**CALIFORNIA COASTAL COMMISSION**
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## STAFF REPORT: REGULAR CALENDAR

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| **Application No.:** | **6-15-1988** |
| **Applicant:** | **Robert Monroe & Norton Sloan** |
| **Agent:** | Walter Crampton |
| **Location**: | 197-201 Pacific Avenue, Solana Beach, San Diego County (APNs 263-323-04; -05) |
| **Project Description**: | Infill 90 ft. long, 7-17 ft. high, 2-11 ft. deep, 1,350 sq. ft. notch in coastal bluff with erodible concrete, construct 2 ft. by 2 ft. key embedded into bedrock formation, and installation of carved and colored erodible concrete on face of proposed infills. |
| **Staff Recommendation:** | Approval with Conditions |

## SUMMARY OF STAFF RECOMMENDATION

The proposed project would fill an existing notch in a coastal bluff with an erodible concrete mixture colored and sculpted to resemble the natural bluff. The notch is located on a city-owned beach fronting two existing single family residences in the City of Solana Beach.

The two bluff-top residences are at not at risk at this time. However, in numerous past actions, the Commission has found that the filling of seacaves or notch overhangs as a preemptive measure has fewer impacts upon coastal resources and public access than the construction of seawalls and upper bluff structures. Unlike a wall located seaward of the natural bluff, seacave infills are placed within the bluff and do not result in immediate encroachment on usable public beach area. Seacaves fills in Solana Beach are typically

lower in height than a seawall that has to cover the clean sands lens located approximately 30 feet above the beach. And while the construction of seacave/notch infills helps to prevent catastrophic bluff failure, when erodible concrete is used, it still allows the bluffs to erode landward.

Thus, the City's certified Land Use Plan (LUP) allows for pre-emptive construction of erodible concrete seacave/notch infills, even when a bluff top structure is not imminently threatened. Erodible concrete designed to erode at the same rate as the adjacent natural bluff results in little to no impacts to sand supply or to public access and recreation; and. thus, no mitigation for public access and recreation impacts is required.. The Commission's coastal engineer has evaluated the relevant project materials, has visited the site, and has determined that the proposed seacave infills represent the minimum amount of armoring necessary to reduce the threat posed by the existing seacaves and to address the expansion of the seacaves and notches at the subject site.

In past erodible concrete seacave infill projects, objections have been raised that erodible concrete does not always erode at the same rate as the surrounding natural bluffs. This is a valid concern; for example, at 459 South Sierra Avenue, approximately ½ mile south of the subject site, there are several seacave fills approved in 1996 where the approved concrete did not erode at the expected rate, and thus, the concrete fill extends seaward of the surface of the natural bluff face (CDP #6-96-102/Solana Beach & Tennis Club). (The bluff top property owner at 459 South Sierra has an application pending to remove the protruding portions of the infill). In contrast to that work, the concrete mixture proposed to be used for the current project has significantly more erodible properties than the erodible concrete used in 1996; and thus, the proposed erodible concrete is expected to erode at a rate far more like natural bluff material. The Commission's coastal engineer has reviewed the currently proposed material specifications and concurs with the design parameters. The four most recent seacave/notch infills constructed in Solana Beach, which used a similar erodible concrete mix as currently proposed, appear to be functioning as designed and are not currently encroaching significantly seaward of the adjacent natural bluff (Ref: 6-99-095/City of Solana Beach; 6-00-066/Pierce et. al.; 6-99-103/Coastal Preservation Association; 6-99-091/Becker).

Furthermore, the subject project involves a two-phase placement of concrete. Phase 1 would consist of constructing only the northerly 20 feet of the project. As conditioned, no work would be allowed to occur on the remaining 70 linear foot portion of the notch fill (Phase 2) until testing shows the strength of concrete material is below the maximum allowed. If testing on either phase identifies that the material does not meet the requirements, no further concrete can be applied until either all of the new infill material or the seaward five feet of the new infill material, whichever is less, is removed. If removal and replacement of the seaward five feet of new infill is infeasible, the applicant must apply to the Commission for an amendment to retain the non-erodible mix and propose mitigation to offset the impacts of the non-erodible concrete. Thus, the Commission has an extra level of assurance that the concrete applied to the subject site will have the characteristic proposed by the applicant, and if it does not, that the material will be removed as feasible or mitigation will be required.

In addition, special conditions require that the applicant submit and implement a comprehensive monitoring program to ensure that the proposed seacave/notch infills are functioning as designed and are not adversely impacting coastal resources. If the material does not erode as anticipated, Special Conditions #1 and #3 require that if any portion of the existing or proposed seacave/notch infills encroaches greater than 6 inches seaward of the adjacent natural bluffs, that the property owner obtain a CDP amendment from the Commission to remove the excess fill or otherwise remedy the situation.

In addition, if the seacave/notch infills do not function as designed, such that the back of the beach is essentially fixed, Special Condition #2 requires that the applicant return to the Commission for a permit or amendment to this permit to mitigate for any unavoided impacts to public access, recreation, shoreline sand supply and visual quality. Mitigation could include sand supply replacement, additional public access and recreation mitigation, or an encroachment agreement with the City.

The Commission's Sea Level Rise Policy Guidance provides direction to consider various adaptation strategies to consider in reviewing requests for shoreline development. The Guidance notes that adaptation strategies should be chosen based on the specific risks and vulnerabilities of a region or project site and the applicable Coastal Act and LCP requirements, with due consideration of local priorities and goals. The circumstances in Solana Beach—the presence of a clean sands lens and a bluff top that is substantially developed, present a significant challenge to the goal of avoiding shoreline protective devices. Allowing preemptive filling of notches and seacaves is one way in which bluff and shoreline protective devices can be limited. Seacave and notch infills allow the City, and the region as a whole, more time to pursue other non-structural methods, such as beach replenishment, to protect the bluffs, and/or moving the line of bluff top development landward away from the bluff edge in order to delay the need for more substantial shoreline protection.

The proposed notch infill project is within the Commission's coastal development permit jurisdiction. The Commission certified the City's Land Use Plan (LUP) in 2012; however, the City of Solana Beach does not yet have an implementation plan; thus, the LCP is not fully certified. Therefore, the Chapter 3 policies of the Coastal Act are the standard of review, with the City's certified LUP used as guidance.

Commission staff recommends **approval** of coastal development permit application 6-15-1988 as conditioned.

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## APPENDICES



## EXHIBITS

# I. MOTION AND RESOLUTION

**Motion:**

*I move that the Commission **approve** Coastal Development Permit Application No. 6-15-1988 subject to the conditions set forth in the staff recommendation.*

Staff recommends a **YES** vote on the foregoing motion. Passage of this motion will result in conditional approval of the permit and adoption of the following resolution and findings. The motion passes only by affirmative vote of a majority of the Commissioners present.

**Resolution:**

*The Commission hereby approves coastal development permit 6-15-1988 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

This permit is granted subject to the following standard conditions:

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

2. **Expiration.** If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.

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

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

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

## III. SPECIAL CONDITIONS

This permit is granted subject to the following special conditions:

1. **Submittal of Final Plans**

   (a) **PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT**, the applicant shall submit, for the review and written approval of the Executive Director, a full-size set of final seacave/notch infill plans that are in substantial conformance with the plans dated April 21, 2017 by TerraCosta Consulting Group. Said plans shall first be stamped approved by the City of Solana Beach and include the following:

      i. Sufficient detail regarding the construction method and technology utilized for texturing and coloring the infill. Such plans shall confirm, and be of sufficient detail to verify, that the infill color and texture closely match the adjacent natural bluffs, including provision of a color board indicating the infill material.

      ii. During construction of the approved development, disturbances to sand and intertidal areas shall be minimized to the maximum extent feasible. All excavated beach sand shall be re-deposited on the beach. Local sand, cobbles or shoreline rocks shall not be used for backfill or for any other purpose as construction material.

      iii. The seacave and notch infills shall conform as closely as possible to the natural contours of the bluff, and shall not protrude beyond the existing "drip-line" (a parallel line extending down the face of the bluff to the beach).

      iv. The erodible concrete for the seacave/notch infills shall be consistent with the submitted plans and shall be designed to provide a material with erosion characteristics similar to that of the adjacent natural bluff as provided for in Special Condition #2 of this permit.

   (b) 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.

2. **Phasing and Erodibility Testing Plan**

(a) **PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT,** the applicant shall submit, for the review and written approval of the Executive Director, a Phasing and Erodibility Testing Plan that provides for the following:

i. **PHASE 1** shall consist of constructing the northerly 20 feet of the infill in accordance with the approved final plans. A total of approximately 40 yards of erodible concrete will be placed during the Phase 1 project, using approximately five (9-yard) ready mix trucks.

ii. An independent inspector shall be present at the plant when the concrete is prepared to confirm the concrete and materials are handled, batched, and mixed in accordance with ASTM C94 standard specification for ready mixed concrete and the Testing Plan required by this Special Condition. An inspector shall also be present at the job site to collect concrete samples and fabricate concrete test cylinders for compressive strength testing by a qualified testing and inspection company.

iii. All inspection personnel shall be qualified and shall work under the direction of a California registered civil engineer.

iv. At the job site, an inspector shall collect a minimum of four concrete test cylinders from each ready mix truck for subsequent 28-day unconfined compression test by a qualified testing and inspection agency, and the results shall be provided to the permittee and the Executive Director. The anticipated 28-day unconfined compressive strength for the specified erodible mix design is 375 PSI with some variation, and shall be deemed to be in non-compliance if the Unconfined Compressive Strength (USC) for any test cylinder exceeds 500 PSI. In addition, after 28 days, Schmidt hammer tests shall be performed at four locations at the Phase 1 infill and four locations at an unarmored portion of the bluff face, south of the Phase 1 location. The Schmidt hammer tests shall be compared with the UCS for the test cylinders and used to inform the utility of future in-situ testing of the erodible concrete.

v. Prior to commencement of Phase 2, the testing and inspection company shall submit a report for the review and written approval of the Executive Director. The report shall provide: sufficient detail regarding the as-mixed concrete supplied by each truck-load to determine whether the concrete was mixed in compliance with the Testing Plan, the results of the Phase 1 compressive strength tests and Schmidt hammer tests, and analysis of all test results. If any of the Phase 1 28-day unconfined compressive strength test results exceed 500 PSI, Phase 2 may not commence without approval from the Executive Director, and all of the new infill material or the seaward five feet of new

infill material, whichever is less, shall be removed. If the Executive Director of the Commission determines that removal of the seaward five feet of the new infill is infeasible, the applicant shall apply to the Commission for an amendment to this CDP to retain the non-erodible mix. The application shall propose mitigation to offset the impacts of the non-erodible concrete.

vi. No additional concrete shall be added to the site until the cause for the non-conforming erodible concrete is determined and steps are developed to prevent placement of additional non-conforming erodible concrete and the Executive Director has provided written approval of the proposed modifications. Once modifications are in place, Phase 1 shall be repeated, until the process produces erodible concrete that meets the standard specified in the approved final plans required by Special Condition 1.

vii. **PHASE 2** may commence after written approval from the Executive Director of a Phase 1 erodible concrete formulation and batch/mixing process, and approval of the Phase 1 finished project. The same inspection and testing protocol shall be implemented during the entire Phase 2 project. If any of the unconfined compressive strength tests exceed 500 PSI, then the seaward five feet of new infill material shall be removed and replaced with erodible concrete that meets the erodibility requirements of less than 500 PSI. If the Executive Director determines that removal and replacement of the seaward five feet of new infill is infeasible, the applicant shall apply to the Commission for an amendment to this CDP to retain the non-erodible mix. The application shall propose mitigation to offset the impacts of the non-erodible concrete.

viii. Regardless of the Unconfined Compressive Strength, Schmidt hammer tests or other testing results, if annual monitoring of the erodible concrete as required by Special Condition #3 of this permit indicates that the erodible concrete extends more than 6 inches seaward of the face of the natural bluff, within 30 days of the completion of the annual monitoring, the applicant shall apply for a permit or permit amendment to remove all portions of the erodible concrete that protrude seaward of the natural bluff face.

(b) The permittee shall undertake development in conformance with the above phasing and testing protocol, unless the Commission amends this permit or the Executive Director determines that no amendment is legally required for any proposed minor deviations.

3. **Monitoring Program.**

(a) **PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT**, the applicant shall submit to the Executive Director for review and written approval, a plan prepared by a licensed geologist or geotechnical engineer for a seacave/notch infill monitoring program which includes the following:

i. Current measurements of the distance between the residences and the bluff edge (as defined by Section 13577, Title 14, of the California Code of Regulations), and provisions for these measures to be taken annually after completion of construction, for the life of the project. The locations for these measurements shall be identified through permanent markers, benchmarks, survey position, written description, or other approved methods so that annual measurements can be taken at the same bluff location and comparisons between years can provide information on bluff retreat.

ii. Provisions for establishing any differential retreat between the natural bluff face and each of the seacaves/notches by measuring both ends of the seacaves/notches and at 20-foot intervals (maximum) along the top of the seacave/notch face and at the bluff face intersection with the infill, annually after completion of construction, for the life of the project. Measurements may be taken through photography. The program shall describe the method by which such measurements shall be taken.

iii. Provisions for the annual measurement of the erosion of the proposed erodible concrete infill. The program shall describe the method by which such measurements shall be taken.

iv. Provisions for submittal of a report to the Executive Director of the Coastal Commission by June 1st annually for a six year period beginning after completion of construction. Each report shall be prepared by a licensed geologist or geotechnical engineer. The report shall contain the measurements and evaluation required by subsections (a) i, (a) ii, and (a) iii of this Special Condition. The report shall also summarize all measurements and provide analysis of trends, annual retreat or rate of retreat, and the stability of the overall bluff face, including the upper bluff area, and the impact of the seacave/notch infills on the natural bluff, and shall include suggestions that do not involve the construction of structures on the face of the bluff for correcting any problems. In addition, each report shall contain recommendations, if any, for necessary maintenance, repair, changes or modifications to the project. If any portion of the existing or proposed seacave/notch infills is found to extend seaward of the drip line of the natural bluff or the stringline of the adjacent natural bluff on either side of each infill by more than six inches in any location, the report shall include alternatives and recommendations to remove or otherwise remedy the excess infill such that no seaward extension of the infill will remain.

v. Provisions for submission of a report containing the information identified in subsection (a)(iv) of this Special Condition at 3 year intervals following the last annual report, for the life of the project. Additional reports shall be submitted in the spring following a 12-month period in which any of the following events occurs:

A A 20-year storm event;

B An "El Niño" storm event; and

C A major tectonic event magnitude 5.5 or greater affecting San Diego County.

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

vi. An agreement that the permittee shall apply for a coastal development permit amendment within three months of submission of the report required in subsections (a)(iv) and (a)(v) of this Special Condition for any necessary maintenance, repair, changes or modifications to the project recommended by the report that require a coastal development permit or amendment.

vii. An agreement that the permittee shall apply for a coastal development permit amendment within three months of submission of the report required in subsections (a)(iv) and (a)(v) of this Special Condition above to address any impacts of the infill that have not been previously addressed, if, based on the monitoring report, the Executive Director determines that the back of the beach has been effectively fixed by the infills.

(b) 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.

4. **Storage and Staging Areas/Access Corridors**

(a) **PRIOR TO ISSUANCE OF THIS COASTAL DEVELOPMENT PERMIT**, the applicants 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:

i. No overnight storage of equipment or materials shall occur on sandy beach or at the Fletcher Cove Parking Lot, and the use of other public parking spaces shall be minimized. 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 seacave/notch infills. Construction equipment shall not be washed on the beach or in the Fletcher Cove parking lot.

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

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

iv. The applicant shall submit evidence that the approved plans and plan notes have been incorporated into construction bid documents. The applicant shall remove all construction materials/equipment from the staging site and restore the staging site to its prior-to-construction condition within 24 hours following completion of the development.

(b) The permittee shall undertake the development in accordance with the approved final plans. Any proposed changes to the approved final plans shall be reported to the Executive Director. No changes to the final 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.

5. **Deed Restriction**

**PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT**, the applicant shall submit to the Executive Director for review and approval documentation demonstrating that the applicant has executed and recorded against the parcel(s) governed by this permit 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; and (2) imposing the 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 entire parcel or parcels governed by this permit. 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.

6. **Removal of Permanent Irrigation**

(a) **PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT**, the applicant shall submit to the Executive Director for review and written approval, a landscape irrigation removal plan for the subject properties at 197 and 201 Pacific Avenue. The plan shall detail the location of all existing permanent irrigation and fully describe the method of removal or capping such that no permanent irrigation features remain in service within 100 feet of the bluff edge. WITHIN 30 DAYS FOLLOWING ISSUANCE OF THE PERMIT, the applicant

shall remove or cap all permanent irrigation features from each of the upper blufftop lots, consistent with the approved plans.

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

7. **As-Built Plans**

Within 60 days following completion of the project, the permittee shall submit as-built plans of the approved seacave/notch infill. In addition, within 60 days following completion of the project, the permittee shall submit certification by a registered civil engineer, acceptable to the Executive Director, verifying the seacave/notch infill has been constructed in conformance with the approved plans for the project.

8. **Future Maintenance/Debris Removal.**

The permittee shall remove all debris deposited on the beach or in the water as a result of construction of the seacave/notch infill. The permittee shall also remove all debris deposited on the beach or in the water as a result of failure or damage of the shoreline protective device in the future. In addition, the permittee shall maintain the permitted seacave/notch infill in its approved state except to the extent necessary to comply with the requirements set forth below. Maintenance of the seacave/notch infills shall include, at a minimum, maintaining its color, texture and integrity. Any change in the design of the project or future additions/reinforcement of the seacave/notch infill beyond minor re-grouting or other exempt maintenance as allowed by Section 13252, Title 14, of the California Code of Regulations, will require a coastal development permit or amendment. However, in all cases, if, after inspection, it is apparent that repair and maintenance is necessary, the permittee shall contact the Commission's San Diego office to determine whether a permit or amendment is necessary, and shall subsequently apply for a coastal development permit or amendment for the required maintenance. If at any time after project completion, any portion of the proposed seacave/notch infill is found to extend seaward of the face of the natural bluff by more than six inches in any location, the permittee shall obtain and implement a coastal development permit or amendment to remove or remedy the excess infill such that no portion of the infill remains seaward of the drip line between the adjacent natural bluff on either end of the infill.

9. **Assumption of Risk**

By acceptance of this permit, the applicant acknowledges and agrees (1) that the site may be subject to extraordinary hazards from bluff collapse and erosion; (2) 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; (3) 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 (4) 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.

10. **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.

11. **Reliance on Permitted Armoring**

No future development, (which is not otherwise exempt from coastal development permit requirements), or redevelopment of the existing principal structures on the bluff top properties governed by this permit, shall rely on the permitted bluff retention devices (existing and proposed seacave/notch infills) to establish geologic stability or protection from hazards. Such future development and redevelopment on the site shall be sited and designed to be safe without reliance on shoreline armoring. As used in these conditions, "redeveloped" or "redevelopment" is as included in the Solana Beach LUP as certified by the Commission in August 2014 in the policy defining Bluff Top Redevelopment, which is hereby incorporated by reference.

# IV. FINDINGS AND DECLARATIONS

## A. PROJECT DESCRIPTION

The proposed project is filling in a 90 ft. long, 7 to 17 ft. high, 2 to 11 ft. deep, 1,350 sq. ft. notch in the coastal bluff located at the beach level, within the face of an approximately 88-ft. high coastal bluff, with an erodible concrete mix. The subject project will be placed on an approximately 20 foot long stretch of natural bluff, as well as in front of portions of old seacave fills previously approved by the Commission along this stretch of bluff (Exhibit #3).

The erodible concrete would be colored and sculpted to match the appearance of the natural bluff, and will be designed to erode at approximately the same rate as the adjacent natural bluffs. The notch infill will be keyed into formational bedrock and is proposed to extend from the rear of the notch seaward up to the drip line of the bluff face.

The notch is located below two existing single family homes located at 197 and 201 Pacific Avenue in the City of Solana Beach (Exhibit #2). The Commission approved construction of the two-story, 2,128 sq. ft. single family residence with an attached two-

car garage at 197 Pacific Avenue in January 1984 (CDP 6-83-690/Monroe). The closest portion of this home is located approximately 30 feet from the bluff edge.

The home at 201 Pacific Avenue was originally built in 1935. In February 1982, the Commission approved redevelopment of this home, consisting of expansion and remodeling of the existing 1,200 sq. ft. single-story home to a 3,051 sq. ft. two-story home (CDP 6-81-306). In June 1994, the Commission approved construction of a 225 sq.ft. second story addition to the home. The closest portions of the home is 15 feet from the bluff edge. The bluff face fronting both of the two subject properties is publicly owned.

The Commission has a certified Land Use Plan; however, the City of Solana Beach does not yet have a certified Implementation Plan. Therefore, the Chapter 3 policies of the Coastal Act are the standard of review, with the City's LUP used as guidance.

**Site History:**

The Commission has approved multiple permits for infilling on seacave and notches at the subject site in the past:

- In November 1984, the Commission approved filling a seacave on the bluff below 201 Pacific Avenue (Ref: CDP #6-84-550).
- In October 1999, the Commission approved filling an approximately 400-ft. long stretch of seacaves/undercut area at the base of the bluff below 201 Pacific Avenue and below six additional homes located adjacent to the north (Ref: CDP #6-99-103/Redd et al.). The approved concrete infill was a maximum of 11 ft. high, a maximum of 17 ft. deep, with an average height of approximately 7 ft. The seven property owners paid a total sand supply mitigation fee of $91,806.
- In October 2000, the Commission approved fill of a 50-ft. long, 40 ft. deep, 17 ft. high seacave below 197 Pacific Avenue and 141 Pacific Avenue (CDP #6-00-066/Monroe & Pierce). In its action, the Commission approved infill of the proposed seacave, but denied the applicants' proposal to infill a 50 ft. long, 11 to 17 ft. deep, 5 ½ to 11 ft. in depth notch in the bluff and required that the notch fill be deleted from the project. The seacave was located primarily in front of 141 Pacific Avenue, while the notch was located primarily in front of 197 Pacific Avenue. The proposal to infill the notch was denied based on the review of the Commission's staff engineer and geologist, who concluded that the collapse of the notch overhang would not endanger the residences at the top of the bluff. In addition, the Commission accepted the applicants' proposal to pay $21,153 to mitigate impacts to sand supply resulting from the seacave infill.
- In 2002, the Commission denied a request to infill a 50 ft. long, 11 to 17 ft. high, 6 to 17 ft. in depth notch below 197 and 201 Pacific Avenue (Ref CDP #6-01-139). The application was denied because proposed infill was a preemptive protection measure and was not required to protect the existing structures at the top of the bluff and because the applicant and the City had not reviewed the

proposal in the context of a comprehensive plan addressing shoreline erosion problems facing the City's shoreline.

- In 2005, the Commission approved a permit to perform maintenance on the existing infill below 201 through 231 Pacific Avenue, which was originally approved pursuant to CDP #6-99-103/Redd et al (Ref: CDP #6-05-091/O'Neal et al). Approved maintenance consisted of reapplication of sacrificial concrete to repair areas where erosional pockets had formed and filling an existing seacave at the southern end of the notch fill that was approximately four ft. above sand level and 20 ft. deep with erodible concrete. The project was approved to restore the notch fill to it previously approved, as-built condition.

**Surrounding Shoreline Protection**

The blufftop home at 205 Pacific Avenue, located directly to the north of subject properties, is protected by an existing seacave infill (Ref: CDPs 6-99-103/Redd et al., 6-05-091/O'Neal). The five homes to the north of 205 Pacific Avenue are protected by a 256.3 ft.-long, 35 ft. high seawall (Ref: 6-09-033/O'Neal et al).

The blufftop homes at 139 and 141 Pacific Avenue, located directly to the south of the subject properties, are partially protected by existing seacave infills (Ref: CDP 6-00-066/Monroe & Pierce). Fletcher Cove, the City's primary beach access and park, is located to the south of these homes and does not currently have any shoreline armoring.

## B. GEOLOGIC STABILITY

As described above, the standard of review is Chapter 3 of the Coastal Act, with the City's LUP providing non-binding guidance. As such, applicable Coastal Act policies are cited in this report, as well as relevant LUP policies.

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...*

Section 30253 of the Act states, in part:

> *New development shall do all of the following:*
>
> *(a) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.*
>
> *(b) 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...*

In addition, the following certified City of Solana Beach Land Use Plan (LUP) language provides additional guidance regarding geologic hazards and shoreline protection:

Page 13 of the Hazards and Shoreline/Bluff Development chapter states the following, in part:

- *Infill/Bluff Stabilization – Seacave/Notch Infill (See Appendix B Figure 1A) – This first solution is designed to address sea caves and undercut portions of the lower dense sandstone bluff where the clean sand lens is not yet exposed. If left uncorrected, the sea cave/undercut will eventually lead to block failures of the lower sandstone, exposure of the clean sand lens and landward bluff retreat. This failure exposes the clean sand lens of the upper bluff terrace deposits triggering rapid erosion and landward retreat of the upper bluff, which eventually endangers the structures at the top of the bluff. If treated at this stage, the Bluff Retention Device will minimize the need for a future higher seawall and future upper bluff repair. This alternative is not designed as a structural wall, is not reinforced, does not include tiebacks, and uses only erodible concrete which shall erode at the same erosion rate as the surrounding natural bluff material. The infill is required to maintain a textured and colored face mimicking the existing bluff material. Erodible concrete seacave/notch infills are designed to erode with the natural bluff and, when maintained to do so, are not subject to the sand supply mitigation, public access and recreation mitigation, encroachment/removal agreement, or authorization timeline policies of the LUP.*

The LUP defines Bluff Retention Devices as follows:

> ***Bluff Retention Devices*** *means a structure or other device, including seacave/notch infills, dripline infill, coastal structures, upper bluff systems, and temporary emergency devices, designed to retain the bluff and protect a bluff home or other principal structure, or coastal dependent use from the effects of wave action erosion and other natural forces.*

The LUP defines Bluff Top Redevelopment as follows:

> ***Bluff Top Redevelopment:*** *Shall apply to proposed development located between the sea and the first public road paralleling the sea (or lagoon) that consists of alterations including (1) additions to an existing structure, (2) exterior and/or interior renovations, (3) and/or demolition of an existing bluff home or other principal structure, or portions thereof, which results in:*

*(a) Alteration of 50% or more of major structural components including exterior walls, floor and roof structure, and foundation, or a 50% increase in floor area. Alterations are not additive between individual major structural components; however, changes to individual major structural components are cumulative over time from the date of certification of the LUP.*

*(b) Demolition, renovation or replacement of less than 50% of a major structural component where the proposed alteration would result in cumulative alterations exceeding 50% or more of a major structural component, taking into consideration previous alterations approved on or after the date of certification of the LUP; or an alteration that constitutes less than 50% increase in floor area where the proposed alteration would result in a cumulative addition of greater than 50% of the floor area, taking into consideration previous additions approved on or after the date of certification of the LUP.*

Policies 4.26, 4.27, and 4.28 of the Hazards and Shoreline/Bluff Development chapter state the following in regards to bluff top irrigation, landscaping, and site drainage:

*Policy 4.26: With respect to bluff properties only, the City will require the removal or capping of any permanent irrigation system within 100 feet of the bluff edge in connection with issuance of discretionary permits for new development, redevelopment, or shoreline protection, or bluff erosion, unless the bluff property owner demonstrates to the satisfaction of the Public Works Director, or the CCC if the project is appealed, that such irrigation has no material impact on bluff erosion (e.g., watering hanging plants over hardscape which drains to the street).*

*Policy 4.27: Require all bluff property landscaping for new development to consist of native, non-invasive, drought-tolerant, fire-resistant, and salt-tolerant species.*

*Policy 4.28: All storm water drain systems that currently drain or previously drained towards the west over the bluff shall be capped. These systems should be redesigned to drain directly, or through a sump system, and then pumped to the street in compliance with SWP* [State Water Project] *2007-0001 and consistent with SUSMP* [Standard Urban Stormwater Mitigation Plan] *requirements. This policy shall be implemented as a condition of approval for all discretionary permits issued for bluff properties or within 5 years of adoption of the LCP, whichever is sooner.*

Policies 4.18 and 4.48 of the Hazards and Shoreline/Bluff Development chapter state the following in regards to the required analysis for a new seacave/notch infill and the expansion and/or alteration of an existing seacave/notch infill:

*Policy 4.18: A legally permitted bluff retention device shall not be factored into setback calculations. Expansion and/or alteration of a legally permitted bluff retention device shall include a reassessment of the need for the shoreline*

*protective device and any modifications warranted to the protective device to eliminate or reduce any adverse impacts it has on coastal resources or public access, including but not limited to, a condition for a reassessment and reauthorization of the modified device pursuant to Policy 4.53.*

*Policy 4.48: A Seacave/Notch Infill shall be approved only if all the findings set forth below can be made and the stated criteria satisfied.*

A. *Based upon the advice and recommendation of a licensed Geotechnical or Civil Engineer, the City makes the findings set forth below:*

1. *The Seacave/Notch Infill is more likely than not to delay the need for a larger coastal structure or upper bluff retention structure, that would, in the foreseeable future, be necessary to protect an existing principal structure, City facility, and/or City infrastructure, from danger of erosion. Taking into consideration any applicable conditions of previous permit approvals for development at the site, a determination must be made based on a detailed alternatives analysis that none of the following alternatives to the coastal structure are currently feasible, including:*

    - *Controls of surface water and site drainage;*
    - *A smaller coastal structure; or*
    - *Other non-beach and bluff face stabilizing measures, taking into account impacts on the near and long term integrity and appearance of the natural bluff face, and contiguous bluff properties.*

2. *The bluff property owner did not create the necessity for the Seacave/Notch Infill by unreasonably failing to implement generally accepted erosion and drainage control measures, such as reasonable management of surface drainage, plantings and irrigation, or by otherwise unreasonably acting or failing to act with respect to the bluff property. In determining whether or not the bluff property owner's actions were "reasonable," the City shall take into account whether or not the bluff property owner acted intentionally, with or without knowledge, and shall consider all other relevant credible scientific evidence as well as relevant facts and circumstances.*

3. *The location, size, design and operational characteristics of the proposed seacave/notch infill will not create a significant adverse effect on adjacent public or private property, natural resources, or public use of, or access to, the beach, beyond the environmental impact typically associated with a similar bluff retention device and the seacave/notch infill is the minimum size necessary to protect the principal structure, and has been designed to minimize all environmental impacts, and provides mitigation for all coastal and environmental impacts as provided for in this LCP.*

B. *The Seacave/Notch Infill shall be designed and constructed:*

1. *To avoid migration of the Seacave/Notch Infill onto the beach;*

2. *To be re-contoured to the face of the bluff, as needed, on a routine basis, through a CDP or exemption, to ensure the seacave/notch infill conforms to the face of the adjoining natural bluff over time, and continues to meet all relevant aesthetic, and structural criteria established by the City;*

3. *To serve its primary purpose which is to delay the need for a larger coastal structure, and designed to be removable, to the extent feasible, provided all other requirements under the LCP are satisfied; and,*

4. *To satisfy all other relevant LCP and City Design Standards, set forth for Bluff Retention Devices.*

The bluffs in Solana Beach are typically approximately 80 feet high, (the bluff at the subject site is approximately 88 ft. high), and include a "clean sands" lens located between the Torrey Sandstone and Marine Terrace Deposits (at approximately elevation 25-35 ft.). The clean sand layer has been described as a very loose sandy material with a limited amount of capillary tension and a very minor amount of cohesion, both of which cause the sandy material to dissipate 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.

When ongoing wave action, often exacerbated by a lack of beach sand, results in bluff retreat and erosion, the presence of the clean sands creates a process where the clean sands rapidly undermine the upper sloping terrace deposits, causing the upper bluff to collapse, thereby exposing more clean sands to wind erosion, which then results in more upper bluff collapses. This cycle can occur so quickly (over months or days, rather than years) that the upper bluff never achieves a stable angle of repose.

The process of undercutting and notching of the bluffs seen along the Solana Beach shoreline represents the natural process of bluff retreat and erosion in this portion of North San Diego County. The process has clearly accelerated in Solana Beach over the last two decades, as the amount of sand on the beaches has decreased and the bluffs are subject to more frequent wave action. Because all of the bluff top lots in Solana Beach (aside from one vacant lot at 523 Pacific Avenue) are currently developed with single and multi-family structures, there is very little opportunity for the bluffs to retreat without adversely affecting the safety and stability of blufftop principal structures. Thus, some amount of shoreline protection along much of Solana Beach may be unavoidable. However, the cycle of large collapses and retreat can be slowed through the construction of erodible concrete seacave/notch infills.

The formation of the notch overhangs along this portion of the Solana Beach shoreline are generally attributed to increasing amounts of wave action. The lower bluff along this

section of shoreline consists of Torrey Sandstone, which is one of the least resistant bedrock formations along the North County coast. As waves impact the Torrey Sandstone, notches are formed creating an overhanging layer of Torrey Sandstone. As the overhang loses support from beneath, its weight along with any structural weakness in the Torrey Sandstone formation eventually leads to a block-like failure. These existing overhangs will eventually collapse, exposing the clean sands and undermining the upper bluff and triggering progressive upper-bluff failures.

The seacave infill monitoring report for the subject site, dated June 29, 2016, makes the following observation of the existing seacave infills at the subject site:

> *"…Our assessment of the infills indicates that they are structurally sound and performing well at the present time. The surface textures and colors of the wall face are essentially similar to the adjacent sandstone and blend in well with the surrounding landforms…"*

The applicants' geotechnical report, titled Coastal Bluff Evaluation and Basis of Design Report and dated July 22, 2016, makes the following observation and recommendations for the subject site:

> *"…These two properties temporarily benefit from an unexposed clean sand layer. However, future lower bluff failures will expose those clean sands, resulting in immediate upper bluff instability and progressive slope failures…"*

> *"…The bluff notches below 197 and 201 Pacific Avenue should be filled. Without taking appropriate preventative measures, the notch overhang will collapse, triggering a series of upper-bluff failures. Such failures would place both bluff-top residents and the beach-going public at significant risk. Furthermore, progressive coastal bluff failures will eventually result in the need for more extensive and costly bluff stabilization, such as a seawall, to stabilize the coastal bluffs…"*

> [Chart from geotechnical report]

| Lot No. | Existing Factor of Safety | Factor of Safety @ Westerly Edge of Residence | Existing Seismic Factor of Safety |
|---|---|---|---|
| 197 | 1.10 | 1.24 | 0.88 |
| 201 | 1.01 | 1.03 | 0.82 |

> *"…even with the alarmingly low factors of safety, we do know that the upper sloping portion of the bluff in this area has been relatively stable for over a century and this provides some justification for limiting the scope of the current project, assuming that the existing overhangs are stabilized and the fragile upper bluff is not undermined. It is for these reasons that a 35-foot seawall is not proposed for these residences…"*

The Commission's engineer agrees with the applicant that the bluff-top residences are at not at risk at this time. In reviewing requests for shoreline protection, the Commission must assess the need to protect private residential development against the potential adverse impacts to public resources associated with construction of shoreline protection. Shoreline protection projects do have the potential to impact existing lateral access along the beach. Structures which fix the back of the beach stop the landward migration of the beach profile while the seaward edge continues to erode, thereby reducing the amount of dry sandy beach available to the public.

However, in numerous past actions, the Commission has found that the filling of seacaves or notch overhangs as a preemptive measure has fewer impacts upon coastal resources and public access than the construction of seawalls and upper bluff structures, which are frequently required to protect existing structures after the collapse of seacaves or other bluff features (#6-87-391/Childs; #6-92-82/Victor; #6-96-102/Solana Beach & Tennis Club; #6-97-1646/Lingenfelder; #6-98-25/Stroben; #6-98-29/Bennett; #6-99-091/Becker; #6-99-103/Coastal Preservation Association; #6-00-066/Pierce & Monroe; and #6-13-0948/Bannasch).

Similarly, Policy 4.48 of the City's LUP allows seacave/notch infill projects to be approved, to prevent catastrophic bluff collapse, even when an existing principal structure is *not* in imminent danger or does not meet the standard for requiring or allowing construction of a seawall, because the adverse impacts associated with these projects are significantly less than those for seawalls and because the infills may prevent catastrophic collapse of the upper bluff. Seacave fills are preferable to seawalls for several reasons. Unlike a wall located seaward of the natural bluff, seacave infills are placed within the bluff and do not result in immediate encroachment on usable public beach area. Seacave infills in Solana Beach are typically lower in height than a seawall, which has to cover the clean sands lens located approximately 30 feet above the beach. And while the construction of seacave/notch infills helps to prevent catastrophic bluff failure, they still allow the bluffs to maintain a natural and expected retreat landward. The Commission has traditionally required seacave plugs and filled notches to be maintained over time such that portions of the fill material that extend beyond the surrounding natural bluff face must be periodically removed, so that the fill does not permanently fix the back of the beach.

The Commission has approved numerous projects in Solana Beach to fill seacave/notch infills with erodible concrete designed to erode at roughly the same rate as the adjacent natural bluff, thus reducing or eliminating impacts to sand supply and to public access and recreation (a partial sample includes: #6-84-573-A1; #6-97-165-A3; #6-98-009; #6-99-91; #6-99-095; #6-00-036; #6-02-085; #6-13-0948). There has not been a comprehensive study done to evaluate the effectiveness of each of these projects, but individual monitoring reports are required to be submitted to the Commission, and the seacave and notch fills do appear to have limited catastrophic bluff failures and delayed the need for seawalls. Impacts of the infill have been limited through conditions that require if any portion of the infills are found to extend seaward of the drip line of the natural bluff by more than six inches in any location, maintenance or a new permit is required to correct the differential.

As with the previously approved projects, the proposed filling of the subject notch is designed as a preventive measure to stop or reduce the potential for collapses of the overhanging area and to stabilize the bluff in an area where there is evidence of the presence of a “clean sands” lens. If erosion at the site is not slowed, the existing blufftop structures are likely to be threatened in the foreseeable future. The proposed project is a relatively minimal type of protection that can be expected to delay the need for a much larger seawall-type of shoreline protection that is far more visually obtrusive, potentially occupies public beach area, and requires more alteration of the natural landform.

It is important to note that as described above, construction of the existing residence at 197 Pacific Avenue, the structure above the southern half of the proposed notch fill, was approved by the Commission in 1994. Thus, this house was not an existing structure at the time the Coastal Act was passed; and therefore, the Commission is not mandated to approve protection for it. The home at 201 Pacific Avenue, however, was originally constructed in 1935. Although substantial modifications have occurred to the structure since that time, the LUP identifies “redevelopment” by evaluating changes to the structure that occur after the date of certification of the LUP (2012). Thus, should this structure become threatened by erosion in the future, it could be considered an existing structure requiring protection as mandated by Section 30235. A failure resulting from collapse of the notch located on the bluff face below both of these two properties would likely result in the need for shoreline protection across the base of both lots to protect an existing structure at 201 Pacific Avenue. Thus, because of the presence of an existing principal structure, filling the notch now may prevent the construction of more substantial shoreline protection later, preventing significantly greater impacts on coastal resources.

The California Coastal Commission Sea Level Rise Policy Guidance, adopted August 12, 2015 also provides direction to consider various adaptation strategies to consider in reviewing requests for shoreline development. The Guidance notes that adaptation strategies should be chosen based on the specific risks and vulnerabilities of a region or project site and the applicable Coastal Act and LCP requirements, with due consideration of local priorities and goals. As described above, the circumstances in Solana Beach—the presence of a clean sands lens and a bluff top that is substantially developed-- present a significant challenge to the goal of avoiding shoreline protective devices. The certified LUP describes a variety of approaches to limit shoreline protection, including potentially allowing lower bluff walls in order to avoid the need for upper bluff protection, and allowing new development to be built in locations that may not be safe for the lifetime of the structure, while the applicants waive the right, if any, to future protection. Allowing preemptive filling of notches and seacaves is one way in which bluff and shoreline protective devices can be limited. Seacave and notch infills allow the City, and the region as a whole, more time to pursue other non-structural methods, such as beach replenishment, to protect the bluffs, or moving the line of bluff top development landward away from the bluff edge in order to delay the need for more substantial shoreline protection.

**Alternatives**

Although both the Coastal Act and the City's certified LCP support the filling of seacaves/notches as a preventative measure, seacave and notch infills do alter the natural coastline. Therefore, it is important to analyze whether there are alternatives to a seacave/notch fill that would delay the need for a seawall with fewer adverse impacts. The City's certified LUP requires that alternatives, such as controls of surface water and site drainage, a smaller coastal structure, and other non-beach and bluff face stabilizing measures, be examined.

As detailed above, groundwater controls, irrigation restrictions, and installation of drought-tolerant plantings is required by the City's certified LUP. The applicant has submitted documentation that the subject site already drains towards the street, so that there is currently very little over-bluff discharge. Monitoring of the upper bluff edge in relation to the residential structures during the past 15 years shows little to no erosion of the upper bluff. The applicant's engineer states that upper bluff runoff is not the cause of erosion and that stricter irrigation/landscaping controls will not mitigate ongoing enlargement of seacaves/notches, and could not serve as an alternative to infilling in this case.

Failures of irrigation lines or excess watering of the blufftop can trigger collapses of bluff-top sediments. Thus, the City's certified LUP recognizes this danger and requires that with the approval of any shoreline protection permit, irrigation located within 100 feet of the bluff edge must be capped or removed. Therefore, Special Condition #6 is imposed to require the applicant to remove or cap all permanent irrigation devices on the subject bluff top property within 100 ft. of the bluff edge to prevent over-watering or accidental breakage of irrigation lines. The certified LUP requires that bluff landscaping for new development consist of native, non-invasive, drought-tolerant, fire-resistant, and salt-tolerant species. The applicant states that the existing landscaping primarily consists of vegetation with low water needs. Any future applications for new development on the subject bluff top property will be conditioned to require only native, non-invasive, drought-tolerant, fire-resistant, and salt-tolerant species pursuant to the certified LUP.

Underpinning of the existing structures could potentially be considered as an alternative to the proposed project; however, this would not stop the seacaves/notches from collapsing and eventually undermining the structures. In addition, when the seacaves/notches and upper bluff eventually collapse, the underpinning system would be exposed to view, which is a less desirable visual condition than the relatively low-scale proposed seacave/notch infill. The eventual exposure of the underpinning in this case would be inconsistent with Coastal Act section 30253 as it would alter the natural landform of the bluff and would essentially create an upper bluff wall. An additional alternative is a smaller coastal structure. As proposed, the applicant will only be using erodible concrete which is the least impactful type of shoreline armoring and has fewer adverse impacts than a seawall or rip rap.

The Commission's engineer has reviewed the project and concurs that the proposed project, as conditioned, is the minimal amount of development needed to address the risk

from collapse of the notch. Given the above-described geological conditions on the subject site, these alternatives would not prevent collapse of the seacaves and notches on the subject site, and thus, would not be feasible alternatives. Thus, there are no less environmentally-damaging feasible alternatives that would delay the need for more substantial shoreline protection.

**Erodibility Testing and Two-Phase Application of the Infill**

As noted, in order to minimize and avoid impacts to sand supply, the proposed seacave/notch fills have been designed to erode at a rate similar to the natural bluff face. In past erodible concrete seacave infill projects, reasonable objections have been raised that erodible concrete does not always erode at the same rate as the surrounding natural bluffs. If the concrete does not erode, or is not regularly removed, it functions much as a traditional seawall would, fixing the back of the beach, and eventually blocking sandy beach area that would otherwise be available for public access and recreation.

For example, on the bluff fronting 347-459 South Sierra Avenue, Solana Beach, there are several infills approved by the Commission in November 1996 (Ref: CDP #6-96-102/Solana Beach & Tennis Club). These infills consisted of a 12-inch thick cast-in-place or precast soil/cement mix facing embedded a minimum of two feet into the bedrock at the base of the bluff. The area behind the facing was backfilled with an air blown soil/cement mixture, and the facing was anchored to this mixture with 18-inch long reinforcing bars. The sea cave plugging and filling procedure was designed with a leaner soil-cement mix on the external facade and a stronger mix internally. This process was intended to allow erosion of the plugs to match the rate of natural erosion of the adjacent bluff. The external facade was then colored and textured to match the natural bluff. These concrete infills have not eroded at the same rate as the adjacent natural bluffs, as was expected when the project was approved in 1996, and thus, the concrete fill currently extends seaward of the surface of the natural bluff face. The applicant has recently applied for a permit to remove the portions of the infill extending beyond the bluff face, as well as to do some additional infilling (CDP #6-17-0819/Solana Beach & Tennis Club).

However, the concrete used in 1996 for this other site has different mix properties from the erodible concrete currently proposed. Specifically, the 1996 concrete mixture used has significantly less erodible mix properties from the erodible concrete currently proposed. Concrete is assessed by pounds per square inch (PSI) standards to determine minimum strengths and to ensure safety. As a reference, standard shotcrete seawalls (such as those seen elsewhere in Solana Beach) typically have a rating of about 3,000 PSI.

With erodible concrete infills, the intent is to set a maximum strength ceiling, which is the opposite of what most engineering tries to do. The applicant's engineer has provided the proposed erodible concrete mix ratio for Commission review (Ref: Page 2 of Project Plans dated April 21, 2017). The mix proposed for the erodible concrete is 200 pounds of Type V Portland Cement, along with 180 pounds of Type F fly ash, 2,800 pounds of concrete sand and about 425 pounds of water. The applicant's engineer has stated that

after 28 days, the anticipated unconfined compressive strength for the erodible mix design will be 300 to 380 pounds per square inch (PSI). The mix would be deemed to be in non-compliance with the appropriate standards if it exceeds 500 PSI. The Commission's engineer has reviewed the proposed material specifications and concurs that the proposed erodible concrete seacave/notch infills should erode at a comparable rate as the adjacent natural bluff. The four most recent seacave/notch infills constructed in Solana Beach, which used a similar erodible concrete mix as currently proposed, appear to be functioning as designed (Ref: 6-99-095/City of Solana Beach; 6-00-066/Pierce et. al.; 6-99-103/Coastal Preservation Association; 6-99-091/Becker). Each of the four seacave infill CDPs referenced above require removal of any portion of the seacave infill that encroaches more than 6 inches seaward of the bluff as a result of erosion, but no removal has been required thus far.

To further ensure that the concrete used to fill the notch meets the erodibility requirements, the applicant has proposed implementing the proposed notch fill in two phases. As proposed, Phase 1 would consist of constructing the northerly 20 feet of the project only. This would require the placement of a total of approximately 40 yards of erodible concrete requiring five (9-yard) ready mix trucks. A minimum of four concrete cylinders would be sampled from each truck for subsequent 28-day unconfined compression test. The results of the test would be submitted to Commission staff. As noted, the anticipated unconfined compressive strength for the erodible mix design is 300 to 380 pounds per square inch (PSI). The mix would be deemed to be in non-compliance with the appropriate standards if it exceeds 500 PSI. No work would be allowed to occur on the remaining portion of the notch fill (Phase 2) without the approval of the Executive Director. At that point, if the concrete was found to be in non-compliance, the Executive Director could require removal of the Phase 1 fill or require other appropriate mitigation.

As proposed by the applicant, if the Phase I fill tests were approved by the Executive Director, the remainder of the notch would be filled, and the same inspection and testing protocol would be implemented for the Phase II concrete, but if any of the compressive strength tests exceed 500 PSI, the applicant's proposal states that the Commission would not require removal of Phase 2 concrete. The complete text of the applicant's proposed phased approach to application and testing is attached as Exhibit #7.

The advantage of the proposed two-phase approach is that it would allow the Commission an added level of assurance that the identified appropriate PSI can be achieved, and if for whatever reason it is not, that only a small, relatively easily removable amount of concrete would be applied. However, several aspects of the applicant's proposed testing protocol and phasing raise concerns. First, while doing a small preliminary test phase first certainly increases the confidence that the remainder of the notch fill done in Phase 2 will have the correct PSI, it is not a guarantee. Should the testing on the second, larger phase determine that the infill erodibility is not consistent with the required PSI, the Commission should have the ability to require that the fill, or at least some portion of the fill be removed, if feasible. The applicant has raised objections to this approach, arguing that it could result in more damage to the bluff to remove the infill. The Commission's engineer has reviewed the project and agrees that fill placed further into the bluff than approximately five feet back most likely would be infeasible to

remove, as the further back into the bluff work is required, the greater the safety risk for construction workers, but that it may be possible to remove and replace of the seaward five feet of new infill.

In addition, the applicant is only proposing to test the erodibility of the concrete in containers taken from the same truck loads as the mixture applied to the notch. These samples will be tested after 28 days; however, concrete continues to strengthen over time. In order to gauge the relative strength of the erodible concrete over its life, in-situ Schmidt hammer tests of the in-fill concrete will be taken at 28 days and compared with the unconfined compressive strength of the erodible concrete in the test cylinders. This baseline comparison of the different test methods will allow for future in-situ examination of the changes in strength of erodible concrete fill in the event that it does not mimic the retreat rates of the native Torrey Sandstone, providing another opportunity to gauge the long-term utility of erodible concrete.

Therefore, Special Condition #2 lays out the requirements for the two phase application of erodible concrete and the testing requirements. The condition requires that both off site (container) and on-site testing be performed after both phases of the project. If testing on either phase identifies that the material does not meet the PSI requirements, no further concrete can be applied until either all of the new infill material or the seaward five feet of new infill material, whichever is less, will be removed. If the Executive Director of the Commission determines that removal and replacement of the seaward five feet of new infill is infeasible, the applicant must apply to the Commission for an amendment to this CDP to retain the non-erodible mix and propose mitigation to offset the impacts of the bluff retention device.

Furthermore, in case the mixture proposed herein does not perform as expected, Special Condition #3 of this permit also requires regular monitoring and maintenance of the seacave/notch infills. If monitoring determines that any portion of the infill encroaches more than 6 inches seaward of the adjacent bluff, the applicant is responsible to obtain the necessary permits to remove those portions. Thus, even if the erodible concrete does not erode at a comparable rate as the adjacent bluff, the encroaching portions of the infill must be removed so that the infill does not encroach seaward of the dripline of the bluff or the stringline of the adjacent natural bluff on either side of each infill.

Special Condition #1 requires that the new 90-ft. long notch infill be located no further seaward than the natural bluff face. Special Condition #8 requires the permittee to maintain the seacave/notch infills in their approved state. Minor re-grouting or exempt maintenance as allowed by Section 13252 of Title 14, the California Code of Regulations (e.g., restoring color, texture, etc.) does not require an additional coastal development permit or amendment. However, whenever changes or maintenance on the seacave/notch are proposed, the applicant must contact the Commission office to determine whether permits are necessary. Thus, the Commission can be assured that, as conditioned, the infill will be properly maintained and will erode or be physically removed at the same rate as the adjacent bluff and that any adverse impacts to shoreline processes have been or will be avoided, minimized, or mitigated.

Although the Commission finds that the seacave/notch infills have been designed to minimize the risks associated with its implementation, the Commission also recognizes the inherent risk of shoreline development. The seacave/notch infills will be subject to wave action and will be at or landward of the drip line of the eroding bluff above the infill. Thus, there is a risk of bluff failure during and after construction of the notch infill and the removal of protruding portions of the existing infills. In addition, there is a risk of damage to the seacave/notch infills or damage to property as a result of wave action on the seacave/notch infills. Given that the applicant has chosen to construct the infills despite these risks, the applicant must assume the risks. Accordingly, Special Condition #9 requires that the applicant assume these risks and waive any claim of damage or liability against the Commission for approval of this application. To ensure that future property owners are properly informed regarding the terms and conditions of this approval, Special Condition #5 requires a deed restriction to be recorded against the properties involved in the application.

Section 30253 requires that new development be independently stable and safe and not require the construction of protective devices that alter the natural landform of the bluffs. In addition, Policy 4.18 of the City's approved LUP requires that existing legally permitted bluff retention devices not be factored into setback calculations for new development or redevelopment of bluff top properties. Such future development must be located in an area where the development is consistent with Coastal Act and/or applicable LCP requirements regarding geologic safety and protection from hazards as if the protection did not exist, including whatever remains of the erodible concrete notch fills. Thus, Special Condition #11 prohibits future development and redevelopment of the bluff top site from relying on the proposed shoreline protection for stability.

Special Condition #9 also defines "redevelopment" pursuant to the City's LUP. As quoted above, this includes alterations, including additions, exterior or interior renovations, or demolition that results in a 50 percent or greater alteration of a major structural component (including exterior walls, floor and roof structures, and foundation) or a 50 percent increase in floor area, cumulatively over time on or after certification of the City's LUP. Furthermore, changes to major structural elements are not additive between individual elements, while alterations to individual major structural elements are cumulative. Thus, if in the future, the applicant proposed to modify 40% of the exterior walls and 30% of the roof structure; this would not be considered redevelopment because it relates to two different major structural components. However, if the applicant were to come back for a subsequent CDP to modify an additional 10% of the exterior walls (50% total) or an additional 20% of the roof structure, (50% total) the project would be considered redevelopment because it would result in a cumulative alteration to 50% of a major structural component. Additions are also cumulative over time, such that an initial 25% addition would not be considered redevelopment; but a subsequent 25% addition, relative to the initial floor area, would result in a cumulative 50% increase in floor area, and would thus constitute redevelopment.

**Conclusion**

In summary, given the amount of coastal erosion that has occurred in the area over the last several years, Solana Beach is currently faced with the possibility of armoring the majority of the shoreline with seawalls. The subject site is an area where preventive measures such as the subject seacave and notch infills represent a feasible alternative to a seawall. The proposed project will delay or prevent the subject seacaves/notches from collapsing, which could result in eventual damage to the existing blufftop structures. In addition, as infill of the notch/seacaves will reduce the potential for a significant bluff failure, the applicant, the City and the region as a whole will have more time to pursue other non-structural methods, such as beach replenishment and moving the line of bluff top development landward away from the bluff edge, to protect the bluffs and delay the need for more substantial shoreline protection. Special Conditions have been designed to provide a reasonably high degree of certainty that the erodible concrete will erode as designed, and required on-going maintenance will ensure that the protection does not function as a seawall. Therefore, the Commission finds that approval of the proposed seacave/notch infills is consistent with the long-term goals of Sections 30235 and 30253 of the Coastal Act regarding the protection of natural shoreline processes, natural landforms and local shoreline sand supply.

## C. VISUAL RESOURCES/RECREATION

Sections 30240, 30250 and 30251 of the Coastal Act require that the scenic and visual qualities of coastal areas be protected, that new development adjacent to park and recreation areas be sited so as to not degrade or impact the areas and that new development not significantly adversely affect coastal resources:

***Section 30240***

*[ . . .]*

*(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.*

***Section 30251***

*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.*

In addition, the following certified City of Solana Beach LUP language, although not the standard of review, provides pertinent guidance regarding the protection of coastal zone visual resources:

> ***Policy 4.30****: Limit buildings and structures on the sloped face and toe of the bluff to lifeguard towers, subsurface public utility drainage pipes or lines, bluff retention devices, public stairs and related public infrastructure which satisfy the criteria established in the LCP. No other permanent structures shall be permitted on a bluff face. Such structures shall be maintained so that they do not contribute to further erosion of the bluff face and are to be visually compatible with the surrounding area to the maximum extent feasible.*
>
> ***Policy 4.38****: Maximize the natural, aesthetic appeal and scenic beauty of the beaches and bluffs by avoiding and minimizing the size of bluff retention devices, preserving the maximum amount of unaltered or natural bluff face, and minimizing encroachment of the bluff retention device on the beach, to the extent feasible, while ensuring that any such bluff retention device accomplishes its intended purpose of protecting existing principal structures in danger from erosion.*

The proposed development is located on the face of a coastal bluff at or landward of the drip line and at or near the same level as the existing sandy beach. Seacaves and notch infills have been a fairly prominent feature of the shoreline in this area, and filling the notch overhang will alter the natural appearance of the bluffs. Matching infill material to the appearance of natural bluffs can be a challenging process and it can be difficult to tell at the time of application how well the infill material will blend into the surrounding natural bluffs. Another difficulty is that weathering can change the appearance of the seacave/notch infills. Thus, even if the infill matches the natural bluffs at the outset, several years later there may be a distinct difference in appearances. Furthermore, the erodible concrete mix proposed by the applicant can be more difficult to treat aesthetically than full strength concrete, due to the nature of erodible concrete. However, past erodible concrete infills constructed in Solana Beach have been aesthetically treated to reasonably match the appearance of the adjacent bluffs (Ref: 6-99-095/City of Solana Beach; 6-00-066/Pierce et. al.; 6-99-103/Coastal Preservation Association; 6-99-091/Becker) and the treatment has not deteriorated.

Special Condition #1 requires the applicant to submit final plans of the method chosen to color and texturize the infill material, with a color board indicating the color of the infill material. Special Conditions #3 and #8 require the applicant to monitor and maintain the color of the infill to ensure the material continues to blend in with the surrounding bluffs in the future. Special Condition #7 also addresses this concern and requires the applicant to submit as-built plans within 60 days of construction of the proposed development to assure the infill has been constructed according to the approved plans.

There are numerous seacave and notch infills along the bluffs in Solana Beach. These infills, while mostly visible, are relatively inconspicuous and do not represent a significant visual blight. In addition, at times when the sand levels are high, these infills

are less visible. Seacave and notch infills are considerably less visually prominent than traditional seawall projects or riprap revetments. Thus, although the project will alter the natural appearance of the bluffs, the project has been designed and conditioned to match the surrounding natural bluffs to the maximum extent feasible, thereby reducing potential negative visual impacts to the extent feasible. Therefore, the Commission finds that the subject development is consistent with the visual resource and recreation policies of the Coastal Act.

## D. PUBLIC ACCESS

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. Coastal Act Sections 30210, 30211, 30212, 30212.5, and 30221 require that public access and use of the coast shall be maximized, that development shall not interfere with the public's right to access the coast and use of dry sand beaches, and that oceanfront land suitable for recreational activities shall be protected.

*Section 30210*

*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.*

*Section 30211*

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

*Section 30212*

*(a) Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where: (1) It is inconsistent with public safety, military security needs, or the protection of fragile coastal resources, (2) Adequate access exists nearby, or, (3) Agriculture would be adversely affected. Dedicated accessways shall not be required to be opened to public use until a public agency or private association agrees to accept responsibility for maintenance and liability of the accessway. […]*

*Section 30212.5*

*Wherever appropriate and feasible, public facilities, including parking areas or facilities, shall be distributed throughout an area so as to mitigate*

*against the impacts, social and otherwise, of overcrowding or overuse by the public of any single area.*

*Section 30221*

*Oceanfront land suitable for recreational use shall be protected for recreational use and development unless present and foreseeable future demand for public or commercial recreational activities that could be accommodated on the property is already adequately provided for in the area.*

In addition, the following certified City of Solana Beach Land Use Plan (LUP) language provides additional guidance regarding mitigation for erodible concrete seacave/notch infills:

Page 13 of the Hazards and Shoreline/Bluff Development chapter states the following, in part:

- *Infill/Bluff Stabilization – Seacave/Notch Infill (See Appendix B Figure 1A) – This first solution is designed to address sea caves and undercut portions of the lower dense sandstone bluff where the clean sand lens is not yet exposed. If left uncorrected, the sea cave/undercut will eventually lead to block failures of the lower sandstone, exposure of the clean sand lens and landward bluff retreat. This failure exposes the clean sand lens of the upper bluff terrace deposits triggering rapid erosion and landward retreat of the upper bluff, which eventually endangers the structures at the top of the bluff. If treated at this stage, the Bluff Retention Device will minimize the need for a future higher seawall and future upper bluff repair. This alternative is not designed as a structural wall, is not reinforced, does not include tiebacks, and uses only erodible concrete which shall erode at the same erosion rate as the surrounding natural bluff material. The infill is required to maintain a textured and colored face mimicking the existing bluff material.* ***Erodible concrete seacave/notch infills are designed to erode with the natural bluff and, when maintained to do so, are not subject to the sand supply mitigation, public access and recreation mitigation, encroachment/removal agreement, or authorization timeline policies of the LUP.*** [Emphasis Added]

The subject project is located on the public bluff formation directly adjacent to a public beach. The mean high tide line is located at the toe of the bluff. Although public lateral access is available along the entire stretch of coastline in this area, vertical access is available only at a limited number of public accessways. The site is approximately 600 feet north of the City's main beach accessway at Fletcher Cove, and approximately 1/3 mile south of the Tide Beach accessway (Exhibit #1).

Shoreline protection projects have the potential to impact existing lateral access along the beach. Structures that fix the back of the beach stop the landward migration of the beach profile while the seaward edge continues to erode, thereby reducing the amount of dry sandy beach available to the public. However, the proposed new notch infill project has

been designed to erode at a comparable rate to natural bluff and is not predicted to impact available beach area in the future. The Commission has not typically required the payment of funds to mitigate for the public access and recreation impacts of erodible concrete seacaves in Solana Beach, because they do not have the same type of adverse impacts that other types of shoreline armoring do, as described above. Thus, the Solana Beach LUP does not require sand supply or public access and recreation mitigation for erodible concrete seacave/notch infills when properly designed and maintained. (However, prior to approval of the LUP, in 2000, the Commission did accept a mitigation fee of $21,153 offered by the previous property owners to mitigate non-specific impacts to sand supply, resulting from a seacave infill located on the subject site (CDP #6-00-066/Monroe & Pierce).

If not properly constructed and maintained, seacave/notch infills can have an adverse impact on coastal resources if they do fix the back of the beach. As described above, special conditions require monitoring of the infills to make sure they are eroding as designed, and removal of any portion of the fill that does not erode. Furthermore, if monitoring reveals that the seacave/notch infills have fixed the back of the beach (either as a result of the concrete not eroding or through lack of maintenance) and thus resulted in similar impacts to sand supply and public access as a seawall, Special Condition #3 requires that within three months of submission of the monitoring report, the applicant must submit a complete CDP application to the Commission to mitigate for any unmitigated impacts. Required mitigation may include sand supply replacement, public access and recreation mitigation, an encroachment agreement with the City, and/or enactment of the authorization timeline policies of the LUP that would require the proposed seacave/notch infills be authorized only so long as they may be required to protect the existing bluff top structures.

Special Conditions #3 ensures that regular monitoring will be conducted and that if any portion of the new notch infill does not erode landward, as designed, and encroaches onto the public beach, that the encroaching portions will be removed. These conditions are necessary to ensure that the notch infill does not encroach onto the public beach in the future.

The beach area fronting the subject site is a public resource, and thus, the protection of beach along the toe of the bluff is important. This stretch of beach has historically been used by the public for access and recreation purposes. Special Condition #10 acknowledges that the issuance of this permit does not waive the public rights that exist on the property. The use of the beach or public parking areas for staging of construction materials and equipment also adversely impacts the public's ability to gain access to the beach. Special Condition #4 prohibits the applicant from storing vehicles on the beach overnight, using any public parking spaces within the Fletcher Cove Parking Lot for staging and storage of equipment, and prohibits washing or cleaning construction equipment on the beach or in the parking lot. Special Condition #4 also prohibits construction on the sandy beach during weekends and holidays throughout the year, or between Memorial Day to Labor Day of any year. Therefore, as conditioned, the Commission finds that the subject proposal will not result in any significant adverse

impacts on beach access or public recreation consistent with Sections 30210, 30211, 30212.5, 30221, 30223 and 30252, pursuant to Section 30604(c) of the Coastal Act.

## E. 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 Commission has certified the City's Local Coastal Program Land Use Plan, but the City has not yet completed, nor has the Commission reviewed any implementing ordinances. Thus, the City's LCP is not fully certified, and Chapter 3 of the Coastal Act is the standard of review. However, as cited above, the certified LUP contains provisions relating to shoreline protection including policies related to erodible concrete seacave/notch infills. The LUP establishes that erodible concrete seacave/notch infills, when maintained properly, are not subject to the sand supply mitigation, public access and recreation mitigation, encroachment removal agreement, or authorization timeline policies of the LUP. This is precisely the type of project envisioned and supported by the LUP amendment due to the project's goal of preventing catastrophic bluff failure, and thus is consistent with the LUP. The location of the proposed infills is designated for Open Space Recreation in the City of Solana Beach LUP. The project, as conditioned, supports recreation as it prevents impacts to the beach.

As conditioned, the subject development is consistent with the land use designation and the shoreline protection policies of the LUP. 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 pre-emptive notch fill has been documented and identified coastal resource impacts 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.

## F. CONSISTENCY WITH 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 City Council of the City of Solana Beach found that the proposed development was exempt from CEQA pursuant to State CEQA guidelines sections 15301(d) (Existing Facilities) and 15304(c) (Minor Alterations to Land).

As such, there are no additional feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse environmental effects which approval of the proposed project, as conditioned, would have on the environment within the meaning of CEQA. Thus, if so conditioned, the proposed project will not result in any significant environmental effects for which feasible mitigation measures have not been employed consistent with CEQA Section 21080.5(d)(2)(A).

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## APPENDIX A – SUBSTANTIVE FILE DOCUMENTS

- City of Solana Beach certified LUP
- City of Solana Beach General Plan and Zoning Ordinance
- Sea Cave Infill Monitoring Report – 197 & 201 Pacific Avenue, TerraCosta Consulting Group, dated June 29, 2016
- Coastal Bluff Evaluation and Basis of Design Report 197 & 201 Pacific Avenue, prepared by TerraCosta Consulting Group, Inc., dated July 22, 2015