, return wall and reconstructed bluff using a geogrid structure. The majority of the beach and bluffs along the Solana Beach shoreline are in public ownership. Much of the beach is accessible in this area only at lower tides, and thus, the protection of a few feet of beach along the toe of the bluff is still important. This stretch of beach has historically been used by the public for access and recreation purposes. Special Condition #11 acknowledges that the issuance of this permit does not waive the public rights that exist on the property. The seawall may be located on State Lands property,

and as such, Special Condition #10 requires the applicant to obtain any necessary permits or permission from the State Lands Commission to perform the work.

With Special Conditions assuring maximum public access, addressing sand supply and authorization from the State Lands Commission, impacts to the public will be minimized to the greatest extent feasible. Thus, as conditioned, the Commission finds the project consistent with the public access and recreation policies of the Coastal Act.

5. Unpermitted Development. The proposed development will occur on a site that contains unpermitted development in form of seacave/notch infills. In December 1998 and April of 1999, the Coastal Commission approved coastal development permits for the placement of concrete and riprap infill of seacave/notches below the subject development sites (ref. CDP #6-98-21/Blackburn and 6-98-137/Johnson). Although the work was completed under temporary emergency authorization (ref. Emerg. Permit 6-98-13/Johnson and 6-98-21-G/Blackburn), the Special Conditions of approval for the regular coastal development permits were not satisfied and the permits were not issued. Failure to remove comply with the conditions within 60 days of Commission action constituted a violation of the terms and conditions of the approved coastal development permit (ref. CDP #6-98-21/Blackburn and 6-98-137/Johnson).

The proposed development involves constructing a seawall over the face of these unpermitted infills. Therefore, future maintenance of these infills will no longer be required. In addition, the Special Conditions of approval for the infills will be generally replicated in the Special Conditions of approval for the proposed seawall, concrete return wall/fill and reconstructed bluff. These include maintenance and monitoring of the site over the lifetime of the project, assuming all risks associated with the development, receiving authorization from other agencies and the recordation of a deed restriction advising future homeowners of the requirements and obligations of the coastal permit. The applicant is also proposing to pay an in-lieu fee for sand replenishment to compensate for the area occupied by the unpermitted fill over the next 30 years. By complying with the Special Conditions of approval for the subject development, the applicant will also comply with the Special Conditions of approval for the seacave/notch infill permits in order to permanently authorize those developments. To assure the applicants fulfill the obligations of the permit approved herein in a timely manner, Special Condition #14 requires the applicants to satisfy all prior to issuance of permit conditions within 90 days of Commission action on the subject application request.

Although development has taken place prior to submission of this permit application, consideration of this application by the Commission has been based solely upon the Chapter 3 policies of the Coastal Act. Review of this permit application 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 permit.

6. Local Coastal Planning. Section 30604(a) also requires that a coastal development permit shall be issued only if the Commission finds that the permitted

development will not prejudice the ability of the local government to prepare a Local Coastal Program (LCP) in conformity with the provisions of Chapter 3 of the Coastal Act. In this case, such a finding can be made.

The subject site was previously in the County of San Diego jurisdiction, but is now within the boundaries of the City of Solana Beach. The City is preparing and plans to submit a new LCP for the area to the Commission for review. Because of the incorporation of the City, the County of San Diego's LCP was never effectively certified. However, the issues regarding protection of coastal resources in the area have been addressed by the Commission in its review of the San Diego County LUP and Implementing Ordinances.

The City of Solana Beach has prepared a draft LCP. In preparation of its LCP, the City of Solana Beach is faced with many of the same issues as the City of Encinitas, located immediately north of Solana Beach, whose LCP was certified by the Commission in March 1995. The City of Encinitas' LCP includes the intent to prepare a comprehensive plan to address the coastal bluff recession and shoreline erosion problems in the City. The plan will include at a minimum, bluff top setback requirements for new development and redevelopment; alternatives to shore/bluff protection such as beach sand replenishment, removal of threatened portions of a residence or the entire residence or underpinning existing structures; addressing bluff stability and the need for protective measures over the entire bluff (lower, mid and upper); impacts of shoreline structures on beach and sand area as well as mitigation for such impacts; impacts for groundwater and irrigation on bluff stability and visual impacts of necessary/required protective structures.

The City of Solana Beach LCP should also address these items in the context of a comprehensive approach to management of shoreline resources. As shoreline erosion along the coast rarely affects just one individual property, it is imperative that a regional wide solution to the shoreline erosion problem be addressed and solutions developed to protect the beaches. Combined with the decrease of sandy supply from coastal rivers and creeks and armoring of the coast, beaches will continue to erode without being replenished. This will, in turn, decrease the public's ability to access and recreate on the shoreline.

In the case of the proposed project, site specific geotechnical evidence has been submitted indicating that the existing structures at the top of the bluff are in danger. The Commission feels strongly that approval of the proposed project should not send a signal that there is no need to address a range of alternatives to armoring for existing development. Planning for comprehensive protective measures should include a combination of approaches including limits on future bluff development, ground and surface water controls, and beach replenishment. Although the erosion potential on the subject site is such that action must be taken promptly, decisions regarding future shoreline protection should be done through a comprehensive planning effort that analyzes the impact of such a decision on the entire City shoreline.

The location of the proposed seawall is designated for Open Space Recreation in the City of Solana Beach Zoning Ordinance and General Plan, and was also designated for open space uses under the County LCP. As conditioned, the subject development is consistent with these requirements. Based on the above findings, the proposed development is consistent with the Chapter 3 policies of the Coastal Act in that the need for the shoreline protective devices has been documented and its adverse impacts on beach sand supply and on adjacent unprotected properties will be mitigated.

Therefore, the Commission finds the proposed development, as conditioned, is consistent with the Chapter 3 policies of the Coastal Act, and will not prejudice the ability of the City of Solana Beach to complete a certifiable local coastal program. However, these issues of shoreline planning will need to be addressed in a comprehensive manner in the future through the City's LCP certification process

7. Consistency with the California Environmental Quality Act (CEQA).
Section 13096 of the Commission's Code of Regulations requires Commission approval of Coastal Development Permits to be supported by a finding showing the permit, as conditioned, 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 effect which the activity may have on the environment.

The proposed project has been conditioned in order to be found consistent with the geologic stability, visual quality, and public access policies of the Coastal Act. Mitigation measures, including conditions addressing payment of an in-lieu fee for impacts to sand supply, monitoring and maintenance of the structures over the lifetime of the project, color of construction materials, landscaping and timing of construction will minimize all adverse environmental impacts. As conditioned, there are no feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse impact which the activity may have on the environment. Therefore, the Commission finds that the proposed project is the least environmentally-damaging feasible alternative and is consistent with the requirements of the Coastal Act to conform to CEQA.

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 or interpretation of any condition will be resolved by the Executive Director or the Commission.

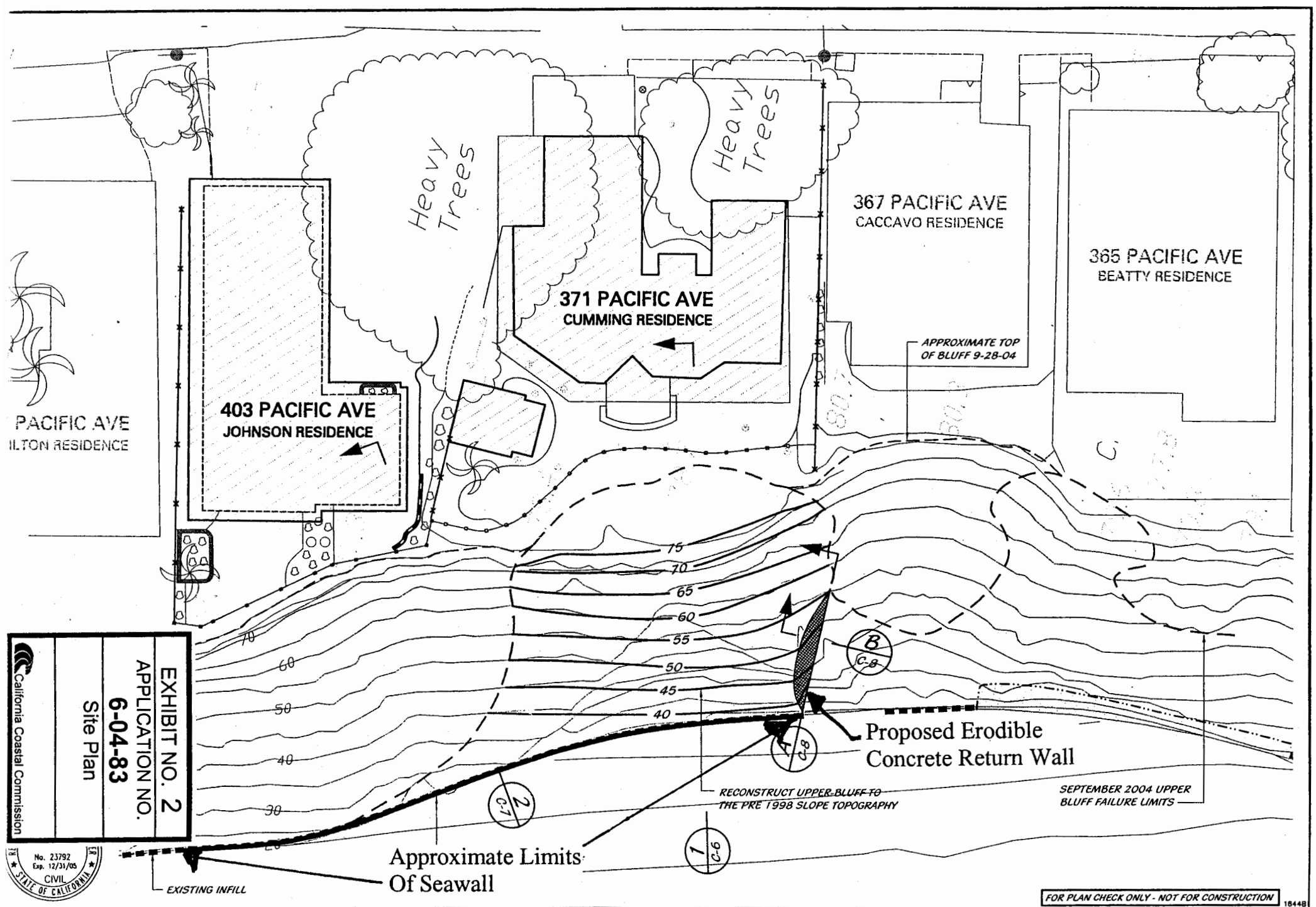
4. Assignment. The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.

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.

(G:\San Diego\Reports\2004\6-04-083 Cumming, Johnson final stfrpt.doc)

EXHIBIT NO. 1
APPLICATION NO.
6-04-83
Location Map

California Coastal Commission



California Coastal Commission

EXHIBIT NO. 2
APPLICATION NO. 6-04-83
Site Plan

No. 23792 Exp. 12/31/05 CIVIL STATE OF CALIFORNIA

FOR PLAN CHECK ONLY - NOT FOR CONSTRUCTION

18448

TERRACOSTA CONSULTING GROUP
ENGINEERS & GEOLOGISTS
4455 MURPHY CANYON ROAD, SUITE 100
SAN DIEGO, CALIFORNIA 92123
(858) 573-6900

DESIGN: WJO
DRAWN: GDS
CHECKED: WFC

REVISIONS

REV.	BY	DATE	APP.

371 / 403 PACIFIC AVENUE SHORELINE STABILIZATION PROJECT

PROPOSED REPAIR

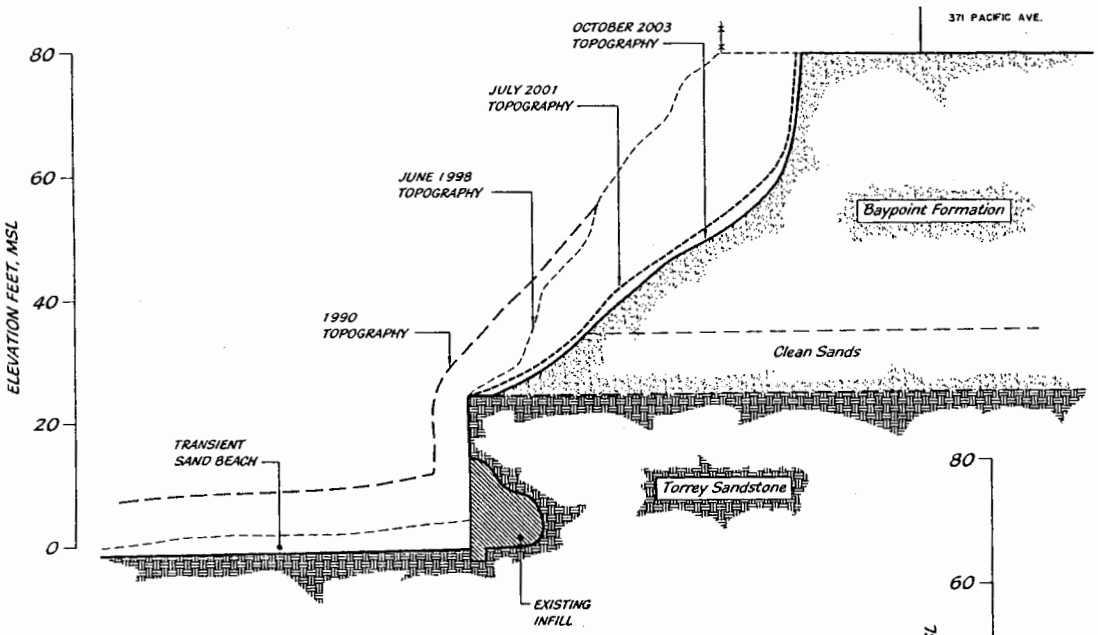
CITY OF SOLANA BEACH

RECOMMENDED FOR APPROVAL	APPROVED FOR CONSTRUCTION
BY:	BY:
R.C.E.: EXP.:	CITY ENGINEER R.C.E.:
DATE:	EXP.: DATE:

DRAWING NO. C-5

SHEET 5 OF 12

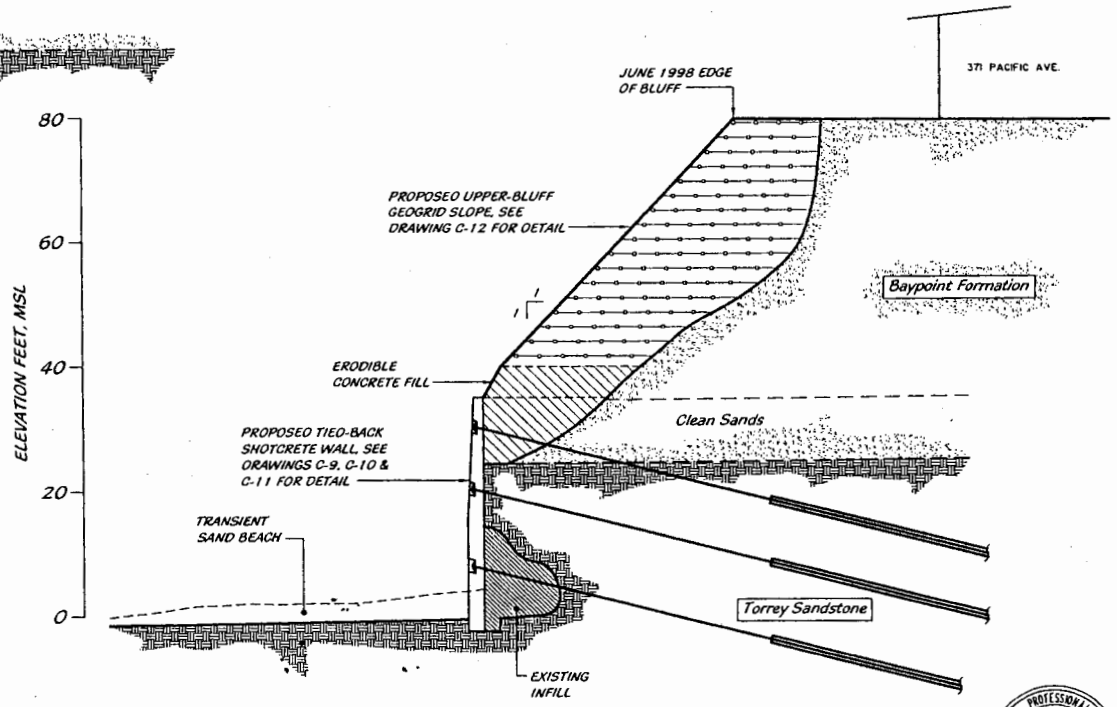
10-19-04 DATE OF PRINT



EXISTING CONDITION
371 PACIFIC AVENUE - SECTION 1 / C-4

SCALE: 1"=10' (HORIZ.:VERT.)

NOTE:
THE RECONSTRUCTION OF THE BLUFF FACE SHALL NOT RESULT IN A USABLE AREA AT THE TOP OF THE BLUFF LARGER THAN EXISTED ON JANUARY 3, 1991 PER SOLANA BEACH MUNICIPAL CODE SECTION 17.62.080.A.8



PROPOSED TIED-BACK WALL & UPPER-BLUFF STABILIZATION
371 PACIFIC AVENUE - SECTION 1 / C-5

SCALE: 1"=10' (HORIZ.:VERT.)

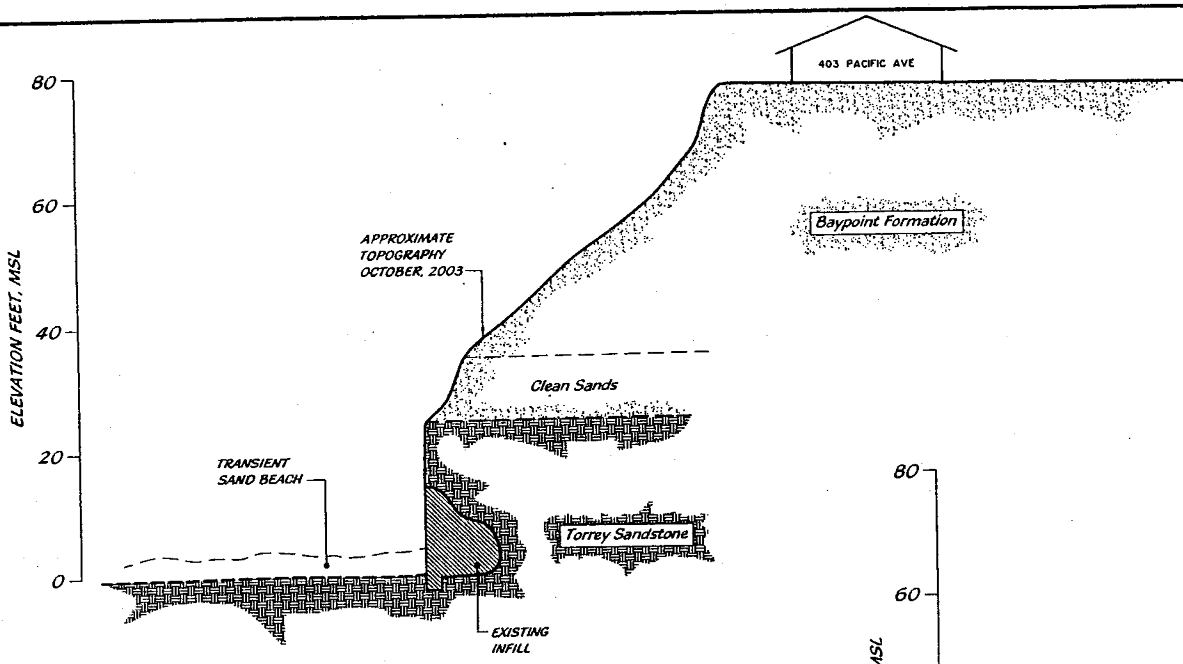
REGISTERED PROFESSIONAL ENGINEER — WALTER F. CRAMPTON — No. 23792 Exp. 12/31/05 — CIVIL — STATE OF CALIFORNIA

1844B

FOR PLAN CHECK ONLY - NOT FOR CONSTRUCTION

EXHIBIT NO. 3
APPLICATION NO. 6-04-83
Cross-Sections for 371 Pacific Avenue
California Coastal Commission

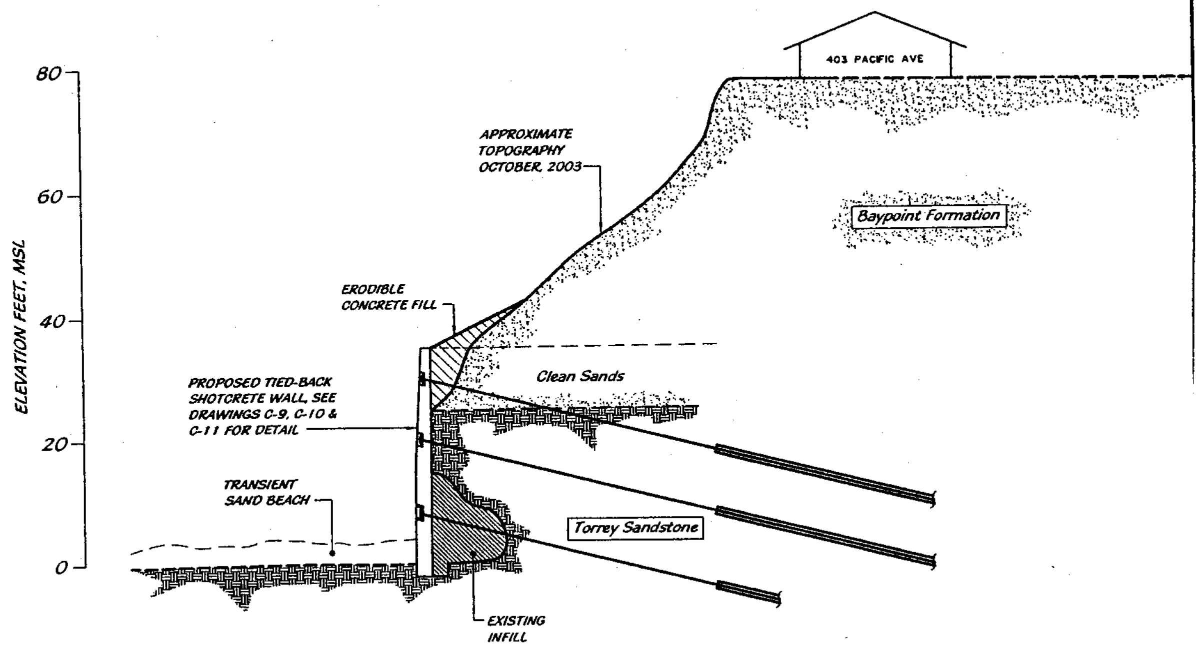
REVISION OF: 23792	TERRACOSTA CONSULTING GROUP ENGINEERS & GEOLOGISTS 4455 MURPHY CANYON ROAD, SUITE 100 SAN DIEGO, CALIFORNIA 92123 (858) 573-8900	DESIGN: WJD	REVISIONS REV. / BY / DATE / APP.	371 / 403 PACIFIC AVENUE SHORELINE STABILIZATION PROJECT	CITY OF SOLANA BEACH RECOMMENDED FOR APPROVAL BY: ____ R.C.E.: ____ EXP.: ____ DATE: ____	APPROVED FOR CONSTRUCTION BY: ____ CITY ENGINEER R.C.E.: ____ EXP.: ____ DATE: ____	DRAWING NO. C-6
12-31-05		DRAWN: GDS		CROSS SECTIONS			SHEET 6 OF 12
		CHECKED: WFC					10-19-04 DATE OF PRINT



EXISTING CONDITION
403 PACIFIC AVENUE - SECTION (2 / C-4)

SCALE: 1"=10' (HORIZ.:VERT.)

NOTE:
THE RECONSTRUCTION OF THE BLUFF FACE SHALL NOT RESULT IN A USABLE AREA AT THE TOP OF THE BLUFF LARGER THAN EXISTED ON JANUARY 3, 1991 PER SOLANA BEACH MUNICIPAL CODE SECTION 17.62.080.A.8



PROPOSED TIED-BACK WALL & UPPER-BLUFF STABILIZATION
403 PACIFIC AVENUE - SECTION (2 / C-5)

SCALE: 1"=10' (HORIZ.:VERT.)

REGISTERED PROFESSIONAL ENGINEER WALTER F. CRAMPTON No. 23792 Exp. 12/31/05 CIVIL STATE OF CALIFORNIA

EXHIBIT NO. 4
APPLICATION NO.
6-04-83
Cross-Sections for 403 Pacific Avenue
California Coastal Commission

FOR PLAN CHECK ONLY - NOT FOR CONSTRUCTION

18448

23792
12-31-05

TERRACOSTA CONSULTING GROUP
ENGINEERS & GEOLOGISTS
4455 MURPHY CANYON ROAD, SUITE 100
SAN DIEGO, CALIFORNIA 92123
(858) 573-6900

DESIGN: WJD
DRAWN: GDS
CHECKED: WFC

REVISIONS				
REV.		BY	DATE	APP.

371 / 403 PACIFIC AVENUE SHORELINE STABILIZATION PROJECT

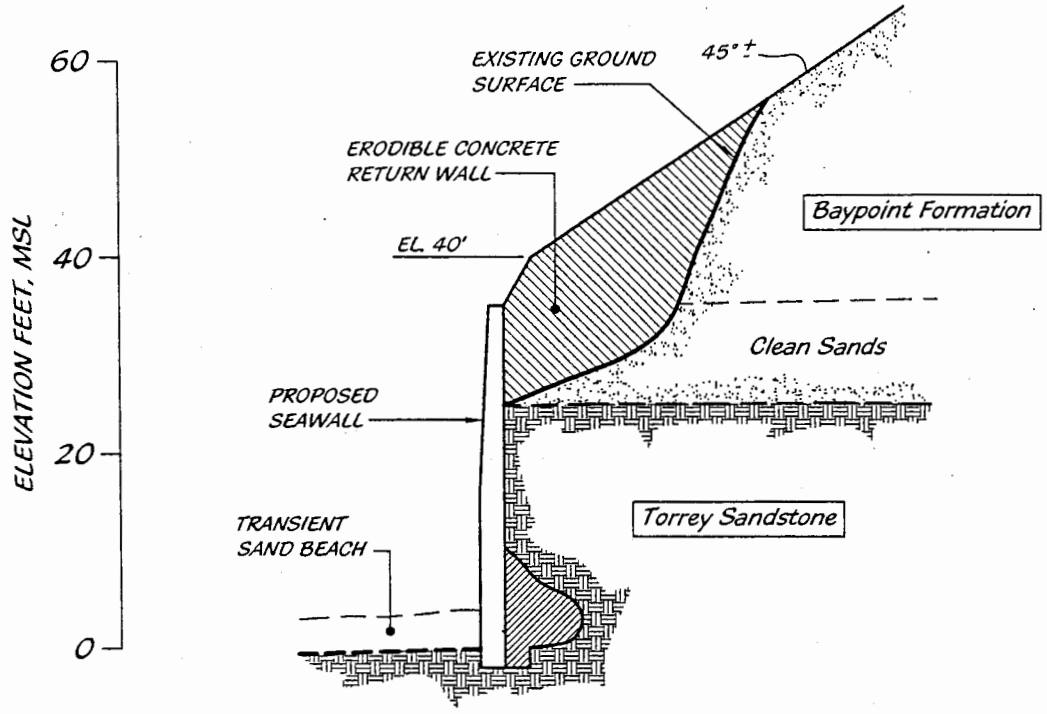
CROSS SECTIONS

CITY OF SOLANA BEACH

RECOMMENDED FOR APPROVAL — BY: R.C.E.: EXP.: DATE:

APPROVED FOR CONSTRUCTION — BY: CITY ENGINEER R.C.E.: EXP.: DATE:

DRAWING NO. C-7
SHEET 7 OF 12
10-19-04
DATE OF PRINT



PROPOSED SEAWALL WITH ERODIBLE CONCRETE RETURN WALL
371 PACIFIC AVENUE - SECTION

A
C-5

SCALE: 1"=10' (HORIZ.:VERT.)

NOTE: IF DRAWING IS NOT FULL SIZE (24X36) THEN REDUCE SCALE ACCORDINGLY

0 1 2 3

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

FOR PLAN CHECK ONLY - NOT F

EXHIBIT NO. 5
APPLICATION NO.
6-04-83
Cross-Section of Seawall and Southern Return Wall

California Coastal Commission

CALIFORNIA COASTAL DEVELOPMENT PERMIT NO.:

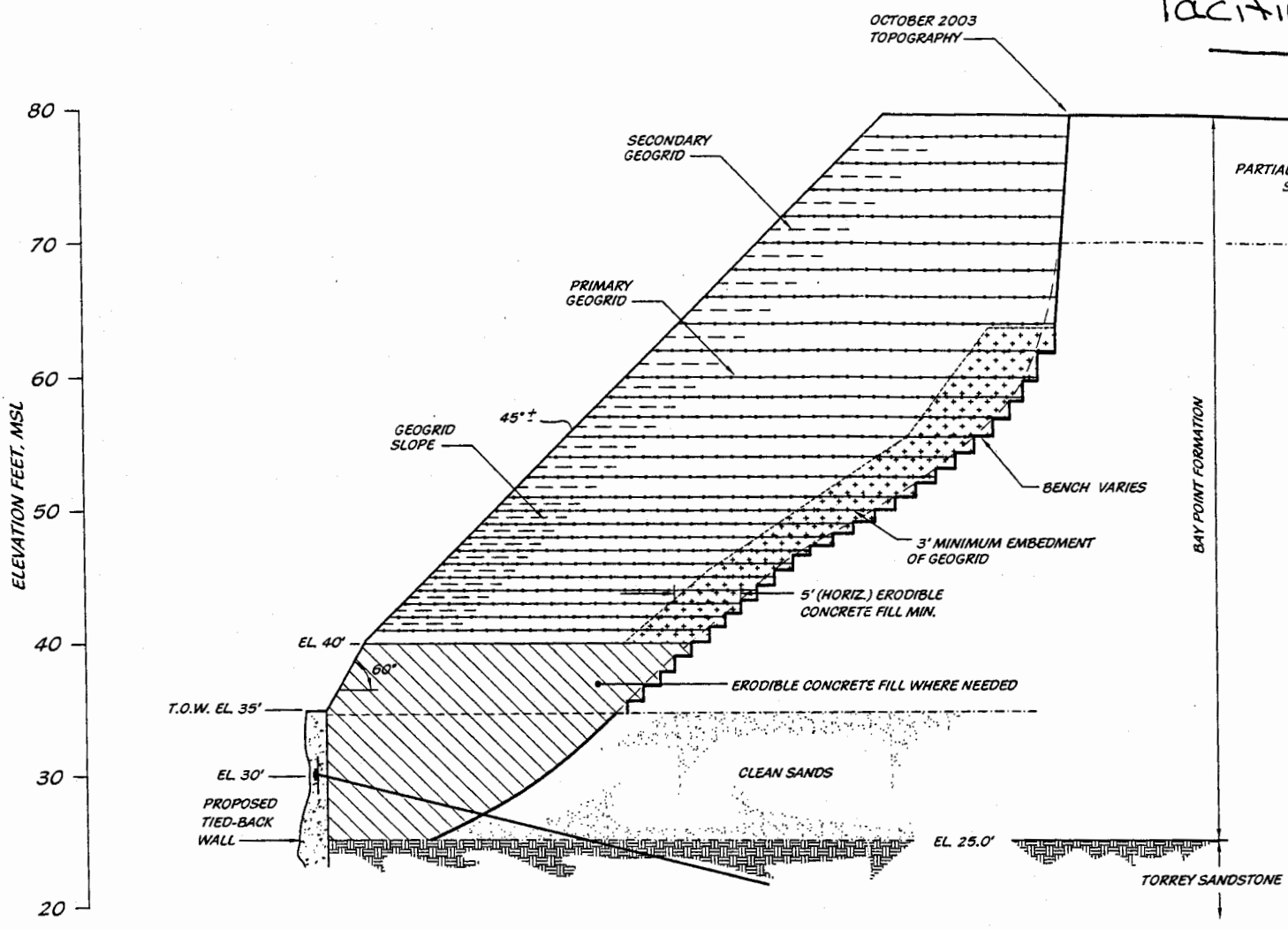
PLANS PREPARED UNDER THE SUPERVISION OF
DATE:
INITIALS: R.C.E. NO.: 23792

ENGINEER OF WORK:
WALTER F. CRAMPTON

TERRACOSTA CONSULTING GROUP
ENGINEERS & GEOLOGISTS
4455 MURPHY CANYON ROAD, SUITE 100
SAN DIEGO, CALIFORNIA 92123
(858) 573-6900

DESIGN: WJD
DRAWN: GDS
CHECKED: WFC
REV.

371 Pacific →



ARCHI

THE RECONST GEOGRID REIN TOLERANT PL 195. IN ORD BLUFFS, THE NATURAL LOO THE BLUFF A SCULPTED ER ERODED TOE LANDSCAPED

DIAGRAMATIC SECTION OF GEOGRID REINFORCED SLOPE

SCALE: 1"=5' (HORIZ.:VERT.)

ULL SIZE (24X36)
ACCORDINGLY
2 3
OR REDUCED PLANS

ANS PREPARED UNDER THE SUPERVISION OF
DATE:
R.C.E. NO.: 23792
R OF WORK:
WALTER F. CRAMPTON
23792 EXP. DATE: 12-31-05

TERRACOSTA CONSULTING GROUP
ENGINEERS & GEOLOGISTS
4455 MURPHY CANYON ROAD, SUITE 100
SAN DIEGO, CALIFORNIA 92123
(858) 573-6900

DESIGN: WJD
DRAWN: GDS
CHECKED: WFC

REVISIONS				
REV.		BY	DATE	APP.

371 / 403 PACIFIC AVENUE SHORELINE STABILIZATION PROJECT

PROPOSED UPPER-BLUFF GEOGRID SLOPE

EXHIBIT NO. 6
APPLICATION NO.
6-04-83
Cross-Section of Upper Bluff Geogrid Structure
California Coastal Commission

CALCULATION OF MITIGATION FEE FOR IMPACTS TO SAND SUPPLY
PROPOSED NOTCH INFILL
371 - 403 PACIFIC AVENUE
CUMMING - JOHNSON RESIDENCES
SOLANA BEACH, CALIFORNIA

CDP NO. 6-04-083

Basic Equations:

$$M = V_t \times C \quad (1)$$

where,

M = mitigation fee,

V_t = total volume of sand required to replace losses due to the structure, and

C = cost per cubic yard of sand

$$V_t = V_b + V_w + V_e \quad (2)$$

where,

V_b = the amount of beach material that would have been supplied to the beach if natural erosion continued or the long-term reduction in the supply of bluff material to the beach, over the life of the structure; based on the long-term average retreat rate, design life of the structure, percent of beach quality material in the bluff, and bluff geometry (cubic yards)

V_w= the long-term erosion of the beach and nearshore resulting from stabilization of the bluff face and prevention of landward migration of the beach profile; based on the long-term average retreat rate, and beach and near-surface profiles (cubic yards)

V_e = the volume of sand necessary to replace the area of beach lost due to encroachment by the sea cave infill; based on the infill design and beach and nearshore profiles (cubic yards)

EXHIBIT NO. 7
APPLICATION NO.
6-04-83
Applicants' Sand Mitigation In-lieu Fee Calculations

$$V_b = (R \times L \times W \times H \times S) / 27 \quad (3)$$

where,

R = long-term regional bluff retreat rate (ft/yr),

L = design life of armoring without maintenance (yr),

W = width of property to be armored (ft),

H = total height of armored bluff (ft),

S = fraction of beach quality material in the bluff material,

$$V_w = R \times L \times V \times W \quad (4)$$

where,

R = long-term regional bluff retreat rate (ft/yr),

L = design life of armoring without maintenance (yr),

v = volume of material required, per unit width of beach, to replace or reestablish one foot of beach seaward of the seawall, and

W = width of property to be armored (ft),

$$V_e = E \times W \times V \quad (5)$$

where,

E = average encroachment of infill, measured from back of notch or back beach (ft),

W = width of property to be armored (ft), and

V = volume of material required, per unit width of beach, to replace or reestablish one foot of beach seaward of the infill.

Site-specific values for equation variables:

C = $14.00 per cubic yard to purchase and deliver sand

R = 0.3 ft/yr

L = 30 years

W = 138 feet

S = 0.75

H = 78 feet

V = 0.9 cubic yards per square foot of beach

E = 2.50 feet

Utilizing equation (3):

$$V_b = \frac{0.3 \times 30 \times 138 \times 78 \times 0.75}{27}$$

$$V_b = 2691\ yard^3$$

Utilizing equation (4):

$$V_w = 0.3 \times 30 \times 0.9 \times 138$$

$$V_w = 1117.8\ yard^3$$

Utilizing equation (5):

$$V_e = 2.50 \times 138 \times 0.9$$

$$V_e = 310.5\ yard^3$$

Utilizing equation (2):

$$V_t = 2691 + 1117.8 + 310.5$$

$$V_t = 4119.3\ yard^3$$

Utilizing equation (1):

$$M = 4119.3\ x\ \$14.00/yd$$

$$M = \$57{,}670$$

Sand Mitigation Fee Parameters

W	=	138 ft
E	=	2.50 ft
V	=	0.9 cy/sf
R	=	0.3 ft/yr
L	=	30 yr
S	=	75%
H	=	78 ft
C	=	$14/cy