CALIFORNIA COASTAL COMMISSION
CENTRAL COAST DISTRICT OFFICE
725 FRONT STREET, SUITE 300
SANTA CRUZ, CA 95060
PHONE: (831) 427-4863
FAX: (831) 427-4877
WEB: WWW.COASTAL.CA.GOV

W8a

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Hearing date:	8/12/2009

COASTAL DEVELOPMENT PERMIT AMENDMENT APPLICATION

Application number.....**A-3-CAP-99-023-A1, Swan and Green Valley Corporation Seawall**

Applicant.....Richard and Nancy Swan, Green Valley Corporation

Project location .....At the toe of the bluff and along the beach seaward of 4840 and 4850 Cliff Drive in the City of Capitola (APNs 034-081-01 and 034-081-02).

Project description.....Amend Coastal Development Permit (CDP) A-3-CAP-99-023 to eliminate the existing condition prohibiting future shoreline armoring that applies to the Green Valley Corporation property (APN 034-081-02), and construct an approximately 115-foot section of contoured concrete seawall (including wing walls) fronting that Green Valley Corporation property and adjacent to an existing seawall on the Swan property (APN 034-081-01).

File documents.....Coastal Commission CDP files A-3-CAP-99-023 and 3-95-59; City of Capitola CDP file 03-006; City of Capitola certified Local Coastal Program (LCP); *Geologic Investigation, Swan Property, 4850 Cliff Drive, Capitola, California, Santa Cruz County APN 034-081-01* by Rogers E. Johnson & Associates, dated April 4, 2002; *Seawall Evaluation, Santa Cruz County APNs 034-252-01, -02, -03, and -04, Capitola California* by Rogers E. Johnson & Associates, dated August 22, 2002; *Geologic Assessment of the Stability of the Swan Coastal Bluff and Seawall, 4850 Cliff Drive, Capitola California, Santa Cruz County APN: 034-081-01* by Rogers E. Johnson & Associates, dated January 6, 2006; *Assessment of Recent Bluff Failure Adjacent to Swan Seawall, 4850 Cliff Drive, Capitola, California, Santa Cruz County, APN: 034-081-01*, by Rogers E. Johnson & Associates, dated December 8, 2006; *Geotechnical and Coastal Engineering Recommendations* by Haro, Kasunich and Associates, Inc., dated September 17, 2007; *Updated Alternatives Analysis Table* by Haro, Kasunich and Associates, Inc., dated June 10, 2009; *Addendum Alternative 'C/D – G' Description and Schematic* by Haro, Kasunich and Associates, Inc., dated July 23, 2009.

Staff recommendation ...**Approval with Conditions**

A.Staff Recommendation

1. Summary of Staff Recommendation

The proposed project site is located at the base of the bluff in the upcoast portion of the City of Capitola. This section of coastline is characterized by high bluffs broken by the floodplain of nearby Soquel Creek. The majority of the bluffs along this area of coast are armored at their base. The Swan parcel (APN 034-081-01) is armored at the base of the bluff with a concrete vertical seawall and along the upper portion of the bluff with a shotcrete wall. The Green Valley Corporation parcel (APN 034-081-02) is unarmored. Each parcel is developed with one single-family dwelling. The residence on the Swan parcel predates the Coastal Act. The residence on the Green Valley Corporation parcel was approved by the Commission, on appeal, in 1999. This 1999 approval was conditioned to disallow future shoreline protective devices designed to protect the approved Green Valley Corporation residence.

In the time since the seawall at the base of the bluff on the Swan parcel was constructed, a notch or sea cave has formed behind and adjacent to the upcoast end of this structure, jeopardizing the integrity of the seawall and, ultimately, the stability of the Swan residence, which is positioned very near the top of the bluff above the seawall. The Commission's staff geologist has determined that the Swan residence is in danger from erosion as that term is understood in relation to the Coastal Act. The residence on the Green Valley Corporation property is not currently in danger from erosion due to the existing sea cave. To address the danger to the Swan residence, the Applicants propose to construct an approximately 115-foot-long and 18-foot-high shotcrete seawall with an artificial rock fascia designed to mimic natural bluff forms beginning at the upcoast end of the existing seawall on the Swan property and extending across the Green Valley Corporation property to the upcoast rocky headland. To address the restrictions against armoring adopted by the Commission in 1999, the Applicants also propose to eliminate the existing condition prohibiting future shoreline armoring that applies to the Green Valley Corporation property.

Shoreline armoring has a number of impacts on the coast, including but not limited to impacts from encroachment, fixing the back of the beach, and preventing the natural retreat of coast bluffs that provide sandy material to the nearby beaches. As a result, the Coastal Act is premised on both hazard and shoreline armoring avoidance. The proposed 115-foot long seawall extending across the entire lower bluff of the Green Valley Corporation property is not needed to address the erosion danger to the Swan residence and would lead to significant impacts to coastal sand supply, beach recreational access, and, to a lesser degree, public views. A cave fill with erodable concrete, which would be required to extend only minimally onto the Green Valley Corporation property, and modification of the upcoast end of the existing Swan seawall, which will reduce wave reflection and erosion on the Green Valley Corporation property, will protect the Swan residence while substantially reducing the coastal resource impacts compared with the proposed project. In addition, such an alternative maintains the integrity of the armoring prohibition relative to the Green Valley Corporation property to the maximum extent feasible.

Therefore, staff recommends that the Commission approve a limited sea cave fill with erodable

concrete, along with mitigations for the impacts of the revised project, including but not limited to: 1) use of appropriate best management practices to protect water quality during construction; 2) visual treatment of the cave fill to match the color of the surrounding bluff; 3) requirements for other agency approvals; 4) assumption of risk, waiver of liability and indemnity agreements for coastal hazards; 5) payment of an in-lieu fee of $9,786 to the City of Capitola to mitigate for the project's impacts to sand supply and beach recreational access; 6) amendment to Special Condition 3f of CDP A-3-CAP-99-023 to allow for the cave fill while otherwise maintaining the prohibition on shoreline armoring on the Green Valley Corporation property; 7) monitoring and maintenance of the as-built project, and; 8) recordation of a deed restriction against the parcels governed by this permit. As conditioned, the project can be found consistent with the Coastal Act. The motion to act on this recommendation is directly below.

2. Staff Recommendation on CDP Amendment

Staff recommends that the Commission, after public hearing, **approve** the proposed project subject to the standard and special conditions below.

Motion: I move that the Commission approve coastal development permit amendment number A3-CAP-99-023-A1 pursuant to the staff recommendation.

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

Resolution to Approve the Permit: The Commission hereby approves a coastal development permit amendment for the proposed development and adopts the findings set forth below on grounds that the development as conditioned will be in conformity with the policies of Chapter 3 of the Coastal Act. Approval of the permit amendment 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.

Report Contents

B.Findings and Declarations

The Commission finds and declares as follows:

1. Project Location, Background, and Description

A. Project Location

The proposed project site is located at the base of the bluff in the upcoast portion of the City of Capitola. This general area consists of relatively flat upland coastal marine terraces along the southwestern flank of the Santa Cruz Mountains. This specific section of the coastline is characterized by high bluffs broken by the floodplain of Soquel Creek opening up to Capitola City Beach. From Capitola City Beach, the bluff rises rapidly to a height of 60–70 feet and continues upcoast for approximately 2 miles where it drops into the Moran Lake drainage, and downcoast approximately 1 mile to New Brighton State Beach.

The Applicants' parcels are located approximately one-third of a mile upcoast of Soquel Creek, and about 500-600 feet upcoast from the Hooper Beach area of Capitola City Beach (see project location

map in Exhibit A). These parcels are the first two of a series of parcels situated between Cliff Drive/Opal Cliff Drive and the ocean, extending to 41st Avenue in unincorporated Santa Cruz County. This area is known locally as the Opal Cliffs area. The Opal Cliffs area is characterized primarily by residential structures located between the public road and the bluff edge. The overwhelming majority of this stretch of coast, including bluff areas immediately up and down coast, has been armored with an assortment of revetments and vertical seawalls.

Each of the subject parcels is developed with one single-family dwelling. The Swan parcel is armored at the base of the bluff with a concrete vertical seawall and along the upper portion of the bluff with a shotcrete wall.[1] Since the seawall at the base of the bluff was constructed, a notch undercut has formed behind and adjacent to the upcoast end of this structure (see photographs in Exhibit C). The existing sea cave is located along the Swan/Green Valley Corporation property line. The sea cave is now about 18 feet wide as measured along the property line from the landward edge of the upcoast end of the seawall to the toe of the bluff. The sea cave extends about 13 to 15 feet onto the Green Valley Corporation property as measured perpendicular to the property line. Wave energy at the end of the seawall has accelerated the erosion in this area, jeopardizing the integrity of the seawall and, ultimately, the stability of the Swan residence, which is positioned about 10-15 feet from the edge of the top of the bluff above the retaining wall.

The Green Valley Corporation parcel (APN 034-081-02), which is located just upcoast from the Swan parcel, is one of the few parcels along this stretch of coast that is unarmored.

See Exhibit A for project location maps and Exhibit C for photographs of the project site.

B. Background and CDP History

By the mid 1990s, the seaward-facing wall of the Swan residence (then owned by Colt Properties) had been undermined by bluff erosion and a portion of the foundation on the southwest corner of the residence was hanging suspended by rebar in midair. The City of Capitola required that this section of the house be demolished. Once the condemned section of the house was removed, the remaining portion of the house was located about 15-20 feet from the bluff edge. In 1995, Colt Properties applied to the Commission for a permit to build a vertical concrete seawall at the base of the bluff to protect the portion of the residence that remained. The Commission found that the remaining extent of the residence was in danger from bluff erosion and granted a permit (CDP 3-95-59) to allow for construction of a vertical concrete seawall approximately 200 feet in length and up to 20 feet in height along the base of the bluff. This permit also allowed for riprap to be used at the upcoast and downcoast ends of the seawall, but prohibited such riprap from encroaching onto the adjacent Green Valley Corporation property, which at that time was vacant.

Erosion of the unprotected upper bluff located on the Swan property caused the Swan residence to be threatened again in 2003. In 2004, the City of Capitola approved a CDP (CDP 03-006) to allow for

[1] The seawall was approved by the Commission in 1995 (CDP 3-95-059) and the shotcrete wall was approved by the City of Capitola in 2004 (CDP 03-006).

construction of a shotcrete wall along a portion of the upper bluff on the Swan property to protect the Swan residence from undermining and to preserve the configuration of the blufftop.[2] The mitigated project included visual treatment of the shotcrete to match the existing bluff materials as closely as possible, a sand loss mitigation fee, and best management practices to prevent construction debris from entering Monterey Bay. The upper bluff retaining wall has been constructed (see Exhibit C for photographs of the site).

In terms of the Green Valley Corporation site, in 1999 the City of Capitola approved a CDP for a residential development on the blufftop portion of the Green Valley Corporation parcel. The City's approval was appealed to the Commission (A-3-CAP-99-023). On July 14, 1999, the Commission found that the City's approval of the project raised a substantial issue in terms of consistency with LCP blufftop setback policies.[3] At that same hearing, the Commission approved a revised project that required the Applicant to set the proposed residential structure back an additional 15 feet from the City LCP's required minimum 50-year bluff edge retreat line, consistent with the recommendations of the project geotechnical reports. The Commission's staff engineer reviewed these geotechnical reports and likewise concluded that there was a high probability that the proposed structure would be safe, without reliance upon shoreline armoring, for the LCP's minimum fifty years with this additional setback. The Commission also conditioned the project (Special Condition 3(f)) to disallow future shoreline protective devices designed to protect the approved residence, as follows:

> ***3. Assumption of Risk, Waiver of Liability and Indemnity Agreement.*** *By acceptance of this permit, the Permittee acknowledges and agrees: …* ***(f)*** *that the Permittee shall not construct, now or in the future, any shoreline protective device(s) for the purpose of protecting the residential development approved pursuant to coastal development permit A-3-CAP-99-023 including, but not limited to, the residence, foundations, decks, driveways, or the septic system in the event that these structures are threatened with imminent damage or destruction from waves, erosion, storm conditions, or other natural hazards in the future and by acceptance of this permit, the Permittee hereby waives any rights to construct such devices that may exist under Public Resources Code Section 30235 or City of Capitola LCP Zoning Section 17.48.090.*

The Applicant accepted all the conditions of the approved permit and the permit for the project was issued on July 2, 2001. The site has since been developed with a residence that conforms to the setback

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[2] This upper bluff shotcrete wall does not connect to the existing concrete seawall located at the toe of the bluff on the Swan's property, i.e. the portion of the bluff located between the existing concrete seawall and the upper bluff shotcrete wall remains unarmored (see photographs in Exhibit C).

[3] Specifically, the residential development approved by the City directly abutted the LCP-required minimum 50-year bluff edge retreat line. The Commission found that if the bluff retreated according to this 50-year prediction, the approved dwelling would be endangered by bluff retreat in advance of the 50-year minimum LCP requirement because its stability and structural integrity would be threatened before the bluff edge was allowed to retreat to its footings. As such, a shoreline protective device would be required to maintain stability and structural integrity before the end of the project's expected economic lifetime. The City's approval did not limit the proposed dwelling's economic lifetime to fifty years and did not restrict future construction of a shoreline protective device. Because structural stability (without reliance of a shoreline protective device) was not assured for even the LCP minimum of fifty years, the project was found to be inconsistent with the LCP's blufftop setback policies and thus the project raised a substantial LCP conformance issue.

and other requirements of CDP A-3-CAP-99-023. The proposed project amendment, however, includes deletion of Special Condition 3(f) and recordation of a revised deed restriction to account for its elimination and to allow the proposed seawall extension onto the Green Valley Corporation property. California Code of Regulations Section 13166(a) asserts that coastal permit amendments that weaken the Commission's intent regarding an approved permit shall be rejected unless new information has been discovered since the permit was approved, and states:

> ***13166(a):*** *The executive director shall reject an application for an amendment to an approved permit if he or she determines that the proposed amendment would lessen or avoid the intended effect of an approved or conditionally approved permit unless the applicant presents newly discovered material information, which he could not, with reasonable diligence, have discovered and produced before the permit was granted.*

A review of information submitted as part of this application, including the Applicants' identification of new geologic information since approval of A-3-CAP-99-023, demonstrated that the proposed amendment request includes adequate "newly discovered material information" (as that item is understood in a California Code of Regulations Section 13166(a) context) to allow the amendment application to be accepted for processing.

C. Project Description

The amendment proposes to eliminate the existing condition prohibiting future shoreline armoring that applies to the Green Valley Corporation property and to modify the associated deed restriction. To address the outflanking of the upcoast portion of the existing Swan seawall (without causing accelerated erosion on the Green Valley Corporation bluff-toe, according to the Applicants' geotechnical representatives), the proposed amendment also includes the construction of an approximately 115-foot shotcrete seawall, 18 feet in height, with tiebacks and with an artificial rock fascia to mimic the natural bluff beginning at the upcoast end of the existing seawall on the Swan property and extending across the Green Valley Corporation property to the upcoast headland. To minimize the potential for increased erosion at the upcoast end of the proposed project, a short segment return or wing wall would be constructed at the upcoast end of the Green Valley Corporation bluff-toe, adjacent to an erosion-resistant bedrock promontory. To reduce wave reflection onto the pocket beach on the Green Valley Corporation property, the project would include removing the upcoast corner of the existing Swan seawall, which would also allow for construction of a smooth transition to the proposed new seawall.

See Exhibit B for project plans and see Exhibit C for photographs of the project site.

2. Coastal Development Permit Amendment Determination

The proposed project falls within the Commission's retained jurisdiction and thus the standard of review is the Coastal Act. As relevant, the City of Capitola's certified LCP can provide non-binding guidance. However, the LCP and Coastal Act policies are very similar as regards allowing shoreline armoring and

protecting against its impacts. Thus, the LCP policies do not provide different policy direction in this case, and their usefulness in this review is limited as a result.

A. Geologic Conditions and Hazards

1. Applicable Policies

Coastal Act Section 30235 addresses the use of shoreline protective devices:

> ***30235.*** *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. Existing marine structures causing water stagnation contributing to pollution problems and fish kills should be phased out or upgraded where feasible.*

Coastal Act Section 30253 addresses the need to ensure long-term structural integrity, minimize future risk, and to avoid landform altering protective measures in the future. Section 30253 provides, in applicable part:

> ***Section 30253.*** *New development shall do all of the following:*
>
> *(1) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.*
>
> *(2) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.*

Coastal Act Section 30235 acknowledges that seawalls, revetments, cliff retaining walls, groins and other such structural or "hard" methods designed to forestall erosion also alter natural landforms and natural shoreline processes. Accordingly, with the exception of new coastal-dependent uses, Section 30235 limits the construction of shoreline protective works to those required to protect existing structures or public beaches in danger from erosion. The Coastal Act provides these limitations because shoreline structures can have a variety of negative impacts on coastal resources including adverse affects on sand supply, public access, coastal views, natural landforms, and overall shoreline beach dynamics on and off site, ultimately resulting in the loss of beach.

In addition, the Commission has generally interpreted Section 30235 to apply only to existing principal structures. The Commission must always consider the specifics of each individual project, but has generally found that accessory structures (such as patios, decks, gazebos, stairways, etc.) are not required to be protected under Section 30235, or can be protected from erosion by relocation or other means that do not involve shoreline armoring. The Commission has generally historically permitted at-grade structures within the geologic setback area, recognizing that they are expendable and capable of being removed rather than requiring a protective device that would alter natural landforms and processes along bluffs, cliffs, and beaches.

Under Coastal Act Section 30235, shoreline protective structures may be approved if: (1) there is an existing structure; (2) the existing structure is in danger from erosion; (3) shoreline altering construction is required to protect the existing threatened structure; and (4) the required protection is designed to eliminate or mitigate the adverse impacts on shoreline sand supply. The first three questions relate to whether the proposed armoring is necessary. The fourth question applies to mitigating some of the impacts from armoring.

2. Analysis

A. Existing Structure to be Protected

The Swan residence is clearly seen in a photograph taken from offshore in 1972 (see page 1 of Exhibit C). Thus, the Swan residence predates the coastal permitting requirements of both 1972's Proposition 20 (the Coastal Initiative) and the 1976 Coastal Act. As such, the Swan residence qualifies as an existing structure for purposes of Section 30235.

As discussed above, the Commission approved construction of a single-family residence on the Green Valley Corporation parcel in 1999. Capitola LUP Policy VII-7[4] and Zoning Section 17.48.100(A) address setbacks for blufftop development and require that bluff and cliff top development shall be approved only if design and setback provisions are adequate to assure stability and structural integrity for the expected economic lifetime (at least 50 years) of the development. Thus, the proposed residence could not be approved as being consistent with the geologic hazards requirements of the Capitola LCP if potential shoreline retreat or coastal erosion would affect the proposed development and necessitate construction of a shoreline protective device. To ensure project conformance with the Capitola LCP's blufftop setback requirements, the Commission's approval at that time required the Applicant to set the proposed residential structure back an additional 15 feet from the 50-year bluff edge retreat line (for a total blufftop setback of about 53 feet), consistent with the recommendations of the project's geotechnical reports. The Commission's staff engineer reviewed these geotechnical reports and likewise concluded that there was a high probability that the proposed structure would be safe, without reliance upon shoreline armoring, for the LCP's required economic lifetime (a minimum of 50 years) with this additional setback. Projection of coastal erosion is not an exact science, and the Commission recognized that this property would eventually be in danger from erosion. Thus, to ensure that the proposed residence would not trigger any such future armoring and that it would maintain consistency with LUP Policy VII-7 and Zoning Section 17.48.100(A)[5], the Commission conditioned its approval to disallow future shoreline protective devices to protect the approved residence. For these reasons, the residence on the Green Valley Corporation property does not qualify for shoreline protection for purposes of Section 30235.

[4] This policy implements the Coastal Act Section 30253 requirement that new development shall not require construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.

[5] Which also implements Coastal Act Section 30235.

B. Danger from Erosion

The Coastal Act allows shoreline armoring to protect existing structures in danger from erosion, but it does not define the term "in danger." There is a certain amount of risk involved in maintaining development along a California coastline that is actively eroding and can be directly subject to violent storms, large waves, flooding, earthquakes, and other geologic hazards. These risks can be exacerbated by such factors as sea level rise and localized geography that can focus storm energy at particular stretches of coastline. As a result, some would say that all development along the immediate California coastline is in a certain amount of "danger." It is a matter of the degree of threat that distinguishes between danger that represents an ordinary and acceptable risk, and danger that requires shoreline armoring per 30235. Lacking Coastal Act definition, the Commission's long practice has been to evaluate the immediacy of any threat in order to make determinations as to whether an existing structure is "in danger." While each case is evaluated based upon its own particular set of facts, the Commission has generally interpreted "in danger" to mean that an existing structure would be unsafe to occupy within the next two or three storm season cycles (generally, the next few years) if nothing were to be done (i.e., in the no project alternative).

Reports Submitted

The Applicant has submitted the following geotechnical evidence to support the contention that the existing Swan residence (but not the Green Valley Corporation residence[6]) is in danger from erosion, and that the proposed project is appropriate:

- *Geologic Investigation, Swan Property, 4850 Cliff Drive, Capitola, California, Santa Cruz County APN 034-081-01* by Rogers E. Johnson & Associates, dated April 4, 2002 (RJA 4/2002);
- *Seawall Evaluation, Santa Cruz County APNs 034-252-01, -02, -03, and -04, Capitola California* by Rogers E. Johnson & Associates, dated August 22, 2002 (RJA 8/2002);
- *Geologic Assessment of the Stability of the Swan Coastal Bluff and Seawall, 4850 Cliff Drive, Capitola California, Santa Cruz County APN: 034-081-01* by Rogers E. Johnson & Associates, dated January 6, 2006 (RJA 1/2006);
- *Assessment of Recent Bluff Failure Adjacent to Swan Seawall, 4850 Cliff Drive, Capitola, California, Santa Cruz County, APN: 034-081-01*, by Rogers E. Johnson & Associates, dated December 8, 2006 (RJA 12/2006);
- *Proposed Swan Seawall Repair* by Rogers E. Johnson & Associates, dated September 13, 2007 (RJA 9/2007);
- *Geotechnical and Coastal Engineering Recommendations* by Haro, Kasunich and Associates, Inc., dated September 17, 2007 (HKA 9/2007).

[6] The Applicants do not assert that the Green Valley Corporation residence is in danger. On the contrary, the application materials are clear that the Applicants do not believe the residence is in danger.

- *Updated Alternatives Analysis [for] Proposed Swan Residence Seawall Repair* by Haro, Kasunich and Associates, Inc., dated June 10, 2009 (HKA 6/2009).

- *Addendum Alternative 'C/D – G' Description and Schematic* by Haro, Kasunich and Associates, Inc., dated July 23, 2009 (HKA 7/2009).

Each of these reports has slightly different purposes and information. The 4/2002 RJA geologic investigation of the Swan property described the site conditions on the Swan property prior to installation of the upper bluff retaining wall, discusses a range of alternatives and recommends a structural shotcrete retaining wall system on the upper bluff and an extension of the existing seawall onto the adjacent Green Valley Corporation property. The 8/2002 RJA seawall evaluation report describes basic site conditions, discusses alternative methods for dealing with the erosion problem and ultimately recommends construction of an upcoast extension of the existing seawall onto the Green Valley Corporation property. Both of these 2002 reports predate the 2004 construction of the upper bluff shotcrete wall below the Swan residence. The 1/2006 RJA geologic assessment report describes the conditions at the coastal bluff on the Swan and Green Valley Corporation properties at that time. The 12/2006 RJA report describes a bluff failure that occurred on the Green Valley Corporation property in November 2006, identified as a block failure of about 400 cubic yards of material that encompassed nearly the entire bluff, top to bottom, and extended 85 feet from the Swan seawall to the promontory on the Green Valley Corporation property. The 9/2007 RJA report included the calculated sand loss due to the proposed seawall construction, as well as a discussion of the ramifications of repairing the outflanked Swan seawall without extending the seawall across the bluff on the adjacent Green Valley Corporation property. The 9/2007 HKA report outlines the geotechnical and coastal engineering recommendations for the repair of the bluff-toe erosion and outflanking at the upcoast end of the Swan seawall and also provides an alternatives analysis table of six possible scenarios regarding repair of the upcoast end of the Swan seawall and one repair enhancement to improve the efficiency of the seawall repair alternatives. The 6/2009 HKA report includes four new alternatives to supplement the alternatives discussed in the 9/2007 HKA report. The 7/2009 HKA report provides a description and schematic of a another alternative that combines the attributes of several previously identified alternatives into a separate alternative; namely an erodable sea cave fill in tandem with modification of the upcoast end of the existing Swan seawall.

Are the Swan and Green Valley Corporation Residences in Danger from Erosion?

Swan Property: The near vertical coastal bluff below the Swan residence is about 68 feet high. The Swan residence is situated as close as 11 feet from the top edge of the bluff, but is protected from upper bluff erosion by a shotcrete wall and from most shoreline erosion by the large seawall constructed at the base of the bluff (see page 2 of Exhibit C). As discussed above, a notch undercut (i.e., a sea cave) has formed behind and adjacent to the upcoast end of the existing bluff-toe seawall on the Swan's property (see page 3 of Exhibit C). The Swan residence is situated about 22 feet horizontally from this mapped sea cave (see Exhibit B). The upcoast end of the Swan's upper bluff shotcrete wall overlies the mapped sea cave. According to a geologic assessment of the stability of the Swan coastal bluff and seawall,

failure of the sea cave below the Swan residence is imminent[7] (although this assessment was done in 2006 and failure has not yet occurred). This 2006 assessment found that there is a very high potential that future failure of the sea cave will translate up the fractured and jointed bedrock bluff face and undermine the terrace deposits at the Swan/Green Valley Corporation property line, and that eventual failure of the terrace deposits will undermine the upcoast perimeter of the Swan residence and compromise the integrity of the tieback anchors at the upcoast end of the Swan blufftop shotcrete retaining wall.[8] For these reasons, the Swan residence is in danger from erosion. Thus, the Swan residence qualifies for shoreline protection consideration under the second Section 30235 test.

Green Valley Corporation Property: Based on the Commission's 1999 approval, the Green Valley Corporation residence does not qualify for shoreline armoring under Coastal Act Section 30235. In addition, the Applicants are not claiming that this residence is in danger despite the armoring prohibition. Specifically, the Commission approved the residence in 1999 with a minimum setback of 53 feet. The 1/2006 RJA report demonstrates that a second undercut has formed near the upcoast property line of the Green Valley Corporation property. Here, the undercut is occurring at the intersection of a "corner" formed by a fault-bounded rocky promontory that juts out a right angle to the general trend of the bluff. This promontory encompasses a portion of the western property line of the Green Valley Corporation property and the upcoast adjacent condominium property. This undercut is a maximum of 21 feet deep and is 14 feet high its mouth. This report also notes that sometime during the winter of 2004-05, directly adjacent to the mouth of the undercut, a joint-bounded slab of the promontory failed. According to RJA, the failed slab measured about 10 feet wide by 4 foot high and 1.5 feet deep.

However, even with the above-mentioned erosion/failure, none of the geotechnical reports finds that the Green Valley Corporation residence is in imminent danger from erosion. Additionally, the submitted project plans (dated September 14, 2007) show that the Green Valley Corporation residence is now set back a minimum of 40 feet from the blufftop edge (due to bluff erosion since 1999, when the residence was approved with a minimum 53-foot setback), well beyond any immediate threat from erosion.

In conclusion, the existing Green Valley Corporation residential structure is not in danger from erosion and does not otherwise qualify for shoreline protection consideration under Coastal Act Section 30235.

C. Feasible Protection Alternatives to a Shoreline Structure

The third Section 30235 test that must be met is that the proposed armoring must be "required" to protect the existing threatened structure. In other words, shoreline armoring can be permitted if it is the

[7] The RJA 1/2006 report states that the average erosion rate at the upcoast end of the Swan seawall is about two feet per year, which is about 30 percent greater than the "normal" rate of coastal bluff erosion (about 1.5 feet per year) along this segment of coastline.

[8] Sea cave erosion has also been noted at the downcoast seawall/bluff interface, but its potential impacts have not been noted as problematic. The HKA 9/2007 report states that a wave-cut notch (i.e., a sea cave) into the bedrock has also formed below the concrete portion of the downcoast end of the seawall, but that "repair plans for the downcoast end of the Swan seawall are beyond the scope of this report." The current project application does not propose any repair to the sea cave that has formed behind the downcoast portion of the Swan seawall.

only feasible alternative capable of protecting the structure.[9] When read in tandem with other applicable Coastal Act policies cited in these findings, this Coastal Act 30235 evaluation is often conceptualized as a search for the least environmentally damaging feasible alternative that can serve to protect existing endangered structures. Other alternatives typically considered include: the "no project" alternative; abandonment of threatened structures; relocation of the threatened structures; sand replenishment programs; drainage and vegetation measures on the blufftop itself; and combinations of each. Three different reports have presented various alternatives to address the erosion at the upcoast portion of the Swan seawall and to provide protection for the Swan structure. Exhibit D provides a table prepared by HKA (6/2009) that summarizes all the proposed alternatives from the Applicants' perspectives. These alternatives are briefly discussed below.

Alternatives Identified

The 8/2002 RJA report included an alternatives analysis. According to that report, the four possible alternatives to address the erosion taking place at the upcoast portion of the Swan seawall were:

- Do nothing.
- Place a wall on the landward side and perpendicular to the seawall along the Green Valley Corporation/Swan property line.
- Extend the seawall 15 to 20 feet onto the Green Valley Corporation property and feather the wall into the bluff.
- Extend the seawall across the Green Valley Corporation property and feather it into the erosion-resistant promontory to the west.

This 8/2002 RJA report found that the consequence of the first alternative (i.e., doing nothing) would be the eventual outflanking of the existing Swan seawall, which would result in the failure of the seawall and of the bluff, as well as the undermining of the Swan residence. This report also found that the second and third alternatives would protect the Swan seawall and residence but would cause accelerated erosion on the Green Valley Corporation property. The report concluded that of the four options discussed, extending the seawall across the entire Green Valley Corporation property would stop the accelerated erosion that is occurring on the bluff fronting the Green Valley Corporation property.

The HKA 9/2007 also included an alternatives analysis that included three alternatives not mentioned in the Rogers Johnson report:

- Fill existing sea cave with erodable concrete to mimic the Purisima bedrock erosion rate.
- Relocate the Swan residence.

[9] Note that Coastal Act Section 30108 defines feasibility as follows: "Feasible" means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors.

- Realign the upcoast portion of the Swan seawall end by cutting the corner off.

This 9/2007 HKA report found that the first alternative might increase the erosion at the upcoast end of the repair and along the Green Valley Corporation bluff-toe, and would require regular maintenance (every 5 to 10 years, or possibly more frequently). The report found that the relocation footprint is extremely limited and would provide only a very short-term reprieve from the threat of coastal erosion. Regarding the third option, the report found that this would have a positive impact by reducing the footprint of the wall and reducing wave reflection onto the Green Valley Corporation parcel.

The 6/2009 HKA report included the alternatives discussed above, as well as four additional alternatives not provided in the above reports:

- Underpin the Swan residence with 80-foot-deep piers (a portion of which would have to be hand dug) tied into and an associated grade beam system (which would need to be excavated by hand under the existing residence), and remove the Swan seawall and blufftop retaining wall as outflanking occurs.

- Same the pier and grade beam alternative above, except this option would also include partial demolition and temporary relocation of the Swan residence to allow heavy equipment to drill all of the 80-foot-deep piers and to excavate the grade beams. The residence would be reconstructed in its original building envelope after installation of the new foundation system.

- Construct a hardened "cup or bowl" (including a wave return) along the bluff within the existing sea cave, extending about 15 feet onto the Green Valley Corporation property.

- Construct a hardened "cup or bowl" (including a wave return) along the bluff face within the portion of the existing sea cave that is solely on the Swan parcel (i.e. no armoring of the portion of the sea cave that is on the Green Valley Corporation parcel).

This 6/2009 HKA report concluded that the alternatives using piers would lead to outflanking of the existing Swan seawall and blufftop retaining wall, which would result in the loss of existing erosion protection for the Swan residence that is provided by these structures. Also, as the bluff erodes, the pier-supported Swan residence would take on the appearance of an offshore oil platform as the bluff eroded to and past the piers. The report also found that hardening the sea cave on the Swan property only, with no hardening of the portion of the sea cave on the Green Valley Corporation property, would cause the un-hardened portion of the sea cave to continue to expand, which would continue to endanger the Swan residence. Regarding extending the sea cave fill onto the Green Valley Corporation property, the report found that the hardened corner next to the unarmored portion of the Green Valley Corporation property would cause a new sea cave to form, which ultimately would threaten the Swan residence. The report concluded that Alternative E (the proposed project) is the only repair alternative that will effectively protect the existing residence on the Swan's property, as well as the existing Swan seawall and upper bluff shotcrete wall, without causing accelerated erosion on the Green Valley Corporation property.

The 7/2009 HKA report provides a description and schematic of a another alternative that combines the

attributes of several previously identified alternatives into a separate alternative; namely an erodable sea cave fill in tandem with modification of the upcoast end of the existing Swan seawall. This report was prepared following discussions between the Applicants' consulting engineer (HKA) and Commission staff regarding the feasibility of this alternative to minimize the amount of armoring while still providing protection to the Swan residence in danger. The 7/2009 HKA report concludes that this alternative is viable, but that it is inappropriate because it is not a well established technique that will both require increased maintenance and could lead to more sea caves as well as increased erosion onto the Green Valley Corporation bluff-toe (see Exhibit E).

Alternatives Conclusion

As discussed above, the sea cave that has developed at the upcoast end of the Swan seawall poses a risk to the stability of the Swan property and principal residence. However, expansion of the existing seawall 115 feet upcoast, as proposed, will alter natural shoreline processes and is an excessive way to deal with the identified erosion risk. In fact, such a project alternative appears to be the one with the most potential coastal resource impacts, and it is contrary to the terms and conditions of the base CDP because such a seawall would front and protect the Green Valley Corporation residence, when that is prohibited. As previously indicated, the Coastal Act directs that the alternative with the fewest resource impacts that protects the endangered structures is the project that is most appropriate for consideration.

According to the Commission's senior engineer, the risks to the Swan residence due to the sea cave can be addressed by the permutation alternative project that includes the sea cave fill and modification of the upcoast corner of the existing seawall, as discussed above. This is a two-fold approach that is directed at the identified problem in a more focused way, and that limits shoreline armoring on the Green Valley Corporation property to the maximum extent feasible. Both approaches were identified by the Applicants' consultants and, while not their preferred or recommended alternatives, were found to be viable for addressing the current coastal concerns. The first part would be to fill in the existing sea cave that straddles the Swan and Green Valley Corporation properties with erodable concrete (see Alternative C in Exhibit D). The objective would be for the concrete to erode at the same rate as the unarmored bluff on the Green Valley Corporation property (i.e., at about 1-foot per year).[10] Implementation of this alternative should minimize or prevent formation of a new sea cave upcoast of the existing sea cave because the sea cave fill would be eroding at the same rate as the surrounding upcoast unarmored bluff face. The second step for addressing the identified erosion risk to the Swan residence would be to reduce the exposed upcoast face of the existing vertical seawall by removing a portion of the upcoast end of the wall to provide a gradual transition from the wall to the cave fill areas behind the wall that presently have a tendency to form notches and gaps (see Alternative G in Exhibit D). Together, this permutation alternative would be at a much reduced scale and scope compared to the proposed project (see description and schematic of this alternative in Exhibit E).

[10] There have been certain cases where erodable concrete has not eroded at the same rate as the surrounding bluff, causing the armoring to protrude from the natural bluff contours when the bluff has retreated more quickly that the erodable concrete. To avoid this situation, the erodable cave fill can be shaped and sanded to match the adjacent bluff retreat if the concrete erodes at a rate less than the surrounding bluffs.

The changes to the existing seawall, combined with the addition of dissipative features to the cave fill, should help to minimize the upcoast propagation of gaps and notches on the Green Valley Corporation property. The Applicants' consulting engineer does not believe that this approach should be pursued because the erodable sea cave fill: 1) would only provide short-term protection for the bluff, the existing seawall, and the Swan residence; 2) would have the potential to reflect wave energy onto the Green Valley Corporation bluff-toe and increase erosion there; 3) would require an enhanced level of monitoring and maintenance to prevent a new sea cave from forming that would endanger the Swan residence; and 4) the design and use of erodable concrete is not yet an established engineering practice, and thus it is difficult to predict whether the erodable concrete mix would be harder or weaker than the surrounding bluff materials (see Exhibit E). However, the Commission's senior engineer believes that this alternative is both feasible and appropriate, and that it is the most Coastal Act consistent approach for addressing the identified erosion risk at this location. Although engineering details for this alternative would still need to be developed, this approach limits shoreline armoring (and associated impacts) and encroachment onto the Green Valley Corporation property[11] to the maximum extent feasible while protecting the Swan residence from the identified erosion danger. See Special Condition 1.

In summary, the existing structure on the Swan property is in danger from erosion and does meet the three tests in Section 30235. However, there are alternatives other than the proposed project that will address the erosion taking place at the upcoast end of the Swan seawall and provide for protection of the Swan residence that do not include extending a seawall across the entire Green Valley Corporation property, and that limit coastal resource impacts to the maximum extent feasible. Therefore, only such a more limited project can be found consistent with the Coastal Act (and consistent to the extent feasible with the base CDP). See Special Condition 1.

D. Sand Supply Impacts

The fourth test of Section 30235 (previously cited) that must be met in order to allow Commission approval is that shoreline structures must be designed to eliminate or mitigate adverse impacts to local shoreline sand supply.

Shoreline Processes

Beach sand material comes to the shoreline from inland areas, carried by rivers and streams; from offshore deposits, carried by waves; and from coastal dunes and bluffs, becoming beach material when the bluffs or dunes lose material due to wave attack, landslides, surface erosion, gullying, et cetera. Coastal dunes are almost entirely beach sand, and wind and wave action often provide an on-going mix and exchange of material between beaches and dunes. Many coastal bluffs are marine terraces – ancient beaches which formed when land and sea levels differed from current conditions. Since the marine terraces were once beaches, much of the material in the terraces is often beach quality sand or cobble,

[11] As discussed above, the existing structure on the Green Valley Corporation is not in danger from erosion and therefore a shoreline armoring project is not required and the proposed project does not meet the third Section 30235 test regarding the Green Valley Corporation property.

and a valuable contribution to the littoral system when it is added to the beach. While beaches can become marine terraces over geologic time, the normal exchange of material between beaches and bluffs is for bluff erosion to provide beach material. Bluff retreat and erosion is a natural process resulting from many different factors such as erosion by wave action causing cave formation, enlargement and eventual collapse, saturation of the bluff soil from ground water causing the bluff to slough off and natural bluff deterioration. When the back-beach or bluff is protected by a shoreline protective device, the natural exchange of material either between the beach and dune or from the bluff to the beach will be interrupted, and, if the shoreline is eroding, there will be a measurable loss of material to the beach. Since sand and larger grain material is the most important component of most beaches, only the sand portion of the bluff or dune material is quantified as sandy beach material.

These natural shoreline processes affecting the formation and retention of sandy beaches can be significantly altered by the construction of shoreline armoring structures since bluff retreat is one of several ways that beach quality sand is added to the shoreline. Bluff retreat and erosion is a natural process resulting from many different factors (such as erosion by wave action causing cave formation, enlargement and eventual collapse, saturation of the bluff soil from ground water causing the bluff to slough off and natural bluff deterioration); shoreline armoring directly impedes these natural processes.

The subject site is located within the Santa Cruz Littoral Cell. The Santa Cruz Cell is a high volume cell with annual longshore transport estimated between 300,000 and 500,000 cubic yards of beach quality materials annually.[12] The dominant direction of longshore transport in this sand supply system is north north-west to south south-east (roughly from upcoast to downcoast in relation to the site).[13] Materials in this system have been estimated to come mainly from coastal streams (roughly 75%), with 20% coming from bluffs, and 5% coming from coastal ravines and sand dunes.[14]

Some of the effects of engineered armoring structures on the beach (such as scour, end effects and modification to the beach profile) are temporary or are difficult to distinguish from all the other actions that modify the shoreline. Others are more qualitative (e.g., impacts to the character of the shoreline and visual quality). Some of the effects that a shoreline structure may have on natural shoreline processes can be quantified, however, including: (1) the loss of the beach area on which the structure is located; (2) the long-term loss of beach which will result when the back beach location is fixed on an eroding shoreline; and (3) the amount of material which would have been supplied to the beach if the back beach or bluff were to erode naturally.[15]

[12] United States Army Corps of Engineers (USACOE), San Francisco District, 1994.

[13] USACOE, San Francisco District, 1994.

[14] Griggs and Best, 1991.

[15] The sand supply impact refers to the way in which the project impacts creation and maintenance of beach sand. Although this ultimately translates into beach impacts, the discussion here is focused on the first part of the equation and the way in which the proposed project would impact sand supply processes.

Fixing the back beach

Experts generally agree that where the shoreline is eroding and armoring is installed, as is the case here, the armoring will eventually define the boundary between the sea and the upland. On an eroding shoreline, a beach will exist between the shoreline/waterline and the bluff as long as sand is available to form a beach. As bluff erosion proceeds, the profile of the beach also retreats and the beach area migrates inland with the bluff. This process stops, however, when the backshore becomes a hard protective structure such as a revetment or a seawall. While the shoreline on either side of the armor continues to retreat, shoreline in front of the armor eventually stops at the armoring. The beach area will narrow, being squeezed between the moving shoreline and the fixed backshore. Eventually, there will be no available dry beach area and the shoreline will be fixed at the base of the structure. In the case of an eroding shoreline, this represents the loss of a beach as a direct result of the armor.

In addition, sea level has been rising slightly for many years. Also, there is a growing body of evidence that there has been an increase in global temperature and that acceleration in the rate of sea level rise can be expected to accompany this increase in temperature (some shoreline experts have indicated that sea levels could rise as much as 3 feet by the year 2100). Mean water level affects shoreline erosion several ways, and an increase in the average sea level will exacerbate all these conditions. On the California coast the effect of a rise in sea level will be the landward migration of the intersection of the ocean with the shore. This, too, leads to loss of the beach as a direct result of the armor. These effects are also known as "passive erosion."

The Commission has established a methodology for calculating passive erosion or the long-term loss of beach due to fixing the back beach. This impact is equivalent to the footprint of the bluff area that would have become beach due to erosion and is equal to the long-term erosion rate multiplied by the width of property which has been fixed by a resistant shoreline protective device.[16] Using this calculation, the impact of the proposed project along 86 linear feet of shoreline[17] would translate to roughly the loss of 86 square feet of new beach per year.[18]

The loss of a square foot of beach area can be roughly converted to the volume of sand that would be required to nourish an equivalent area of beach. There is a rough rule of thumb that it takes between 1 to 1.5 cubic yards of sand to establish 1 square foot of dry beach through nourishment.[19] The Commission

[16] The area of beach lost due to long-term erosion (Aw) is equal to the long-term average annual erosion rate (R) times the number of years that the back-beach or bluff will be fixed (L) times the width of the property that will be protected (W). This can be expressed by the following equation: Aw = R x L x W. The annual loss of beach area can be expressed as Aw' = R x W.

[17] Note that the proposed seawall itself would be approximately 115 feet in overall length. However, this overall dimension includes return components that would be roughly perpendicular to the general orientation of the shoreline at this location. As a result, its straight line length along the general orientation of the shoreline is somewhat shorter, approximately 86 linear feet along the shoreline, with respect to estimating its impact due to fixing the back beach. See Exhibit B for proposed project plans.

[18] The long term average annual erosion rate, R is approximately 1 foot/yr. The shoreline length of the proposed wall would be 86 feet. Thus, the area of beach lost annually due to long-term erosion, (Aw' = R x W) is 1 foot/yr x 86 feet = 86 square feet per year.

[19] This conversion value is based on the regional beach and nearshore profiles, and overall characteristics. When there is not regional data to better quantify this value, it is often assumed to be between 1 and 1.5, the basis being that to build a beach seaward one foot, there must be enough sand to provide a one-foot wedge of sand through the entire region of onshore-offshore transport. If the range of reversible sediment movement is from -30 feet msl to +10 feet msl, then a one-foot beach addition must be added for the full range from

has not been able to establish the active range of onshore-offshore sand transport for the Capitola area. However, if a 1.0 conversion factor is used that assumes that the active range of sand transport is at the lower limit of the expected range (i.e., the low end of the spectrum of values typically assumed by coastal engineers), a conservative estimate of the cubic yard equivalent of 86 square feet of beach sand per year can be calculated. Thus, the sand volume equivalent for the loss of beach due to passive erosion by the proposed seawall project would be 86 cubic yards per year of beach-quality sand.

If, instead of the proposed project, the approvable alternative (i.e., the erodable sea cave fill with the seawall corner modification – see Exhibit E) were implemented, there would be no direct loss of useable beach due to the fixing of the back beach location because the sea cave area itself is roughly perpendicular to the general shoreline orientation behind the existing seawall, and the fill of this area would erode at the same rate as the upcoast unarmored bluff-toe and surrounding bluff. In other words, the bluff would be expected to continue to erode at its demonstrated long-term rate along with the erodable fill area behind and adjacent to the seawall.[20] Thus, because there would be no "fixing" of the back beach with the approvable project, no mitigation would be required for passive erosion associated with it. Thus, the approvable project would have no passive erosion impacts compared to the proposed project, which would result in a passive erosion impact of 86 cubic yards per year of beach-quality sand.

Encroachment on the Beach

Shoreline protective devices (such as the seawall proposed) are all physical structures that occupy space. When a shoreline protective device is placed on a beach area, the underlying beach area cannot be used as beach. This generally results in a loss of public access as well as a loss of sand and/or areas from which sand generating materials can be derived. The area where the structure is placed will be altered from the time the protective device is constructed, and the extent or area occupied by the device will remain the same over time, until the structure is removed or moved from its initial location, or in the case of a revetment, as it spreads seaward over time. The beach area located beneath a shoreline protective device, referred to as the encroachment area, is the area of the structure's footprint.

In this case, the proposed seawall's base would occupy roughly 900 square feet of beach space. For the alternative sea cave fill and seawall corner modification project, the area of new encroachment would be approximately 233 square feet.[21] Because this alternative also includes removal of the corner of the existing seawall, the newly exposed corner area can be subtracted from the area of new encroachment to result in a net encroachment area. Since the corner area is approximately 32 square feet,[22] the overall net encroachment area is 201 square feet. Thus, the encroachment calculation for the alternative sea cave fill

-30 to +10 feet, or 40 feet total. This 40-foot by 1 foot square parallelogram could be built with 1.5 cubic yards of sand (40 cubic feet divided by 27 cubic feet per cubic yard). If the range of reversible sediment transport is 27 feet, it will take 1 cubic yards of sand to rebuild one square foot of beach; if the range of reversible sediment transport is larger than 40 feet, it will take more than 1.5 cubic yards of sand to rebuild one square foot of beach.

[20] If, however, the concrete fill were not erodable, there would be a passive erosion impact. The erodable fill allows this impact to be avoided.

[21] As measured from plans provided by the Applicants' consulting engineer (see Exhibit E).

[22] Id.

and seawall corner modification project is 201 square feet.[23] Using the same conversion factor described above, the sand volume equivalent for the direct loss of beach due to encroachment by the proposed project would be 900 cubic yards of beach-quality sand, and for the alternative project it would be 201 cubic yards of beach-quality sand.

Retention of Potential Beach Material

If natural erosion were allowed to continue (absent the proposed seawall), some amount of beach material would be added to the beach at this location, as well as to the larger littoral cell sand supply system fronting the bluffs. Because littoral drift at this location is from up to downcoast (towards the downcoast beaches of Capitola) the impact would be relatively more towards Capitola than upcoast along Opal Cliffs. The volume of total material that would have gone into the sand supply system over the lifetime of the shoreline structure would be the volume of material between (a) the likely future bluff face location with shoreline protection; and (b) the likely future bluff location without shoreline protection. Since the main concern is with the sand component of this bluff material, the total material lost must be multiplied by the percentage of bluff material which is beach sand, giving the total amount of sand which would have been supplied to the littoral system for beach deposition if the proposed device were not installed. The Commission has established a methodology for identifying this impact.[24] The Applicants indicate that this impact would be roughly 54 cubic yards of sand per year for the proposed seawall project. The Commission's geologist and engineer concur that this figure is consistent with the amount that would be determined using the Commission's methodology.

Alternatively, if the above-described sea cave fill (with erodable concrete) alternative were implemented, then this impact would be significantly reduced. Specifically, the cave opening is approximately 8 feet high (estimated from Photo 2, taken April 3, 2009 and attached to the 6/2009 HKA report) by 18 feet across (from 7/2009 HKA report). Assuming the 8-foot by 18-foot face extends to the back of the cave and that it would erode at the same 1 foot per year rate established for the rest of the bluff, then continued erosion of the back of the cave would also have contributed sand to the beach. Assuming the area of the back of the cave is 8 feet high by 18 feet wide, and that the erosion rate would be 1-foot per year, the erosion of the back of the cave would supply 144 cubic feet of sediment annually

[23] Although the fill would erode, this encroachment area and mitigation would remain the same. Specifically, the area that would have been exposed (absent the fill) would move from the back of the cave to the front of the cave fill, and the "lost" exposed beach area due to encroachment would remain over time even after the fill erodes. Thus, the impacts from one time relocation of the back beach location and relocation of the erodable portion of the bluff can be addressed by the described mitigation for cave fill encroachment.

[24] The equation is Vb = (S x W x L) x [(R x hs) + (1/2hu x (R + (Rcu - Rcs)))]/27. Where: Vb is the volume of beach material that would have been supplied to the beach if natural erosion continued (this is equivalent to the long-term reduction in the supply of bluff material to the beach resulting from the structure); S is the fraction of beach quality material in the bluff material; W is the width of property to be armored; L is the design life of structure, if assumed a value of 1, an annual amount is calculated; R is the long term average annual erosion rate; hs is the height of the shoreline structure; hu is the height of the unprotected upper bluff; Rcu is the predicted rate of retreat of the crest of the bluff during the period that the shoreline structure would be in place, assuming no seawall were installed (this value can be assumed to be the same as R unless the Applicant provides site-specific geotechnical information supporting a different value); Rcs is the predicted rate of retreat of the crest of the bluff, during the period that the seawall would be in place, assuming the seawall has been installed (this value will be assumed to be zero unless the Applicant provides site-specific geotechnical information supporting a different value); and divide by 27 (since the dimensions and retreat rates are given in feet and volume of sand is usually given in cubic yards, the total volume of sand must be divided by 27 to provide this volume in cubic yards, rather than cubic feet).

(8' x 18' x 1'/year = 144 cubic feet/year) or 5.3 cubic yards per year of sediment (144 cubic feet/27cubic feet/cubic yard). The cave has formed entirely in the Purisima Formation and this material has been found to contain approximately 60% sand. Thus, the 5.3 cubic yards of sediment per year would yield 3.2 cubic yards of sand per year (5.3 cubic yards/year x 0.60 = 3.2 cubic yards/year). Given the cave is roughly 10 feet deep on average (see Exhibit E), and further applying the 1-foot per year erosion rate to the erodable sea cave fill, this material will be blocked for 10 years. Thus, over the life of the approved alternative project, 32 cubic yards of sand would be retained.[25]

Thus, the approvable project would result in a retention impact of 3.2 cubic yards per year of beach-quality sand over ten years (32 cubic yards total), while the proposed project would result in a retention impact of 54 cubic yards per year of beach-quality sand. In other words, the retention impact would be significantly reduced with the smaller fill project as compare to the proposed project.

Beach and Sand Supply Impacts Conclusion

The proposed project would be expected to result in a quantifiable beach and sand supply impacts. There would be a beach loss due to encroachment and passive erosion of 986 cubic yards for the first year and 86 cubic yards each year thereafter, and there would be a direct sand loss due to retention of bluff material of 54 cubic yards of sand each year. If these impacts were to be mitigated through a beach nourishment effort, the impacts would be comparable to the deposition of 1,040 cubic yards of beach-quality sand for the first year and 140 cubic yards per year thereafter. The Applicants have not proposed any mitigation for these impacts. Without compensating mitigation, the proposed project is inconsistent with the fourth test of Section 30235.

With the alternative sea cave fill and seawall corner modification project, the quantifiable beach and sand supply impacts would be greatly minimized to an impact of 233 cubic yards of sand over the life of the project.[26] This is a substantially smaller impact than that of the proposed project. Even so, this means that even the alternative project has sand supply impacts that are not completely eliminated, albeit that are significantly less than the proposed project. Nonetheless, Coastal Act Section 30235 requires that these impacts be mitigated.

It has proven difficult over the years to identify appropriate mitigation for such impacts. Partly this is because creating an offsetting beach area is not an easy task, and finding appropriate properties that could be set aside to become beach area over time (through natural processes, including erosion) is difficult both due to a lack of such readily available properties and the cost of such coastal real estate

[25] Note that the sea cave fill will impact the way the surrounding bluff area makes its way into the sand supply system (because it will reduce potential for bluff collapse and associated transport of such materials into the system), but this difference is not critical for this calculation. Specifically, the sea cave fill would erode along with the upcoast unarmored bluff and the material in the bluff above the cave fill will still be able to reach the coast due to bluff retreat and subaerial erosion in the same way as the unarmored bluffs upcoast. The installation of the cave fill should prevent the material from being delivered to the coast in an abrupt cave collapse, but, over time, the material will be delivered in small, incremental amounts that would compare with the amounts supplied by the upcoast, unarmored bluffs. Any relative difference in this respect is adequately captured by the conservative assumption that the 8-foot by 18-foot face extends to the back of the cave and that it would erode at the same 1 foot per year rate established for the rest of the bluff.

[26] 201 cubic yards of sand associated with encroachment, and 32 cubic yards of sand associated with retention of sand.

more broadly. As a proxy, other types of mitigation typically required by the Commission for such direct sand supply impacts have been in-lieu fees and/or beach nourishment, and in some cases compensatory beach access improvements. With regards to beach nourishment, a formal sand replenishment strategy can introduce an equivalent amount of sandy material back into the system over time to mitigate the loss of sand that would be caused by a protective device over its lifetime. Obviously, such an introduction of sand, if properly planned, can feed into the Santa Cruz Littoral Cell sand system to mitigate the impact of the project. However, as opposed to other areas with established programs (e.g., SANDAG in San Diego) there are not currently any existing beach nourishment programs directed at this beach area. Absent a comprehensive program that provides a means to coordinate and maximize the benefits of mitigation efforts in the area now and in the future, the success of piecemeal mitigation efforts, such as an Applicant-only project to drop equivalent amounts of sand over time at this location, is questionable.

With respect to using beach access improvements to offset impacts, such mitigation is typically applied by the Commission to public agencies that are in the beach management business when they have applied for armoring projects.[27] It is more difficult to put the burden for a public project on a private applicant and thus such mitigation is atypical.[28] In addition, the Commission is currently unaware of any specific projects in the Capitola area that could benefit from such mitigation at this time.

As an alternative mitigation mechanism, the Commission oftentimes uses an in-lieu fee when in-kind mitigation of impacts is not available.[29] In situations where ongoing sand replenishment or other appropriate mitigation programs are not yet in place, the in-lieu mitigation fee is deposited into an account until such time as an appropriate program is developed, and the fees can then be used to offset the designated impacts. When mitigation funds are pooled in this way for multiple projects in a certain area, the cumulative impacts can also be better addressed inasmuch as the pooled resources can sometimes provide for a greater mitigation impact than a series of smaller mitigations based on individual impacts and fees. In this case, the Commission finds that an in-lieu fee is the most appropriate and reasonable mitigation method, given the above described factors.

Thus, in order to mitigate for the approvable project's identified sand supply impact (and others related to it that are linked to beach recreational access loss and public view impacts),[30] this approval is conditioned for an in-lieu fee (see Special Condition 11). The fee is based on the volume of sand equivalent to the quantified impacts and the cost to replace this volume of sand.[31] The cost to supply

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[27] For example, as recently required with respect to recreational access improvements along the Pleasure Point shoreline area of Santa Cruz County as part of the Commission's approval of a seawall fronting East Cliff Drive (CDPs A-3-SCO-07-015 and 3-07-019, approved December 13, 2007).

[28] Although the Commission has applied such a requirement for this type of impact before (see, for example, CDP 3-02-107, Podesto).

[29] See, for example, CDP A-3-SLO-01-040 (Brett), CDP 3-98-102 (Panattoni) and CDP 3-97-065 (Motroni-Bardwell).

[30] See also public viewshed findings, and public access and recreation findings that follow.

[31] As previously noted, the Applicants have not identified any impact to beach sand resources or any proposed mitigation. The sand supply method has been used in many cases by the Commission, although other methods have also been used, such as recent cases where beach surveys have been used to establish recreational values of beaches. In this case, beach use data and survey information are not

beach quality sand is about $42 per cubic yard in the Capitola area.[32] At $42 per cubic yard, the 233 cubic yards of sand translates into a fee of $9,786 to be paid into a fund for beach access improvements.[33]

Under Special Condition 11, the fee must be deposited into an interest-bearing account to be established and managed by the City of Capitola or another appropriate entity. The sole purpose of the fee/account shall be for public beach recreational access improvements at beaches within Capitola's city limits. Consistent with current Commission practice regarding shoreline protective devices, as the sea cave fill erodes away, the sea cave fill will need to be replaced. This replacement would require either a permit amendment or a new permit and the need for a new fee (or other mitigation) would be evaluated at that time.

As conditioned, the project satisfies the Coastal Act Section 30235 requirements regarding mitigation for sand supply impacts.[34]

E. Geologic Conditions and Hazards Conclusion

The proposed project does not meet the Section 30235 tests, fundamentally because the existing residential structure on the Green Valley Corporation is not in danger from erosion. Also, as discussed above, shoreline armoring to protect the Green Valley Corporation residence is prohibited. The Swan residence, however, does meet the Section 30235 tests and as such, does qualify for shoreline protection. Armoring beyond the existing cave (i.e. the proposed project) results in significantly greater impacts to coastal resources and results in protection of the Green Valley Corporation residence, inconsistent with the base CDP. The proposed project cannot be found consistent with the Coastal Act. It is true that in order to provide protection for the Swan residence it will be necessary to extend armoring onto the Green Valley Corporation property. But it is also true that such armoring can be limited to that necessary to protect the Swan residence. In other words, even the alternative project will lead to some armoring that protects the Green Valley Corporation residence, but this is unavoidable if the Coastal Act protection afforded the Swan residence is to be realized. Only a smaller amount of armoring is needed to protect the Swan residence, and only this amount of armoring can be found Coastal Act consistent (see Special Condition 1).

Although reduced, even the approvable alternative has a number of unavoidable impacts on the coast, including but not limited to the impacts from encroachment of the sea cave fill onto the beach. Special

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readily available for this beach area, and it would be both costly and difficult to develop such information now. As a result, and as has been done in the past by the Commission, the sand replacement cost method is applied to this case.

[32] This figure is based on an estimate from Graniterock, which is a commercial sand supplier in the vicinity of the project, as well as from other experiences the Commission has had calculating sand supply costs statewide. Based on the specific characteristics of this project, as well as comparisons to other similar type projects, a cost of $42 per cubic yard of beach sand delivered to the project site is reasonable.

[33] Note that it is possible that updated costs may be obtained to refine this figure. Specifically, if the Applicants submit three bids for the cost of delivered beach quality sand that average to an amount different than $42 per cubic yard, and the bids have been reviewed and approved by the Executive Director, this fee may be adjusted to the average for these three bids.

[34] Note that the proposed project, on the other hand, cannot be found consistent in this respect because it lacks sand supply mitigation.

Condition 1 of this approval requires submission of revised project plans consistent with Alternatives C and G as identified by the Applicants (see pages 1 and 3 of Exhibit D). The project is also conditioned to require an in-lieu fee of $9,786 payable to the City of Capitola or another appropriate entity to mitigate for the project's impacts to sand supply (Special Condition 11), and is also conditioned to require review and approval from the Monterey Bay National Marine Sanctuary and the State Lands Commission[35] (see Special Conditions 9 and 10).

Given that the approvable project consists partially of an erodable sea cave fill, this approval is also conditioned to require monitoring (Special Condition 7) of the sea cave fill to ensure that it is eroding at a rate similar to the surrounding unarmored bluff, with maintenance requirements to modify the face of the fill if it is eroding at a slower rate than the surrounding unarmored bluff. Such future monitoring and maintenance activities must be understood in relation to clear as-built plans. Therefore, Special Condition 6 of this approval requires the submittal of as-built plans to define the footprint and profile of the permitted development.

In terms of recognizing and assuming the hazard risks for shoreline development, the Commission's experience in evaluating proposed developments in areas subject to hazards has been that development has continued to occur despite periodic episodes of heavy storm damage and other such occurrences. Development in such dynamic environments is susceptible to damage due to such long-term and episodic processes. Past occurrences statewide have resulted in public costs (through low interest loans, grants, subsidies, direct assistance, etc.) in the millions of dollars. As a means of allowing continued development in areas subject to these hazards while avoiding placing the economic burden for damages onto the people of the State of California, applicants are regularly required to acknowledge site hazards and agree to waive any claims of liability on the part of the Commission for allowing the development to proceed.

There are inherent risks associated with development on and around seawalls and eroding bluffs in a dynamic coastal bluff environment; this applies to the project proposed as well as for the development landward of the bluffs themselves. The approved project, and all development inland of it, is likely to be affected by shoreline erosion in the future. Although the Commission has sought to minimize the risks associated with the development proposed in this application (and in past actions with other development at this location), the risks cannot be eliminated entirely. Given that the Applicants have chosen to pursue development despite these risks, the Applicant must again assume these risks. Accordingly, this approval is conditioned for the Applicant to assume all risks for developing at this location (see Special Condition 12).

To ensure future property owners are properly informed regarding the terms and conditions of this approval, this approval is also conditioned for deed restrictions to be recorded against each of the properties involved in the application (see Special Condition 14).

Finally, this permit amends Special Condition 3f of CDP A-3-CAP-99-023 to allow for the

[35] The State Lands Commission indicates that the proposed seawall is located on State Lands' property and that the sea cave fill area may be located on State Lands' property as well.

implementation of the approved project alternative relative to the Green Valley Corporation property while otherwise maintaining the prohibition on shoreline armoring on this property (see Special Condition 2).

As conditioned, the project can be found consistent with the hazard polices of the Coastal Act as cited in this finding.

B. Public Access and Recreation

1. Applicable Policies

Coastal Act Section 30604(c) requires that every coastal development permit issued for any development between the nearest public road and the sea "shall include a specific finding that the development is in conformity with the public access and public recreation policies of [Coastal Act] Chapter 3." The proposed project is located seaward of the first through public road (Cliff Drive). Coastal Act Sections 30210 through 30214 and 30220 through 30224 specifically protect public access and recreation. In particular:

> ***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.*
>
> ***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.*
>
> ***30213.*** *Lower cost visitor and recreational facilities shall be protected, encouraged, and, where feasible, provided. Developments providing public recreational opportunities are preferred. …*
>
> ***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.*
>
> ***30223.*** *Upland areas necessary to support coastal recreational uses shall be reserved for such uses, where feasible.*

Coastal Act Section 30240(b) also protects parks and recreation areas, such as the adjacent beach area. Section 30240(b) states:

> ***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.*

These overlapping policies clearly protect the beach (and access to and along it) and offshore waters for public access and recreation purposes, particularly free and low cost access.

2. Analysis

According to the Applicants' representative, the proposed seawall would occupy about 900 square feet of beach space.[36] The effect of covering a portion of this beach area with the proposed seawall would be to remove a portion of the beach from use. Because the beach here is accessible only at low tides, and is not heavily used, this impact would be relatively small. That said, this loss of beach area is still an impact caused by the proposed project.

Furthermore, as noted above in the discussion of sand supply impacts, in addition to the direct loss of useable recreational beach area, the introduction of the proposed seawall would have a number of effects on the dynamic shoreline system and the public's beach use interests. First, the proposed seawall would lead to a progressive loss of sand as the seawall prevents bluff retreat because the retained bluff material would not be available to nourish the sand supply system. Second, and particularly in combination with the loss of sand generating materials, the proposed seawall would fix the back beach location. The effect on public use would be a narrowing of useable beach space; eventually this beach area between the proposed seawall and the water would be expected to disappear. Third, changes in the shoreline profile, particularly changes in the slope of the profile that result from a reduced beach width, alter the useable beach area restricted for public access. A beach that rests either temporarily or permanently at a steeper angle than under normal conditions will have less horizontal distance available for the public to use. This reduces the actual area in which the public can pass along the beach. Fourth, the proposed seawall would cumulatively affect public access by causing accelerated or increased erosion on the adjacent beaches. Ultimately, the proposed project would result in the loss of beach altogether at this location.

As discussed above, there is an alternative that does not involve extension of a 115-foot-long seawall across the Green Valley Corporation bluff-toe, but that will provide the necessary protection under the Coastal Act for the Swan residence and reduce the amount of wave reflection onto the Green Valley Corporation bluff-toe; specifically, a reduced scale project directed at the sea cave area and reconfiguration of the upcoast end of the existing Swan seawall (see previous hazards finding for detail). The armoring under this alternative would not lead to passive erosion, and thus would not lead to the types of impacts described above associated with it. The armoring under this approvable alternative would include about 201 net square feet of beach encroachment, which is substantially less armoring across the Green Valley Corporation bluff face than under the proposed project. In addition, the amount of beach sand retained would be significantly reduced from 54 cubic yards per year under the proposed project to 3.2 cubic yards per year, and 32 cubic yards over its lifetime, for the approvable alternative project. Thus, implementation of this reduced alternative (based on the Applicants' Alternatives C and G as shown in Exhibit D and as depicted alone in Exhibit E, and as required by Special Condition 1) will result in fewer impacts to public access due to elimination of passive erosion impacts, significantly reduced encroachment of the back beach area, and significantly reduced retention of sand compared

[36] *Proposed Swan Seawall Repair* by Rogers E. Johnson & Associates, dated September 13, 2007.

with the proposed project.

As stated above, the beach below the Swan and Green Valley Corporation properties is accessible only at low tides, and is not heavily used. However, during construction, which is expected to last about a month, beach access would effectively be precluded at this site and would be adversely affected from the Capitola wharf to the project site, including the very popular Hooper Beach area. This is also the case with the approvable alternative project, albeit likely at a much lesser scale/duration given the much reduced scope of development. The approvable alternative project will also require regular monitoring and maintenance to ensure that the sea cave fill is eroding at a rate similar to the surrounding unarmored bluff (see Special Conditions 7 and 8). Maintenance of the approvable alternative project will also have these same types of public beach access impacts. To minimize these impacts to beach access, the project is conditioned to minimize construction and maintenance encroachment on the beach and all beach access points and to prohibit construction and maintenance activities from taking place during the summer or on weekends, when recreational use is likely highest. In addition, to provide maximum information to the beach-going public during all construction, the Applicants must maintain copies of the CDP and approved plans available for public review at the construction site, as well as provide a construction coordinator whose contact information is posted at the site to respond to any problems and/or inquiries that might arise (see Special Conditions 3 and 4).

Although the required construction conditions can minimize the impacts of this project on beach goers, the conditions cannot completely compensate for the unavoidable degradation of the usual beach recreational experience available at this location, including the overall diminution of aesthetics and ambiance, due to the proposed project. To offset these impacts to the recreational beach, mitigation is necessary. Therefore, the approved project includes an in-lieu fee of $9,786 that will be applied to improve beach recreational access in the Capitola area (see Special Condition 11). Also, Special Condition 13 requires that the Applicants acknowledge that issuance of the CDP does not constitute a waiver of any public rights which may exist on the subject properties. As conditioned, the project is consistent with the Coastal Act access and recreation policies sited above.

C. Visual Resources

1. Applicable Policies

Coastal Act Section 30251 states:

> ***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. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.*

Coastal Act Section 30240(b), previously cited, also protects the aesthetics of beach recreation areas such as those seaward of the bluffs here. Section 30240(b) states:

> ***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.*

2. Analysis

Much of the localized area has already been altered by shoreline armoring, including the substantial gravity seawall at the toe of the bluff below the Swan residence. In terms of public viewshed impacts, the proposed seawall would cover and alter a natural, undulating coastal landform located adjacent to a beach. As a result, the proposed seawall could negatively impact the public viewshed as seen from the beach and the nearby Capitola wharf. However, because the beach here is accessible only at low tides, and is not heavily used, this impact would be relatively small.

The proposed seawall would be designed to mimic natural bluff forms in the vicinity. If successful in this respect, this impact would be more in terms of eliminating natural landform undulations and replacing those with more of a linear bluff appearance. Both can capture the essence of this stretch of coastline; thus, visually, and particularly given that the primary public view is a distant view from the wharf, a successfully camouflaged project would have minimal visual impacts. If not successful, the proposed seawall would adversely affect the overall public viewshed and aesthetic by introducing an obviously artificial structure along the lower bluff directly adjacent to the back beach area. The Commission has had experience with both successful camouflaging and unsuccessful camouflaging in this respect, and much of the outcome is predicated on the skill of the contractors performing the work as much as anything else.

On the other hand, in terms of public views, the alternative approvable project consisting of a sea cave fill and modification of the upcoast portion of the Swan seawall will result in much more limited visual impacts, as compared to the seawall project proposed by the Applicants. Specifically, the orientation of the sea cave fill relative to the wharf view is such that the sea cave fill should be only minimally visible from the wharf. The sea cave fill can be colored to ensure its visible components, as well as the modified corner of the existing Swan seawall, effectively blend in with the natural bluff color. To further offset the visual impacts of the approvable alternative, Special Condition 5 requires that erodable concrete used to fill the sea cave, as well as any concrete facing on the modified upcoast end of the Swan seawall, be colored to mimic the natural bluff face.[37] As conditioned, the project will minimize visual impacts along this public beach area and will not significantly alter scenic public views. Thus, the project, as

[37] The Commission also usually requires that seawalls, including sea cave fills, be textured and contoured to match the natural undulations and texture of the surrounding natural bluff face. In this case, the approvable project consists of a sea cave fill with erodable concrete. Any surface texturing or contouring of the sea cave fill would be expected to erode away quickly, perhaps with each storm season. Thus, to avoid the need for frequent (e.g., yearly, or even more frequent) surface maintenance of the sea cave fill, this approval is conditioned to require only that the concrete used be colored to mimic the surrounding natural bluff face. Such a performance standard makes sense in this case given that the primary public view is distant, and close-up views are much more limited.

revised, is consistent with Sections 30251 and 30240(b) of the Coastal Act.

D. Marine Resources

The Coastal Act protects the marine resources and habitat offshore of this site. Coastal Act Sections 30230 and 30231 provide:

> ***Section 30230.*** *Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*
>
> ***Section 30231.*** *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

As proposed by the Applicants, the project would include work from a crane-supported platform located in the parking area between the two properties to allow installation of soil nails and rock anchors. The project would also require the movement of large equipment, workers, and supplies during periods of low tides to gain access to the site; include large equipment operations on the beach area fronting the site; include substantial concrete and other work on the beach; and potentially encroach on Sanctuary and State Lands waters (depending on tides).

The approvable alternative (a sea cave fill and modification of the upcoast end of the existing Swan seawall) will require similar construction methods as described above, although these construction methods would be reduced in scope and impact due to the greatly reduced footprint and scale of these alternatives. To protect marine resources and offshore habitat, Special Conditions 3 and 4 require that these impacts be contained through construction parameters that limit the area of construction, clearly fence off the minimum construction area necessary, keep equipment out of Sanctuary and State Lands waters, require off-beach equipment and material storage during non-construction times, require construction documents to be kept at the site for inspection, require a construction coordinator to be available to respond to inquires, and clearly delineate and avoid to the maximum extent feasible beach use areas. As conditioned, the project is consistent with Coastal Act Sections 30230 and 30231 regarding protection of marine resources and offshore habitat.

3. Conditions of Approval

A. Standard Conditions

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

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

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

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

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

B. Special Conditions

1. **Revised Project Plans.** PRIOR TO ISSUANCE OF THIS AMENDMENT TO COASTAL DEVELOPMENT PERMIT A-3-CAP-99-023, the Permittees shall submit for Executive Director review and approval two full-size sets of revised project plans that are substantially in conformance with Alternatives C and G as described in the *Updated Alternatives Analysis Table* by Haro, Kasunich and Associates, Inc. (Exhibit D) dated June 10, 2009 and the schematic in the *Addendum Alternative 'C/D – G' Description and Schematic* by Haro, Kasunich and Associates, Inc., dated July 23, 2009 (Exhibit E). Specifically, the revised plans shall provide for: (a) a sea cave fill with erodable concrete that erodes at a rate similar to the surrounding unarmored bluff face (i.e., 1.0 feet per year), and shall include evidence demonstrating the manner in which the concrete is to be made to erode at such a rate; and (b) a realignment of the upcoast end of the existing Swan seawall by removing the corner of the seawall at an approximately 45 degree angle to decrease wave turbulence and wave reflection onto the Green Valley Corporation property. The revised plans shall also require that any large sections of sea cave fill that fall to the beach are immediately removed and disposed of properly. The Permittees shall undertake development in accordance with the approved revised plans.

2. **Revised Special Condition 3.** Special Condition 3 of CDP A-3-CAP-99-023 (which applies to the Green Valley Corporation (APN 034-081-02) property only) is revised to read as follows (revised language is shown with underline):

   Assumption of Risk, Waiver of Liability and Indemnity Agreement. By acceptance of this

permit, the Permittee acknowledges and agrees: (a) that the site is subject to hazards from episodic and long-term bluff retreat and coastal erosion; (b) to assume the risks to the Permittee and the property that is the subject of this permit of injury and damage from such hazards in connection with this permitted development; (c) to unconditionally waive any claim of damage or liability against the Commission, its officers, agents, and employees for injury or damage from such hazards; (d) 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; (e) that any adverse effects to property caused by the permitted project shall be fully the responsibility of the landowner; and (f) that the Permittee shall not construct, now or in the future, any shoreline protective device(s) (except for that approved pursuant to CDP A-3-CAP-99-023-A1, which is the minimum necessary to protect the adjacent Swan residence) for the purpose of protecting the residential development approved pursuant to coastal development permit A-3-CAP-99-023 including, but not limited to, the residence, foundations, decks, driveways, or the septic system in the event that these structures are threatened with imminent damage or destruction from waves, erosion, storm conditions, or other natural hazards in the future and by acceptance of this permit, the Permittee hereby waives any rights to construct such devices that may exist under Public Resources Code Section 30235 or City of Capitola LCP Zoning Section 17.48.090.

PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, the Permittee shall execute and record a deed restriction, in a form and content acceptable to the Executive Director incorporating all of the above terms of this condition. The deed restriction shall include a legal description of the Permittee's entire parcel. The deed restriction shall run with the land, binding all successors and assigns, and shall be recorded free of prior liens that the Executive Director determines may affect the enforceability of the restriction. This deed restriction shall not be removed or changed without a Commission amendment to this coastal development permit.

3. **Construction Plan.** PRIOR TO COMMENCEMENT OF CONSTRUCTION the Permittees shall submit two sets of a Construction Plan to the Executive Director for review and approval. The Construction Plan shall, at a minimum, include the following:

   (a) Construction Areas. The Construction Plan shall identify the specific location of all construction areas, all staging areas, all storage areas, all construction access corridors (to the construction site and staging areas), and all public pedestrian access corridors. All such areas within which construction activities and/or staging are to take place shall be minimized to the maximum extent feasible in order to minimize construction encroachment on the beach, Cliff Drive, and all beach access points, and to have the least impact on public access.

   (b) Construction Methods and Timing. The Construction Plan shall specify the construction methods to be used, including all methods to be used to keep the construction areas separated from public recreational use areas (including using the space available on the blufftop portions of

the Permittees' properties for staging, storage, and construction activities to the maximum extent feasible, and including using unobtrusive fencing (or equivalent measures) to delineate construction areas). All erosion control/water quality best management practices to be implemented during construction and their location shall be noted.

(c) Property Owner Consent. The Construction Plan shall be submitted with written evidence indicating that the owners of any properties on which construction activities are to take place, including properties to be crossed in accessing the site, consent to such use of their properties.

(d) Construction Requirements. The Construction Plan applies to initial installation of the sea cave fill, as well as maintenance of the sea cave fill to ensure that it is eroding at the same rate as the surrounding unarmored bluff face. The Construction Plan shall include the following construction requirements specified by written notes on the Construction Plan. Minor adjustments to the following construction requirements may be allowed by the Executive Director if such adjustments: (1) are deemed reasonable and necessary; and (2) do not adversely impact coastal resources.

- All work shall take place during daylight hours and lighting of the beach area is prohibited.
- Construction work or equipment operations shall not be conducted below the mean high tide line unless tidal waters have receded from the authorized work areas.
- Grading of intertidal areas is prohibited.
- Only rubber-tired construction vehicles are allowed on the beach, except track vehicles may be used if the Executive Director agrees that they are required to safely carry out construction. When transiting on the beach, all such vehicles shall remain as high on the upper beach as possible and avoid contact with ocean waters and intertidal areas.
- All construction materials and equipment placed on the beach during daylight construction hours shall be stored beyond the reach of tidal waters. All construction materials and equipment shall be removed in their entirety from the beach area by sunset each day that work occurs. The only other exceptions shall be for erosion and sediment controls and/or construction area boundary fencing where such controls and/or fencing are placed as close to the toe of the seawall/revetment as possible, and are minimized in their extent.
- Construction (including but not limited to construction activities, and materials and/or equipment storage) is prohibited outside of the defined construction, staging, and storage areas.
- No work shall occur during weekends and/or the summer peak months (i.e., from the Saturday of Memorial Day weekend through Labor Day, inclusive) unless, due to extenuating circumstances (such as tidal issues or other environmental concerns), the Executive Director authorizes such work.

- Equipment washing shall not take place on the beach; refueling and/or servicing of equipment shall be allowed only at a designated location as noted on the Plan. Appropriate best management practices shall be used to ensure that no spills of petroleum products or other chemicals take place during these activities.

- The construction site shall maintain good construction site housekeeping controls and procedures (e.g., clean up all leaks, drips, and other spills immediately; keep materials covered and out of the rain, including covering exposed piles of soil and wastes; dispose of all wastes properly, place trash receptacles on site for that purpose, and cover open trash receptacles during wet weather; remove all construction debris from the beach; etc.).

- All erosion and sediment controls shall be in place prior to the commencement of construction as well as at the end of each workday. At a minimum, silt fences, or equivalent apparatus, shall be installed at the perimeter of the construction site to prevent construction-related runoff and/or sediment from entering into the Pacific Ocean.

- All beach areas and all beach access points impacted by construction activities shall be restored to their pre-construction condition or better within three days of completion of construction. Any beach sand impacted shall be filtered as necessary to remove all construction debris from the beach.

- The Permittees shall notify planning staff of the Coastal Commission's Central Coast District Office at least three working days in advance of commencement of construction or maintenance activities, and immediately upon completion of construction or maintenance activities.

All requirements above and all requirements of the approved Construction Plan shall be enforceable components of this coastal development permit. The Permittees shall undertake development in accordance with the approved Construction Plan. Any proposed changes to the Construction Plan shall be reported to the Executive Director. No changes to the approved Construction Plan shall occur without a Commission amendment to this permit unless the Executive Director determines that no amendment is legally necessary.

4. Construction Site Documents & Construction Coordinator. DURING ALL CONSTRUCTION:

(a) Construction Site Documents. Copies of the signed coastal development permit and the approved Construction Plan shall be maintained in a conspicuous location at the construction job site at all times, and such copies shall be available for public review on request. All persons involved with the construction shall be briefed on the content and meaning of the coastal development permit and the approved Construction Plan, and the public review requirements applicable to them, prior to commencement of construction.

(b) Construction Coordinator. A construction coordinator shall be designated to be contacted during construction should questions arise regarding the construction (in case of both regular

inquiries and emergencies), and their contact information (i.e., address, phone numbers, etc.) including, at a minimum, a telephone number that will be made available 24 hours a day for the duration of construction, shall be conspicuously posted at the job site where such contact information is readily visible from public viewing areas, along with indication that the construction coordinator should be contacted in the case of questions regarding the construction (in case of both regular inquiries and emergencies). The construction coordinator shall record the name, phone number, and nature of all complaints received regarding the construction, and shall investigate complaints and take remedial action, if necessary, within 24 hours of receipt of the complaint or inquiry.

5. **Concrete Color.** All concrete used for the sea cave fill and the surface of the modified upcoast end of the existing Swan seawall shall mimic the mottled color of the surrounding natural bluff face. Any protruding concrete elements (e.g., corners, edges, etc.) shall be contoured in a non-linear manner to the maximum extent feasible to evoke natural bluff undulations.

6. **As-Built Plans.** WITHIN TWO (2) MONTHS OF COMPLETION OF CONSTRUCTION, the Permittees shall submit two copies of As-Built Plans showing all development completed pursuant to this coastal development permit amendment; all property lines; and all residential development inland of the seawall structure and sea cave fill. The As-Built Plans shall be substantially consistent with the approved final plans (see Special Condition 1), including providing for all of the same requirements specified there, and shall account for all of the parameters of Special Condition 7 (Monitoring) and Special Condition 8 (Future Maintenance). The As-Built Plans shall include a graphic scale and all elevation(s) shall be described in relation to National Geodetic Vertical Datum (NGVD). The As-Built Plans shall include color photographs (in hard copy and jpg format) that clearly show the as-built project, and that are accompanied by a site plan that notes the location of each photographic viewpoint and the date and time of each photograph. At a minimum, the photographs shall be from upcoast, seaward, and downcoast viewpoints; from several locations on the Capitola Wharf, including the seaward end; and from a sufficient number of beach viewpoints as to provide complete photographic coverage of the sea cave fill and modified upcoast end of the Swan seawall at a scale that allows comparisons to be made with the naked eye between photographs taken in different years and from the same vantage points. The As-Built Plans shall be submitted with certification by a licensed civil engineer with experience in coastal structures and processes, acceptable to the Executive Director, verifying that the seawall has been constructed in conformance with the approved final plans described by Special Condition 1 above.

7. **Monitoring.** The Permittees shall ensure that the condition and performance of the as-built project is regularly monitored by a licensed civil engineer with experience in coastal structures and processes. Such monitoring evaluation shall at a minimum address whether the sea cave fill is eroding at a rate similar to the surrounding unarmored bluff face. Monitoring reports prepared by a licensed civil engineer with experience in coastal structures and processes, and covering the above-described evaluations, shall be submitted to the Executive Director for review and approval at three-year intervals by May 1st of each third year (with the first report due May 1, 2012, and subsequent reports due May 1, 2015, May 1, 2018, and so on) for as long as the approved project exists at this

location. The reports shall identify any recommended actions necessary to maintain the approved project in a structurally sound manner and its approved state, including providing for removal from the beach of any sizeable chunks (greater in size than gravel) of sea cave fill erodable concrete, and shall include photographs taken from each of the same vantage points as required in the as-built plans (see Special Condition 6) with the date and time of the photographs and the location of each photographic viewpoint noted on a site plan.

8. **Future Maintenance.** Coastal development permit amendment A-3-CAP-09-023-A1 authorizes future maintenance as described in this special condition. The Permittees acknowledge and agree, on behalf of themselves and all successors and assigns that: (a) it is the Permittees' responsibility to maintain the sea cave fill and modified upcoast end of the Swan seawall in a structurally sound manner and in their approved state; (b) it is the Permittees' responsibility to remove all debris that may fall from the blufftop area onto the beach below. Any such development, or any other maintenance development associated with the as-built sea cave fill or modified upcoast end of the Swan seawall shall be subject to the following:

   a. **Maintenance.** "Maintenance," as it is understood in this condition, means development that would otherwise require a coastal development permit whose purpose is to repair, reface, and/or otherwise maintain the approved sea cave fill and modified upcoast end of the seawall in their approved state, including to ensure that the sea cave fill is eroding at a rate similar to the adjacent unarmored bluff face.

   b. **Maintenance Parameters.** Maintenance shall only be allowed subject to the parameters of the approved Construction Plan required by Special Condition 3. Any proposed modifications to the approved construction plan and/or beach restoration requirements associated with any maintenance event shall be reported to planning staff of the Coastal Commission's Central Coast District Office with the maintenance notification (described below), and such changes shall require a coastal development permit amendment unless the Executive Director deems the proposed modifications to be minor in nature (i.e., the modifications would not result in additional coastal resource impacts).

   c. **Other Agency Approvals.** The Permittees acknowledge that these maintenance stipulations do not obviate the need to obtain permits from other agencies for any future maintenance and/or repair episodes.

   d. **Maintenance Notification.** At least 2 weeks prior to commencing any maintenance event, the Permittees shall notify, in writing, planning staff of the Coastal Commission's Central Coast District Office. The notification shall include a detailed description of the maintenance event proposed, and shall include any plans, engineering and/or geology reports, proposed changes to the maintenance parameters, other agency authorizations, and other supporting documentation describing the maintenance event. The maintenance event shall not commence until the Permittees have been informed by planning staff of the Coastal Commission's Central Coast District Office that the maintenance event complies with this coastal development permit

amendment. If the Permittees have not received a response within 30 days of receipt of the notification by the Coastal Commission's Central Coast District Office, the maintenance event shall be authorized as if planning staff affirmatively indicated that the event complies with this coastal development permit amendment. The notification shall clearly indicate that the maintenance event is proposed pursuant to this coastal development permit amendment, and that the lack of a response to the notification within 30 days of its receipt constitutes approval of it as specified in the permit.

e. Maintenance Coordination. Maintenance events shall, to the degree feasible, be coordinated with other maintenance events proposed in the immediate vicinity with the goal being to limit coastal resource impacts, including the length of time that construction occurs in and around the beach area and beach access points at Capitola Beach. As such, the Permittees shall make reasonable efforts to coordinate the Permittees' maintenance events with other events, including adjusting maintenance event scheduling as directed by planning staff of the Coastal Commission's Central Coast District Office.

f. Non-compliance Proviso. If the Permittees are not in compliance with the conditions of this permit at the time that a maintenance event is proposed, then the maintenance event that might otherwise be allowed by the terms of this future maintenance condition shall not be allowed by this condition.

g. Emergency. Nothing in this condition shall serve to waive any Permittee rights that may exist in cases of emergency pursuant to Coastal Act Section 30611, Coastal Act Section 30624, and Subchapter 4 of Chapter 5 of Title 14, Division 5.5, of the California Code of Regulations (Permits for Approval of Emergency Work).

h. Duration of Covered Maintenance. Future maintenance under this coastal development permit is allowed subject to the above terms for ten (10) years from the date of approval (i.e., until August 12, 2019). Maintenance can be carried out beyond the 10-year period if the Executive Director extends the maintenance term in writing.

i. Sea Cave Fill Rate of Erosion. If the sea cave fill is eroding at a slower rate than the surrounding unarmored bluff face, the exterior portion of the sea cave fill shall be modified during any maintenance event by "shaving" or otherwise removing portions of the sea cave fill to match the landward configuration of the surrounding natural bluff face. Any sizeable chunks (greater in size than gravel) of sea cave fill erodable concrete that are the end result of such shaving shall be removed from the beach.

9. MBNMS Review. PRIOR TO COMMENCEMENT OF CONSTRUCTION, the Permittees shall submit to the Executive Director for review a copy of the Monterey Bay National Marine Sanctuary (MBNMS) permit, letter of permission, or evidence that no MBNMS permit is necessary for the approved project. Any changes to the approved project required by the Sanctuary shall be reported to the Executive Director. No changes to the approved project shall occur without a Commission

amendment to this coastal development permit unless the Executive Director determines that no amendment is legally necessary.

10. **State Lands Commission Authorization.** PRIOR TO COMMENCEMENT OF CONSTRUCTION, the Permittees shall submit to the Executive Director for review a copy of the State Lands Commission authorization to allow the approved project, or evidence that no State Lands Commission authorization is necessary. Any changes to the approved project required by the State Lands Commission shall be reported to the Executive Director. No changes to the approved project shall occur without a Commission amendment to this coastal development permit unless the Executive Director determines that no amendment is necessary.

11. **Public Access/Sand Supply Mitigation.** PRIOR TO ISSUANCE OF THIS AMENDMENT TO COASTAL DEVELOPMENT PERMIT A-3-CAP-99-023, the Permittees shall submit to the Executive Director evidence that a public access/sand supply mitigation fee of $9,786 has been deposited into an interest-bearing account to be established and managed by the City of Capitola or another appropriate entity as approved by the Executive Director. The sole purpose of the fee/account shall be for public beach recreational access improvements (such as benches, picnic tables, trail improvements, interpretive signage, sand replenishment, etc.) in the City of Capitola. PRIOR TO ISSUANCE OF THIS COASTAL DEVELOPMENT PERMIT AMENDMENT TO A-3-CAP-99-023, if the Applicants submit three bids for the cost of delivered beach quality sand that average to an amount less or more than $42 per cubic yard and the bids have been reviewed and approved by the Executive director, this fee may be adjusted to the average for these three bids. The entire fee and any accrued interest shall be used for the above-stated purpose, in consultation with the Executive Director, within ten years of the fee being deposited into the account. PRIOR TO EXPENDITURE OF ANY FUNDS CONTAINED IN THIS ACCOUNT, the Executive Director must review and approve the proposed use of the funds as being consistent with the intent and purpose of this condition.

12. **Assumption of Risk, Waiver of Liability, and Indemnity Agreement.** By acceptance of this permit, the Permittees acknowledge and agree on behalf of themselves and all successors and assigns:

    a. That the site is subject to extreme coastal hazards including but not limited to episodic and long-term shoreline retreat and coastal erosion, high seas, ocean waves, storms, tsunami, coastal flooding, landslides, bluff and geologic instability, and the interaction of same;

    b. To assume the risks to the Permittees and the property that is the subject of this permit of injury and damage from such hazards in connection with this permitted development;

    c. To unconditionally waive any claim of damage or liability against the Commission, its officers, agents, and employees for injury or damage from such hazards;

    d. 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, and;

e. That any adverse effects to property caused by the permitted project shall be fully the responsibility of the Permittees.

13. **Public Rights.** The issuance of this coastal development permit shall not constitute a waiver of any public rights which may exist on the subject properties. The Permittees shall not use such permit as evidence of a waiver of any public rights that may exist on the properties.

14. **Prior Permit Conditions (Applicable to the Green Valley Corporation Property Only).** Special Condition 3 of the original permit (A-3-CAP-99-023) has been modified and re-imposed as Special Condition 2 of this permit amendment. This condition applies to the Green Valley Corporation property only (APN 034-081-02). All other previous conditions of approval required by Coastal Development Permit A-3-CAP-99-023 remain in effect.

15. **Deed Restriction.** PRIOR TO ISSUANCE OF THIS AMENDMENT TO COASTAL DEVELOPMENT PERMIT A-3-CAP-99-023, the Permittees shall submit for Executive Director review and approval documentation demonstrating that the Permittees have executed and recorded against each of the subject properties governed by this permit (i.e., APNs 034-081-01 and 034-081-02) deed restrictions, 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 properties, subject to terms and conditions that restrict the use and enjoyment of that properties; and (2) imposing the special conditions of this permit as covenants, conditions and restrictions on the use and enjoyment of the properties. The deed restrictions shall include a legal description and site plan of the parcels governed by this permit. The deed restrictions shall also indicate that, in the event of an extinguishment or termination of the deed restrictions for any reason, the terms and conditions of this permit shall continue to restrict the use and enjoyment of the subject properties 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 properties.

    For the Green Valley Corporation property only, this deed restriction supersedes and replaces the deed restriction required pursuant to A-3-CAP-99-023 that was recorded on June 25, 2001 as document number 2001-0038731.

4. California Environmental Quality Act (CEQA)

Section 13096 of the California Code of Regulations requires that a specific finding be made in conjunction with coastal development permit applications showing the application to be consistent with any applicable requirements of 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 that the activity may have on the environment.

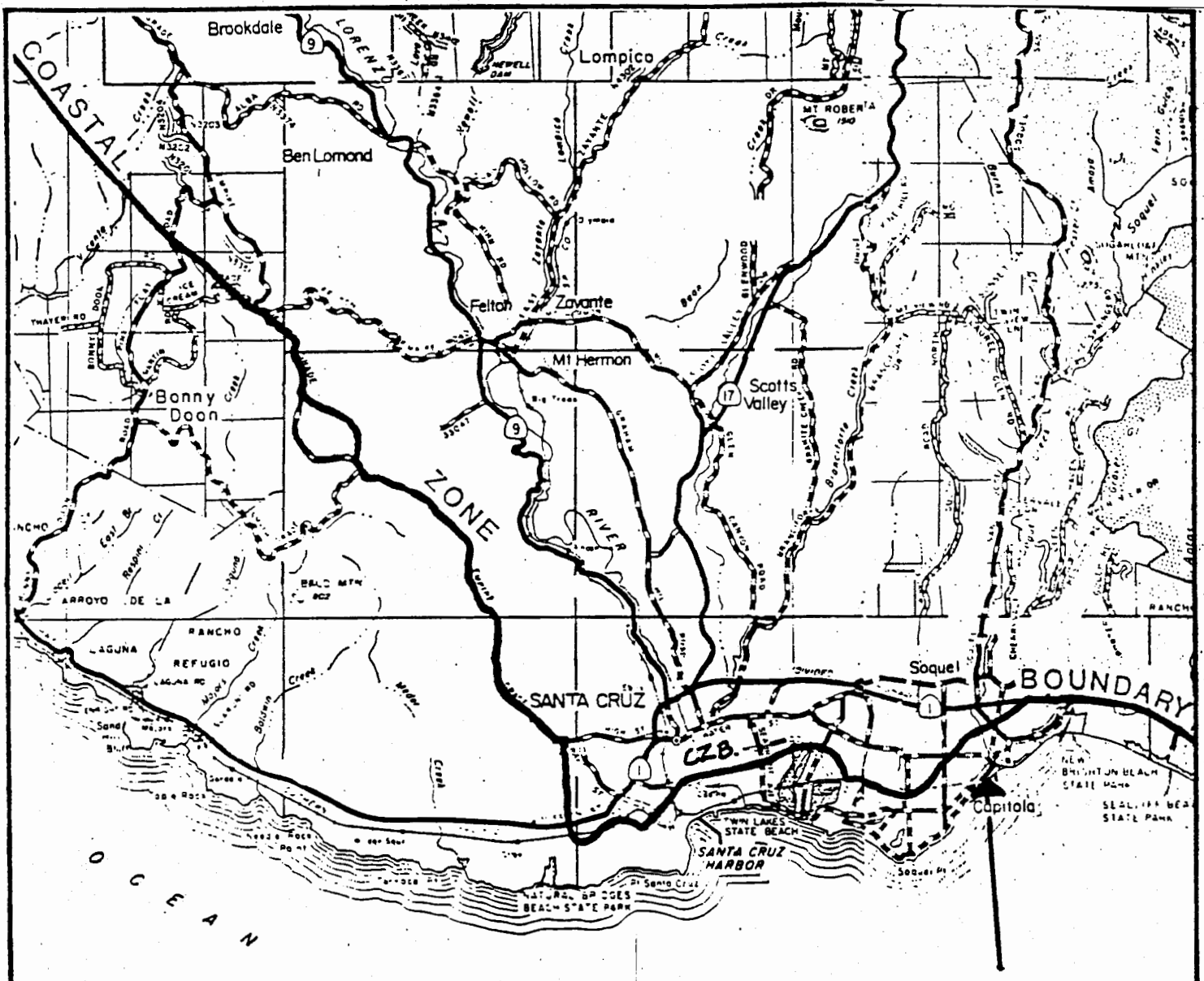
The City of Capitola, acting as the lead CEQA agency, completed an initial study for the project that concluded that, with the addition of mitigation measures, the project would not have significant environmental impacts. The City incorporated said mitigation measures into its approval of the project.

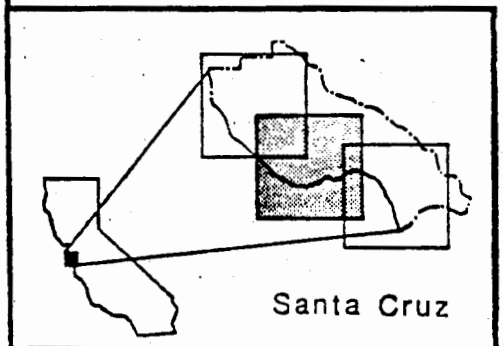
The Coastal Commission's review and analysis of land use proposals has been certified by the Secretary of Resources as being the functional equivalent of environmental review under CEQA. The preceding coastal development permit findings discuss the relevant coastal resource issues with the proposal, and the permit conditions identify appropriate modifications to avoid and/or lessen any potential for adverse impacts to said resources. All public comments received to date have been addressed in the findings above, which are incorporated herein in their entirety by reference.

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).

W8a

A-3-CAP-99-023-A1





California Coastal Commission

LOCATION MAP

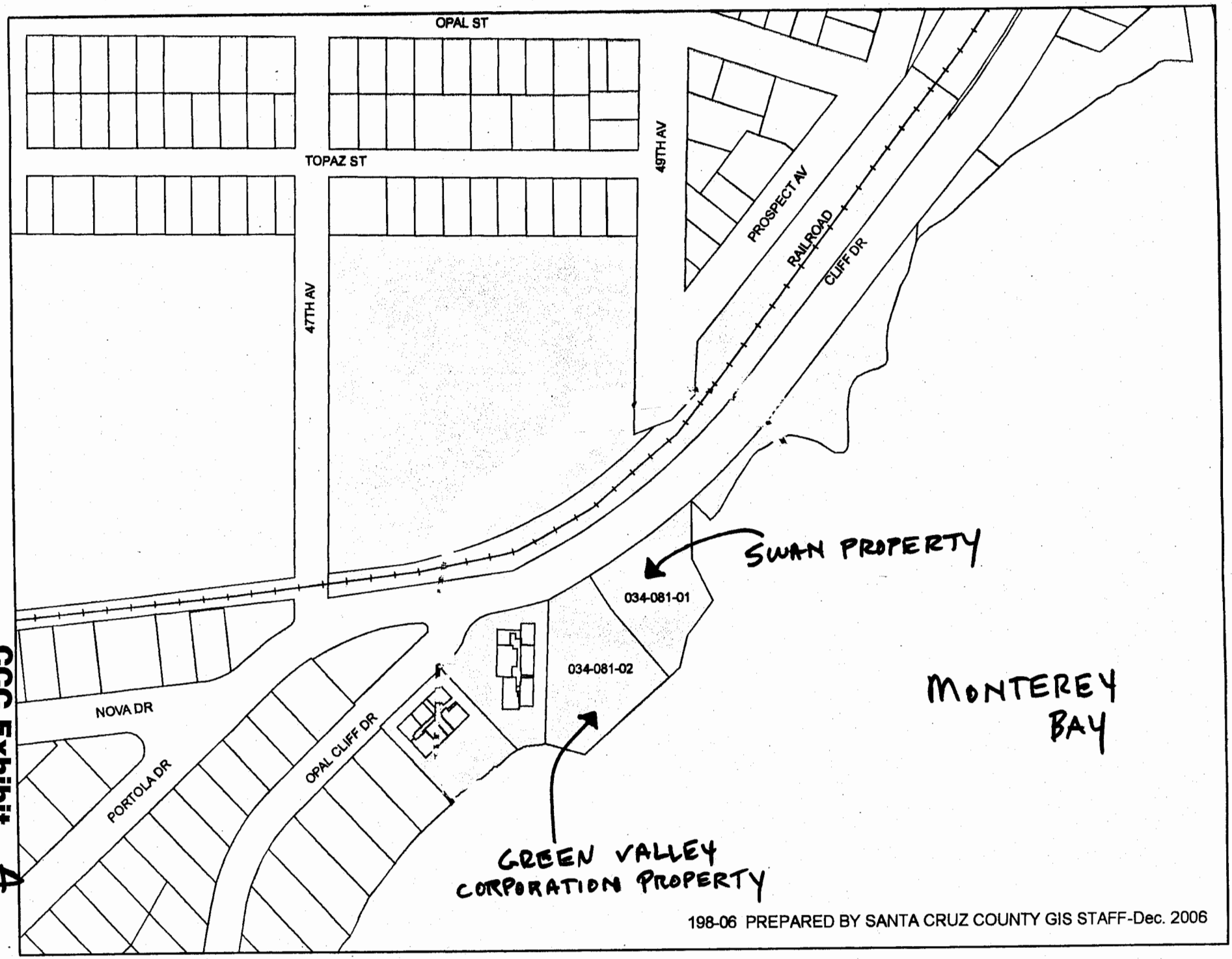
1 0 1 2 miles

N

County of Santa Cruz

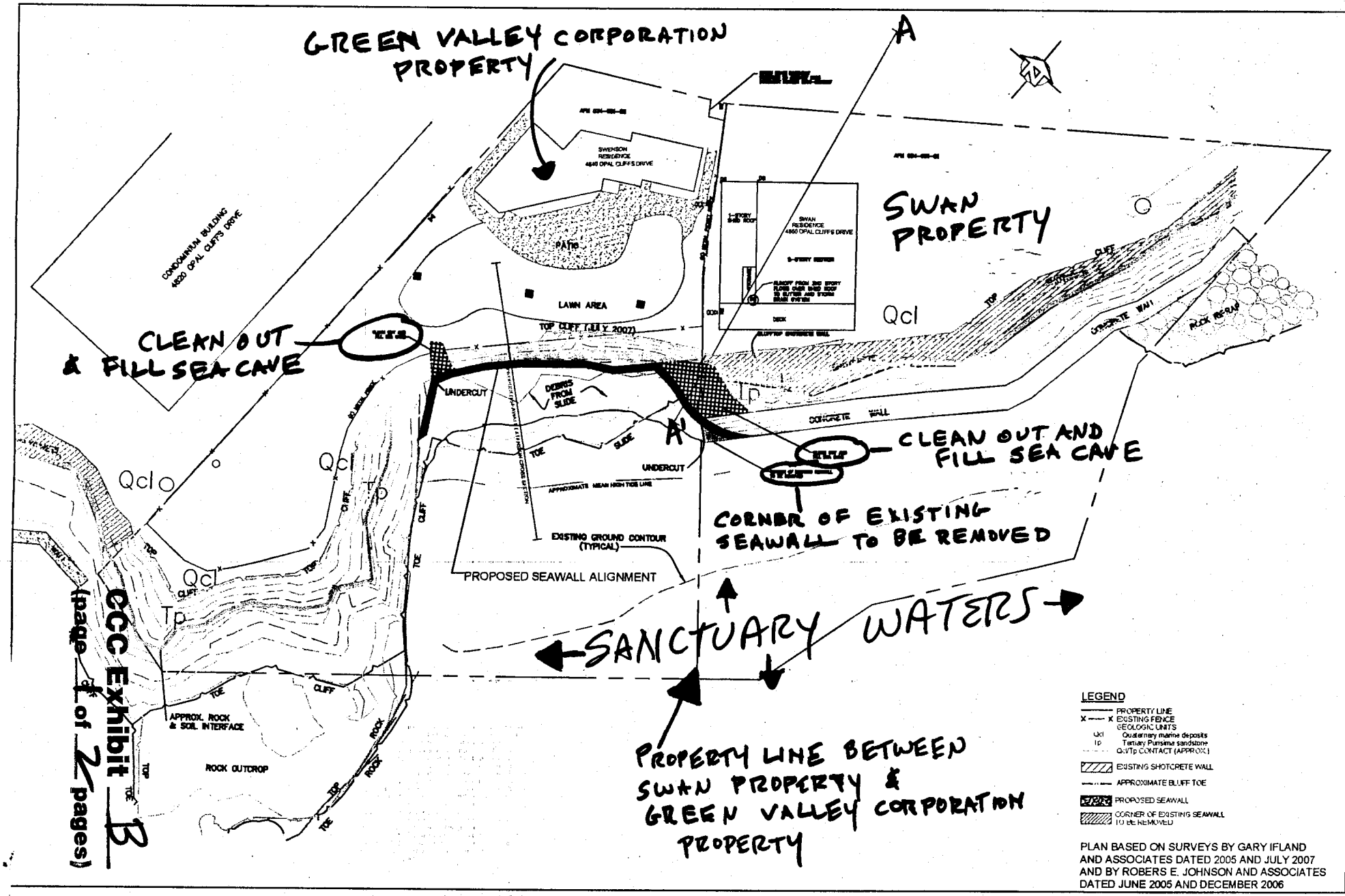
Sheet 2 of 3

CCC Exhibit A
(page 1 of 2 pages)



CCC Exhibit A
(page 2 of 2 pages)

PROPOSED PROJECT



PLAN BASED ON SURVEYS BY GARY IFLAND AND ASSOCIATES DATED 2005 AND JULY 2007 AND BY ROBERS E. JOHNSON AND ASSOCIATES DATED JUNE 2005 AND DECEMBER 2006

CCC Exhibit B (page 1 of 2 pages)

REVISIONS	BY

SWAN SEAWALL CONCEPTUAL PLAN
SWAN RESIDENCE
4850 OPAL CLIFFS DRIVE
CAPITOLA, CALIFORNIA

HARO, KASUNICH AND ASSOCIATES, INC.
CONSULTING CIVIL, GEOTECHNICAL & COASTAL ENGINEERS
116 EAST LAKE AVE. WATSONVILLE, CA 95076 (831) 722-4175

Date	14 SEPTEMBER 07
Scale	1" = 40'
Drawn	MH
Job	SC64R6
Sheet	4 of 5 Sheets

PURPOSE OF BLUFF STABILIZATION

The purpose of these coastal bluff stabilization plans is to reduce coastal erosion and recession and to reduce the risk of damage to the Swan residence and blufftop retaining wall system at 4850 Cliff Drive in Capitola, California (APN 034-081-01). These plans cover extending the Swan seawall onto the Swenson property (APN 034-081-02), which is also developed with a blufftop residence. The work on the Swenson property consists of constructing a tied back reinforced concrete seawall at the base of the coastal bluff. Extension of the Swan seawall onto the Swenson property is necessary to protect the residence on the Swan property from erosion, according to Rogers E. Johnson and Associates, Engineering Geologists, who have analyzed coastal erosion and bluff recession on both the Swan and Swenson properties. The existing seawall at the base of the bluff on the Swan property is being outflanked by coastal erosion on the Swan property, and the toe of the bluff on the Swenson property is being undercut by erosion that threatens the stability of the Swan residence and blufftop retaining wall system. Construction of the proposed extension of the Swan seawall as shown on these plans, in conjunction with maintenance of the existing coastal bluff protection on the Swan property, should retard erosion of the Swenson blufftop and increase the life of the Swan residence.

PURPOSE OF PLANS

These plans are conceptual. They are intended to be adequate to prepare artistic renderings and photo simulations of the proposed Swan seawall extension. These plans may differ from the actual physical site, due to the dynamic environment and ongoing coastal erosion. The dimensions are approximate. Prior to construction or cost estimating, detailed plans, calculations and specifications will be needed. These plans consist of 3 sheets.

WALL SURFACING

The fascia of the proposed seawall shall be sculpted, carved, textured, colored and shaped to resemble the adjacent natural bedrock outcrops along the coastal bluff. All visible surfaces shall consist of artificial rock. Experienced artificial rock contractors shall be utilized for this portion of the work.

KEY DESIGN FEATURES

These plans show the footing locations anticipated to minimize any adverse effects on the adjacent properties from ongoing coastal erosion. The location of the upcoast end of the wall has been carefully selected. The seaward face of the upcoast end of the seawall has been designed to feather into the existing bluff to minimize reflection of ocean wave energy towards the adjacent unprotected bedrock. A deep keyway is utilized at the upcoast end of the seawall to prevent immediate outflanking of the wall from ongoing erosion of the adjacent earth materials and to allow an opportunity for future maintenance and repair of the seawall. The base of the seawall shall be embedded a minimum of 3 feet vertically below the elevations of sound native bedrock 10 feet seaward of the footing. The keyway shall be inspected by an Engineering Geologist, and approved, prior to placement of concrete. The downcoast end of the seawall will feather into the existing Swan gravity type seawall. The upcoast end of the Swan seawall will be reconfigured to soften the transition between the existing wall and the extension. Voids, undercuts, and notches in the coastal bluff behind the structural seawall shall be filled with concrete grout. The upper portion of the seawall shall be recurved seaward, as shown on the plans, to reduce wave runup and retard erosion above the proposed seawall. The Contractor should anticipate public scrutiny of their work, particularly in regards to its impacts on the marine environment including the intertidal areas.

MARINE PROTECTION

To prevent any impacts upon the marine habitat, no overburden or wet cement may be allowed to adversely impact the beach or enter the tidal zone. Under no circumstances shall use of heavy equipment be allowed in the tidal waters. Any areas of loose or unstable soil must be stabilized immediately after other portions of the project are finished. Any heavy equipment operations must be conducted with care near the edge of the bluff to prevent the destabilization of the subsirate and additional erosion. Care must be taken so the coastal bluffs outside the work area are not damaged during construction.

ELEVATION DATUM

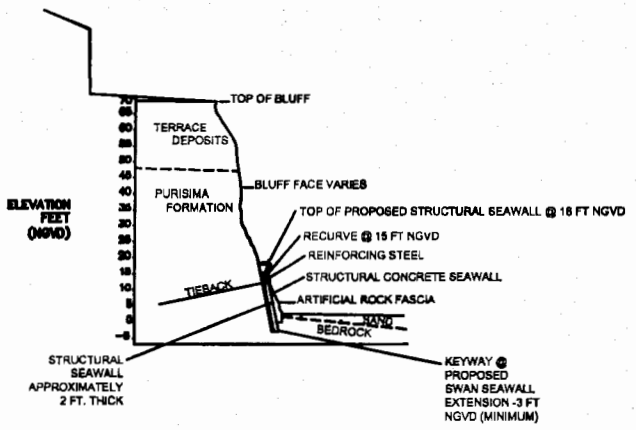
The vertical datum is NGVD, which is approximately Mean Sea Level.

SITE DISTURBANCE

Disturbance of the bluff face and bluff-top areas beyond the limits of the work area must be avoided.

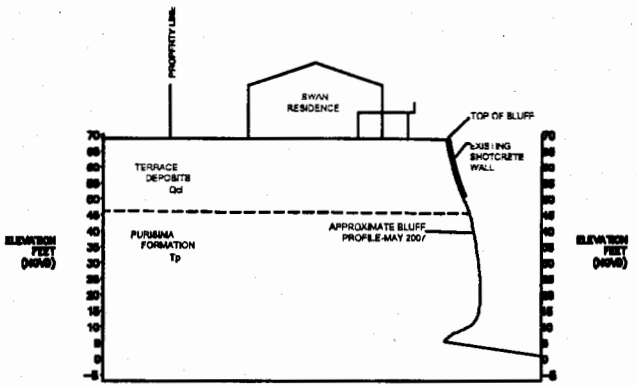
SUPPLEMENTAL RECOMMENDATIONS

If undesirable or changed conditions are encountered prior to or during construction, or if the proposed construction will differ from that planned at this time, Haro, Kasunich and Associates shall be notified so that supplemental recommendations can be given.



CROSS SECTION-PROPOSED SEAWALL

SCALE: 1"=20'



CROSS SECTION A-A'

SCALE: 1"=20'

SECTIONS BASED ON GEOLOGIC CROSS SECTIONS BY ROGERS E. JOHNSON AND ASSOCIATES DATED 23 MAY 2007

CCC Exhibit B (page 2 of 2 pages)

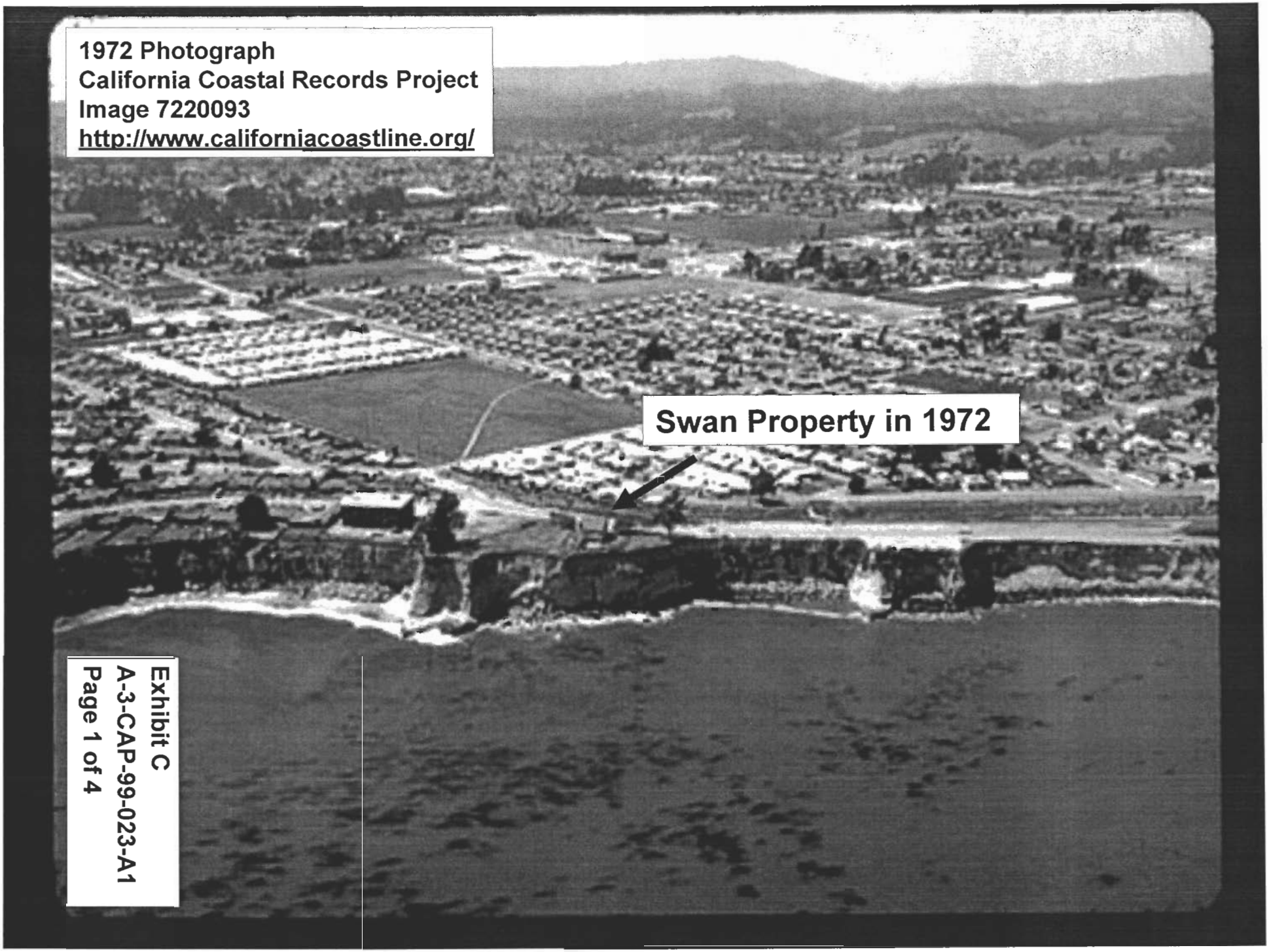
REVISIONS	BY

GENERAL NOTES AND CROSS SECTIONS

SWAN RESIDENCE
4850 OPAL CLIFFS DRIVE
CAPITOLA, CALIFORNIA

HARO, KASUNICH AND ASSOCIATES, INC.
CONSULTING CIVIL, GEOTECHNICAL & COASTAL ENGINEERS
116 EAST LAKE AVE., WATSONVILLE, CA 95076 (831) 722-4175

Date	2 SEPTEMBER 07
Scale	1" = 60'
Drawn	MH
Job	SC8486
Sheet	5 of 5 Sheets


1972 Photograph
California Coastal Records Project
Image 7220093
http://www.californiacoastline.org/
Swan Property in 1972
Exhibit C
A-3-CAP-99-023-A1
Page 1 of 4

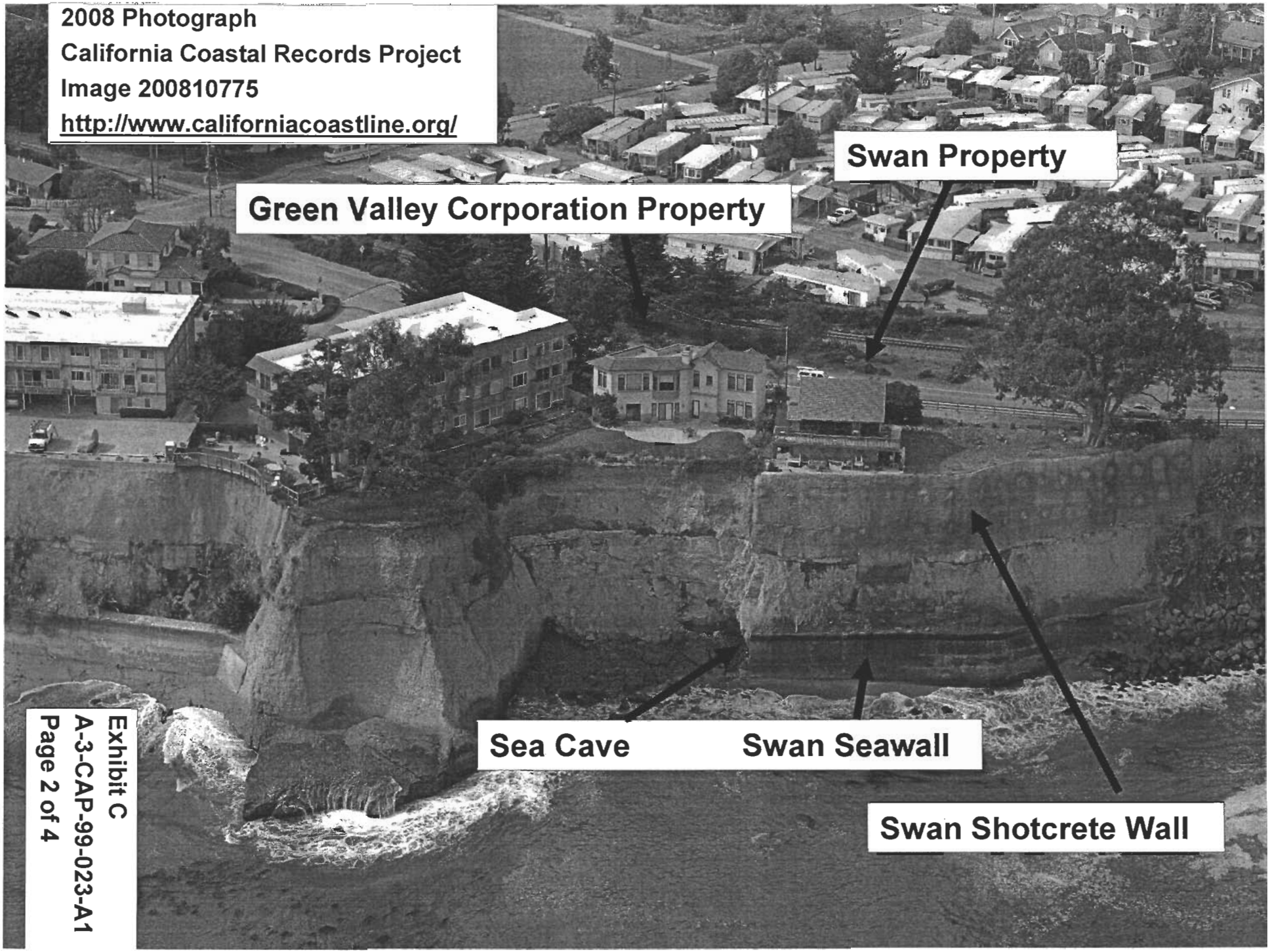
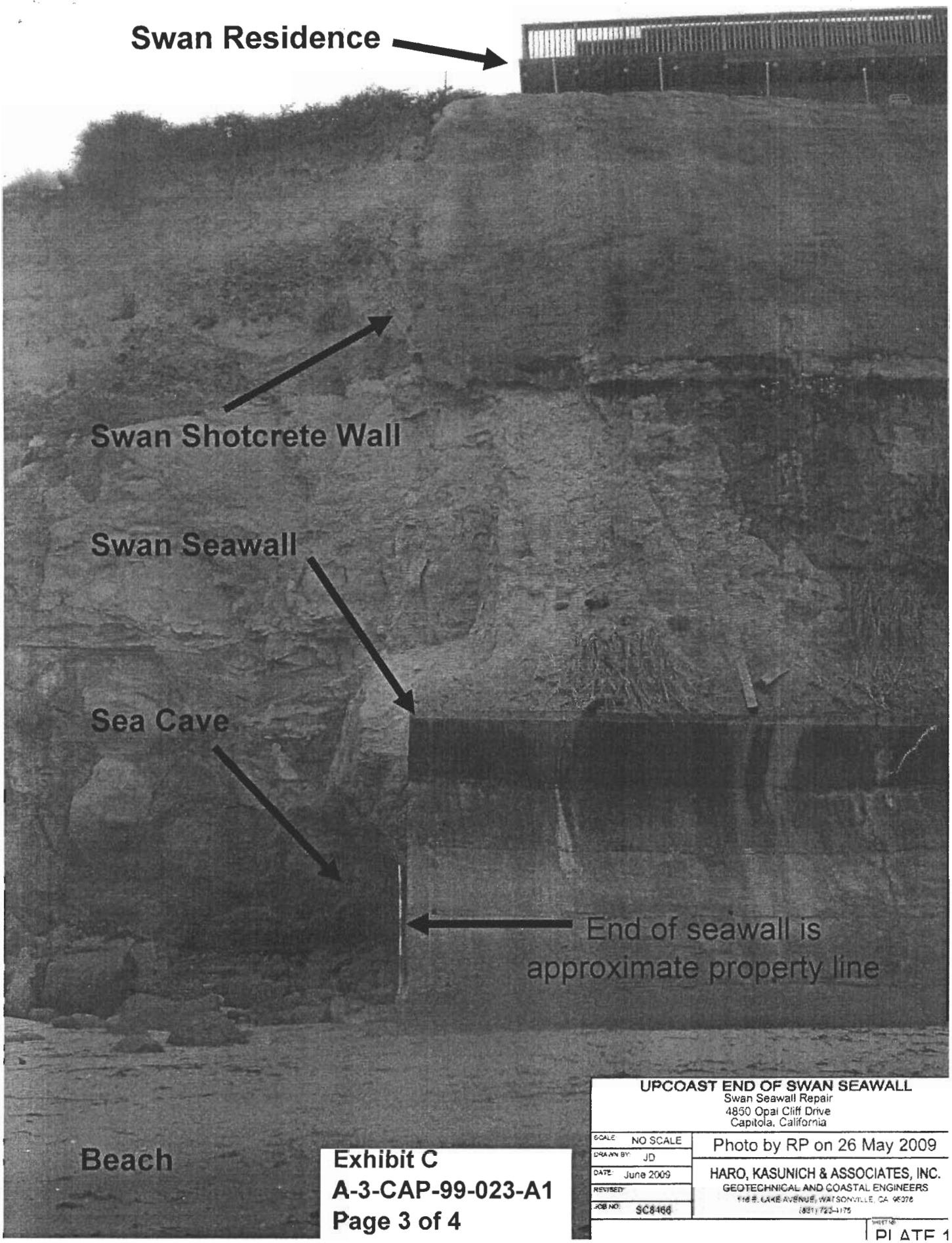


Exhibit C
A-3-CAP-99-023-A1
Page 2 of 4

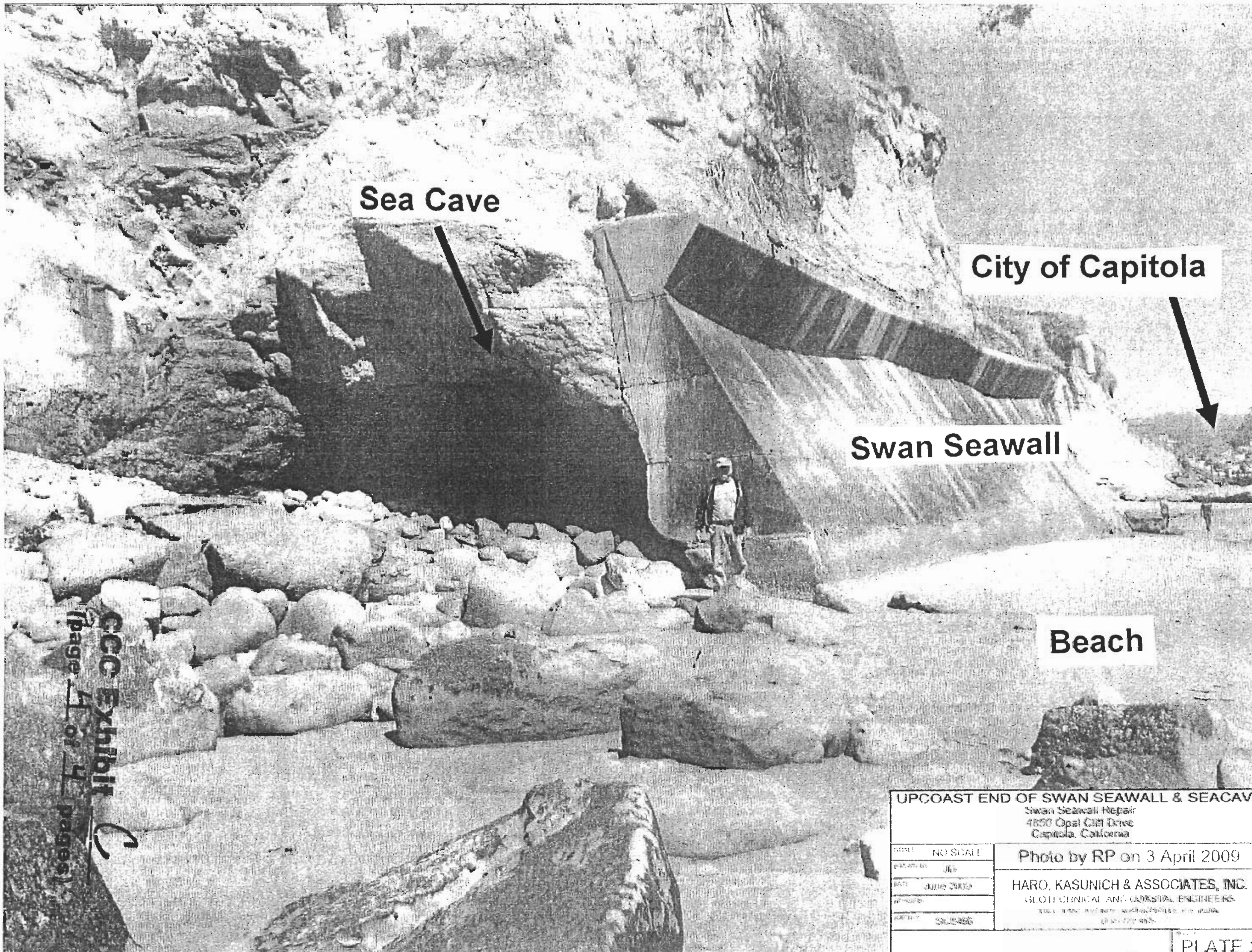


UPCOAST END OF SWAN SEAWALL
Swan Seawall Repair
4850 Opal Cliff Drive
Capitola, California

SCALE: NO SCALE	Photo by RP on 26 May 2009
DRAWN BY: JD	
DATE: June 2009	HARO, KASUNICH & ASSOCIATES, INC.
REVISED:	GEOTECHNICAL AND COASTAL ENGINEERS
JOB NO: SC8466	116 E. LAKE AVENUE, WATSONVILLE, CA 95076 (831) 722-4175

SHEET NO. PLATE 1

Exhibit C
A-3-CAP-99-023-A1
Page 3 of 4



UPCOAST END OF SWAN SEAWALL & SEACAVE
Swan Seawall Repair
4850 Opal Cliff Drive
Capitola, California

NO SCALE
June 2009

Photo by RP on 3 April 2009

HARO, KASUNICH & ASSOCIATES, INC.
GEOTECHNICAL AND COASTAL ENGINEERS

PLATE 2

CCC Exhibit C
(page 4 of 4 pages)

10 June 2009

Seawall Upcoast end Repair Alternatives Analysis Table
Swan Residence
4850 Opal Cliff Drive, Capitola, California

	Alternatives	Longevity of Design	Visual Impact	Beach Encroachment	Negative Impacts to Upcoast Parcel
A	Do Nothing	Sea cave behind seawall will continue to expand outflanking the seawall end as well as undermining the Swan blufftop wall and residence.	Seawall profile will become more visible as adjacent bluff toe recedes.	Swan residence and blufftop wall will need to be demolished or debris will fall onto beach.	Increased erosion upon Swenson blufftoe as the Swan seawall and receding blufftoe become a headlands projecting out into the surf zone.
B	Fill existing sea cave spanning the Swan/Swenson parcel boundary on Swan parcel only with a vertical face structural concrete plug along property line.	Seacave plug will accelerate erosion at upcoast end of repair offering only short term protection for Swan blufftop wall and residence. Requires constant monitoring for needed repair. Does not allow for any margin of error or repair delay.	Vertical face of concrete plug can be capped with a textured and colored artificial rock fascia.	Work crews return to beach every 5 to 10 years to fill newly developed seacave at upcoast end of plug.	Increased erosion at Swenson blufftoe due to armoring of Swan seawall headlands. New sea cave will develop at upcoast end of plug reducing Swenson residence design life.
C	Fill existing sea cave with erodable concrete to mimic Purisima bedrock erosion rate.	Like structural concrete plug, only offers short term protection for Swan blufftop wall and residence	Sea wall profile becomes prominent as plug erodes.	Work crews on beach to repair erodable plug as frequent as or more frequent than repairs for concrete plug.	Erosion continues due to seawall headlands.

	Alternatives	Longevity of Design	Visual Impact	Beach Encroachment	Negative Impacts to Upcoast Parcel
D	Fill existing sea cave spanning the Swan/Swenson parcel boundary with a vertical face concrete plug extending from Swan seawall across the parcel line and along Swenson bluff toe for about 20 feet.	A more effective design for Swan protection, but still offers only short term protection and still accelerates blufftoe erosion rate on Swenson parcel.	Vertical face of concrete plug can be capped with a textured and colored artificial rock fascia.	Work crews return to beach every 5 to 10 years to fill newly developed sea cave at upcoast end of plug.	Increased erosion at Swenson blufftoe due to armoring of Swan seawall headlands. New sea cave will develop at upcoast end of plug reducing Swenson residence design life.
E	Fill existing sea cave spanning the Swan/Swenson parcel line with a vertical face, structural concrete plug extending from Swan seawall across the parcel line and along Swenson bluff toe with short length wing wall at upcoast bedrock headlands.	Best long term design to protect Swan seawall, residence and bluff top without causing accelerated erosion on the Swenson parcel.	Vertical face of concrete plug can be capped with a textured and colored artificial rock fascia.	Structural shotcrete concrete plug with artificial rock fascia would be 2 to 3 feet thick. Will need far less maintenance than any other repair alternative.	No additional accelerated erosion or reduction in residence design life on Swenson parcel.
F	Relocating Swan residence either landward/northeast about 9 feet or downcoast/northwest about 30 feet.	Relocation footprint limited. Short term mitigation of only 5 to 15 years. Twenty to 30 year mitigation with setback variances granted.	Same as existing plus demolition /reconstruction of Swan residence. Seawall becomes more visible as bluff toe recedes.	Temporary barrier along bluff toe during demolition and construction. Bluff top wall will need to be demolished or debris will fall onto beach.	Ongoing erosion below Swan residence and along parcel line is not mitigated.

	Alternatives	Longevity of Design	Visual Impact	Beach Encroachment	Negative Impacts to Upcoast Parcel
G	Realign upcoast seawall end by cutting corner off and utilizing tieback anchors to restore lateral restraint for all seawall repair schemes. This is not a seawall repair alternative, but a mechanism to reduce the negative effects of all repairs to the Swan seawall.	Reduces wave reflection into Swenson pocket beach. Existing wall thickness as measured along Swan/Swenson parcel line is about 8 feet. The seacave behind the seawall end is now at least 18 feet deep as measured along the parcel line. Rounding of the seawall end would have a positive but limited effect.	Realigned corner may be textured, colored and stained to camouflage corner.	Reduces existing seawall footprint and increases public access to pocket beach.	Positive impact by reducing headlands effect of seawall for all repair schemes by decreasing turbulence and wave reflection. Positive but limited effect.

	Alternatives	Longevity of Design	Visual Impact	Beach Encroachment	Negative Impacts to Upcoast Parcel
H	Underpinning of Swan residence, in place, with 80 feet deep piers and associated grade beam system with existing residence in place. A portion of the 80 feet deep piers would have to be hand dug and the grade beam system would need to be excavated by hand under existing residence. Seawall and blufftop retaining wall removed as outflanking occurs.	Long term protection for Swan residence if needed pier depth achieved. Piers to be embedded below the top of projected bedrock beach platform and designed for wave impact and active earth pressures. Anticipated pier depths on the order of 80 feet due to close proximity to existing shoreline, enabling the home to remain if the existing erosion protection is not maintained. Piers will not protect all Swan structures. If not maintained, the seawall and blufftop retaining wall will be outflanked and will need to be removed at considerable difficulty. Will result in the loss of the existing erosion protection provided by the existing seawall and blufftop retaining wall.	As bluff erodes, the pier supported Swan residence will take on the appearance of an offshore oil platform.	Temporary barrier along bluff toe during demolition/construction. Bluff top wall will need to be demolished or debris will fall onto beach.	Positive long term impact by reducing headlands effect of all seawall repair alternatives except full wall across Swenson bluff toe by decreasing turbulence and reducing wave reflection. But, like relocation of the Swan residence, this alternative will not mitigate ongoing erosion. If the seawall is removed, this will compromise existing support of the fractured bedrock above the seawall; and, if not removed and not maintained, the seawall will cause increased erosion at bluff toe as it becomes a headland projecting out into the surf zone.

	Alternatives	Longevity of Design	Visual Impact	Beach Encroachment	Negative Impacts to Upcoast Parcel
I	Same as "H" above, except partial demolition and temporary relocation of Swan residence to allow heavy equipment to drill all of the 80 feet deep piers and excavate grade beams. Residence to be reconstructed in original building envelope after new deep foundation system is installed.	Long term protection for Swan residence if needed pier depth achieved. Piers to be embedded below the top of projected bedrock beach platform and designed for wave impact and active earth pressures. Anticipated pier depths on the order of 80 feet due to close proximity to existing shoreline, enabling the home to remain if the existing erosion protection is not maintained. Piers will not protect all Swan structures. If not maintained, the seawall and blufftop retaining wall will be outflanked and will need to be removed at considerable difficulty. Will result in the loss of the existing erosion protection provided by the existing seawall and blufftop retaining wall.	As bluff erodes, the pier supported Swan residence will take on the appearance of an offshore oil platform.	Temporary barrier along bluff toe during demolition and construction. Bluff top wall will need to be demolished or debris will fall onto beach.	Positive long term impact, as in "H", above. But, seawall removal will compromise existing support of the fractured bedrock above the seawall; and, if not removed and not maintained, seawall will cause increased erosion as it becomes a headland projecting out into the surf zone.

	Alternatives	Longevity of Design	Visual Impact	Beach Encroachment	Negative Impacts to Upcoast Parcel
J	Hardened "cup or bowl" constructed within the existing Swan/Swenson seacave to contain and reflect wave energy away from bluff toe below the Swan residence. Extends about 15 feet onto Swenson bluff toe, fills cave and restores blufftoe support. Recurve or wave return along rim of cup. May need columns to support cave roof.	Offers only short term protection for Swan residence and accelerates bluff toe erosion rate on Swenson parcel. Upcoast end of repair will need maintained as bedrock platforms erode fronting the repair and the upcoast end becomes outflanked due to accelerated erosion.	Similar to existing seacave at seawall end. Concrete used may be textured, colored and stained to camouflage repair.	Work crews return to beach every 5 to 10 years to fill newly developed sea cave at upcoast end of plug. Cup design may focus wave energy and promote hydraulic shock, deteriorating fractured bedrock above the seawall.	Increased erosion at Swenson bluff toe due to armoring of Swan seawall headlands. Cup design may focus wave energy and promote hydraulic shock, deteriorating fractured bedrock above the seawall. New sea cave will develop at upcoast end of wall extension and accelerated erosion will reduce Swenson residence design life.
K	Hardened "cup or bowl" constructed solely within the existing Swan/Swenson seacave but solely on the Swan parcel. Columns may be needed to support cave roof. Recurve or wave return along rim of cup. No extension onto Swenson parcel. Swenson parcel portion of seacave will not be supported.	Offers only short term protection for Swan residence and accelerates bluff toe erosion rate on Swenson parcel. Upcoast end and seaward toe of cup will need maintained as bedrock platform fronting the repair erodes and the upcoast end becomes outflanked due to accelerated erosion. Swan must react immediately to new seacave forming below Swan residence blufftop building footprint. Does not allow for any margin of error or delay in repair.	Similar to existing seacave at seawall end. Concrete used may be textured, colored and stained to camouflage repair.	Work crews return to beach every 5 to 10 years to fill newly developed sea cave at upcoast end of plug. Cup design may focus wave energy and promote hydraulic shock, deteriorating fractured bedrock above the seawall.	Increased erosion at Swenson bluff toe due to armoring of Swan seawall headlands. Cup design may focus wave energy and promote hydraulic shock, deteriorating fractured bedrock above the seawall. New seacave will develop at upcoast end of cup and accelerated erosion will reduce Swenson residence design life. Does not allow for any margin of error or delay in repair.

W8a

HARO, KASUNICH AND ASSOCIATES, INC.

CONSULTING GEOTECHNICAL & COASTAL ENGINEERS

Project No. SC8466
23 July 2009

CALIFORNIA COASTAL COMMISSION
Central Coast District Office
725 Front Street, Suite 300
Santa Cruz, California 95060

Attention: Ms. Susan Craig

Subject: Addendum Alternative 'C/D – G' Description and Schematic

Reference: Proposed Swan Residence Seawall Repair
Capitola, California
Application No. A-3-CAP-99-023-A1

Dear Ms. Craig:

As requested this letter provides a description and schematic of a new seawall repair alternative for the Swan seawall at 4850 Opal Cliff Drive in Capitola, California. This new or addendum repair alternative is a modification of previously presented seawall repair alternatives and was discussed on 20 July 2009 by Susan Craig and Lesley Ewing, PE of the California Coastal Commission and Rick Parks, project geotechnical and coastal engineer.

Seawall repair alternatives previously presented by our firm were first outlined in the Geotechnical and Coastal Engineering Recommendations dated 17 September 2007 and recently amended in the Updated Alternatives Analysis Table dated 10 June 2009.

In our 17 September 2007 Geotechnical and Coastal Engineering Recommendations, Alternatives C, D and G were described as follows:

> Alternative C - Fill existing seacave spanning the Swan/Swenson parcel boundary on Swan parcel only with a vertical face erodible concrete plug along property line. The erodible concrete would ideally deteriorate with wave erosion at the same rate as the Purisima sandstone bedrock;
>
> Alternative D - Fill existing seacave spanning the Swan/Swenson parcel boundaries with a vertical face concrete plug extending from Swan seawall across the parcel line and along Swenson blufftoe for about 20 feet; and

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Alternative G - Realign upcoast seawall end by cutting corner off and utilizing tieback anchors to restore lateral restraint for all seawall repair schemes. This is the repair enhancement to improve other repair alternatives.

The alternative discussed on 20 July 2009 would best be described as a modification or combination of Alternatives C and D with the upcoast end of the existing Swan realigned or altered to reduce wave reflection as described in Alternative G. The modified alternative would utilize erodible concrete to fill the seacave at the outflanked end of the Swan seawall and plug the existing sea cave spanning the Swan/Swenson parcel boundary. This alternative would extend about 15 feet onto the Swenson blufftoe in order to fill the existing seacave and restore support to the bluff above. The erodible concrete plug would extend seaward to the drip line of the seacave as shown on the attached schematic. The seaward face of the erodible plug would be near vertical with the concrete grout colored to match the adjacent blufftoe sandstone bedrock.

It is our understanding the upcoast end of the outlined Alternative "C/D – G" would conform to and fill in the seacave spanning the Swan/Swenson parcel boundary at the time of the repair. If the seacave or wave cut notch deepens before the repair can be completed, the erodible plug would extend from the drip line of the seacave overhang to the landward perimeter of the seacave. At this time, the seacave extends about 15 feet on to the Swenson parcel, as measured perpendicular to the Swan/Swenson property line.

Conversely, if a portion of the overhang fails prior to implementation of the seawall repair, the footprint of the erodible plug upon the Swenson parcel would be reduced. Failure of the blufftoe prior to implementation of the repair would substantially shorten the time period before additional blufftoe repairs are needed to protect the Swan residence.

Analysis of Alternative Discussed on 20 July 2009

The erodible plug provides only short term support of the bluff, seawall and Swan residence and will have the potential to reflect wave energy onto the Swenson blufftoe and accelerate erosion. The erosion along the unprotected Swenson blufftoe will cause the blufftoe to retreat exposing the Swan property to lateral attack as the seawall repair becomes outflanked. The accelerated increase in this erosion will cause a reduction in the design life of the Swenson residence.

The upcoast end of the erodible plug as well as the seaward toe of the erodible plug must be monitored and maintained as needed to prevent a new seacave from encroaching back toward the Swan residence. Due to the close proximity of the Swan residence directly above the erodible seacave plug, this repair alternative would require constant monitoring of the blufftoe condition to provide immediate repair and does not allow for any margin of error or repair delay.

Repair would also be needed more frequently due to the erodible material. But, the need for immediate repair may not be able to be accommodated due to manmade obstacles such as permitting delays or natural impediments such as long duration winter storms limiting site access.

We cannot recommend the use of erodible concrete to protect the Swan residence due to its uncertain engineering effectiveness. To our knowledge, the design and use of erodible concrete is not yet an established engineering practice. Development of a site specific erodible concrete mix would be a trial process. First the erodibility of the project site bedrock would need to be quantified in a reproducible and standardized manner. Second, the concrete laboratory would need to translate the measured erodibility of the bedrock into a concrete mix design that can be pumped to the shoreline project site. At this time we cannot predict whether an erodible concrete mix will be harder, weaker or worse case, not set up completely to be washed away by the incoming tide.

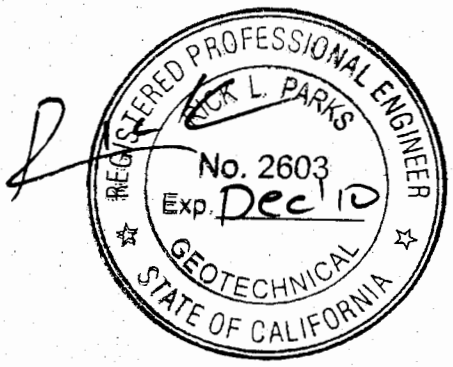
The best long term solution to effectively maintain the Swan seawall and protect the Swan residence while not causing accelerated erosion and a reduction in the design life of the Swenson residence, is to implement Alternative E. Alternative E places a textured and colored, thin section, vertical seawall from the upcoast end of the Swan seawall, across the Swenson blufftoe to the erosion resistant headlands. This alternative is explained further in our Geotechnical and Coastal Engineering Recommendations dated 17 September 2007 and the Updated Alternatives Analysis Table dated 10 June 2009. Alternative E is also delineated in the project plan set, Sheet 4 – Swan Seawall Conceptual Plan dated 14 September 2007.

If you have any questions regarding this letter or the project, please call our office.

Respectfully Submitted,

HARO, KASUNICH AND ASSOCIATES, INC

Rick L. Parks
G.E. 2603



RLP/jm

Attachment: Alternative 'C/D – G' Schematic

Copies: 3 to Addressee
2 to Richard and Nancy Swan
2 to Mr. Douglas Marshall, Esq.

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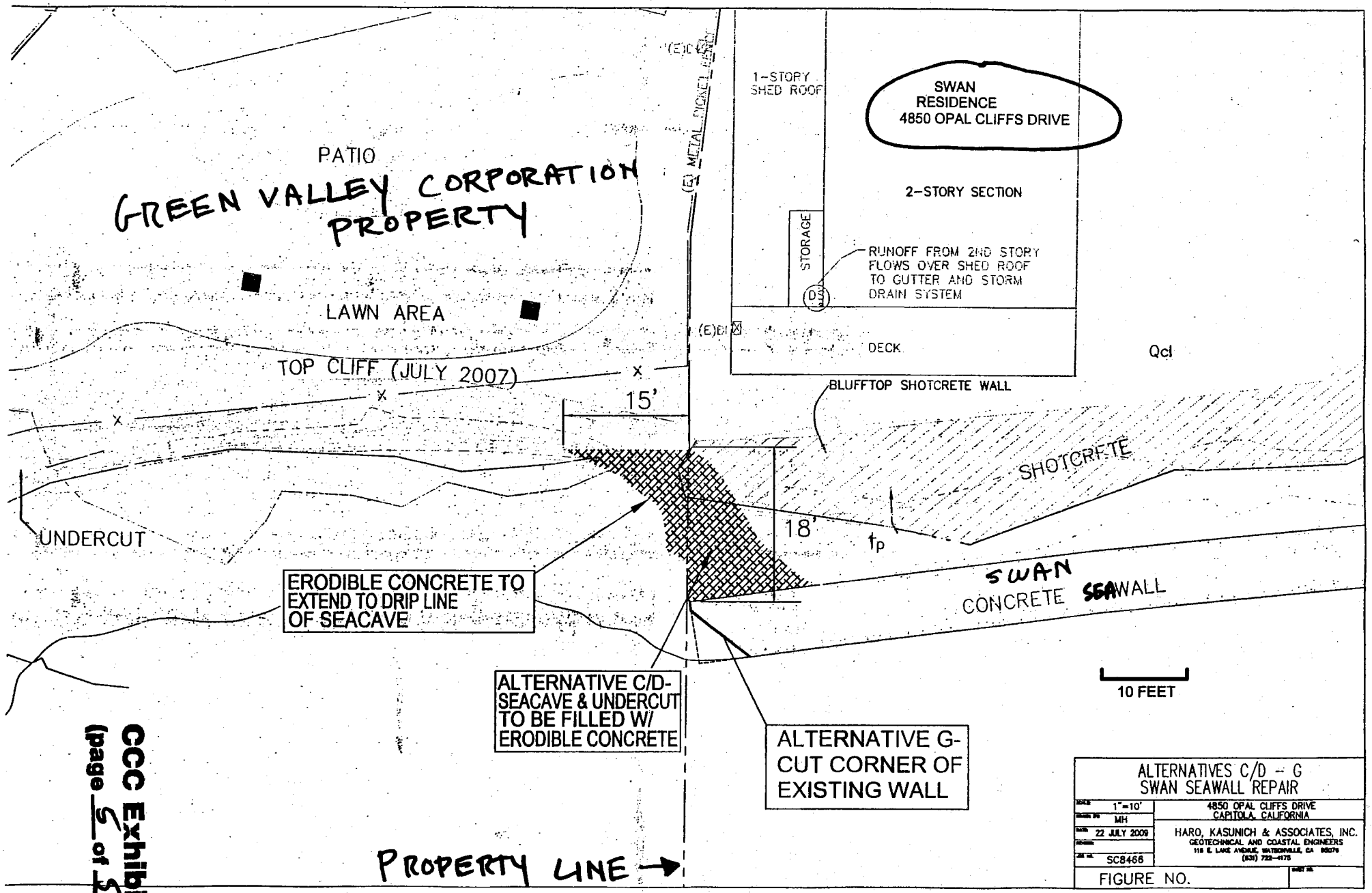

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