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Th16a

Second Addendum

August 10, 2016

To: Commissioners and Interested Persons

From: California Coastal Commission
San Diego Staff

Subject: Addendum to **Item Th16a**, Coastal Commission Permit Application **#A-6-ENC-16-0067 (Meardon)**, for the Commission Meeting of August 11, 2016

The purpose of this addendum is to include two response letter from the applicant to the staff report. Staff recommends the following changes be made to the above-referenced staff report. Additions to the staff report are underlined:

1. On page 4 of the staff report, the following shall be added to the list of exhibits:

   9. Response Letter From The Applicant, Received August 10, 2016 (a large attachment to the letter was also submitted by the applicant on August 10, 2016 and is available in the file)

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August 10, 2016

Th16a
This letter has been provided to Coastal Staff.

Steve Kinsey, Chairman,
Honorable Coastal Commissioners, and
Sherilyn Sarb
California Coastal Commission
45 Freemont Street, No. 2000
San Francisco, CA 94105

Re: Meardon, 438 Neptune Avenue, Encinitas
#A-6-ENC-16-0067

Dear Chairman Kinsey, Coastal Commissioners, and Ms. Sarb:

I was recently retained to represent the applicant and property owner, Paul Meardon. Respectfully, this appeal does not raise substantial issues because the City's approval fully conforms with the Encinitas LCP, the law applicable to this appeal. Public Resources Code §30603(b)(1). The Staff report argues that the City's approval raises 5 substantial issues on appeal. However, the City correctly applied its LCP and the 5 criticisms mentioned in the appeal and Staff report are not substantial issues for appeal.

The primary issue concerns the appropriate bluff edge setback. Commission staff believes that the appropriate setback for the Meardon property is 83 feet. If true, this would leave Mr. Meardon with a building envelope that is only 12 feet x 35 feet (420 square feet) on his 6,400 square foot lot. To get there, the Staff report urges the Commission to read into the City's 1995 LCP, the technical requirements of a 2005 Commission policy (the "Johnsson Method") that was first implemented by the Commission in 2006. However, the Johnsson Method is not part of the LCP. Unless and until it is incorporated into the LCP by formal certified amendment, the LCP should be given effect as written, and the appeal should be dismissed.

Bluff Edge Setback Determination

Although the LCP was certified in 1995, the Staff report argues that the LCP requires applicants to calculate the bluff edge setback based on the Johnsson Method, a Commission policy that arose about 10 years after LCP certification. In most cases, the Johnsson Method results in a far greater, managed retreat level bluff edge setback as compared to the actual requirements of the LCP. In this case, the setback on this 120-foot lot would be 83 feet. Given that the front yard setback is 25 feet, that leaves space for a home that is just 12 feet from front door to back door.

However, the LCP does not require the Johnsson Method. The LCP requires the method employed by the project's engineers and the City, and allows for a 40-foot setback. Prior to the publication of Dr.

Johnsson's memorandum, the Commission interpreted the LCP's bluff edge setback requirements precisely in the same manner as the City did for the Meardon CDP. See, for example, the Commission's discussion regarding bluff edge setbacks in A-6-ENC-01-116 (Refold) and A-6-ENC-02-3 (Berg).

Please also see (i) the letter dated October 5, 2006 from the City to Sherilyn Sarb which addresses the Commission's interpretational change after 10 years, and (ii) the Commission's "Sample Policies For Planners Developing, Amending, or Review LCP Policies On Shoreline Protective Structures, Hazards, and Beach Erosion," Page 2, Policy Guidance 3(a) which sets forth a methodology for determining bluff edge setbacks that is far different from the Johnsson Method. Both documents are attached to this letter as Exhibits A and B, respectively. Please also see the spreadsheet attached as Exhibit C, which demonstrates that the Commission agreed with the City's interpretation of its LCP from its May 1995 certification through at least 2006. In July 2006, after Dr. Johnsson's memorandum was published, the Commission changed its interpretation even though the LCP remained static.

Under the City's Coastal Bluff Overlay Zone ordinance, which comprises the City's certified LIP for oceanfront development, a 40-foot bluff edge setback is expressly allowed when a geotechnical engineer certifies the home will be "reasonably safe" over its lifetime without having to propose bluff stabilization to protect the structure in the future. This prerequisite is founded on the LUP requirement that the report must establish a setback that "will not result in risk of foundation damage resulting from bluff erosion or retreat to the principal structure within its economic life...." General Plan, Public Safety Element, Policy 1.6(f). Thus, the LCP's setback methodology does not require a 1.5 factor of safety after 75 years. It requires a 1.5 factor of safety at the time of construction, along with an engineer's certification that the home will be reasonably safe and that it can be sited *without bluff retreat to the principal structure*.

Further, the CBOZ does not require the engineer to employ any specific stability analysis method, and instead allows the engineer to choose "a current acceptable engineering stability analysis method," including the widely recognized Janbu method utilized by the applicant's engineer and accepted by the City's geotechnical consultant, James Knowlton, who has over 40 years of experience directly in North County San Diego.

Nevertheless, the Staff report asserts that the 2005 Johnsson Method is, and implicitly always has been, required by the 1995 LCP. The Johnsson Method requires coastal engineers to locate the bluff edge setback at the location that will maintain a 1.5 factor of safety or greater at the time of construction **and** for at least 75 years thereafter. This requirement is simply not supported by the plain language of the City's LCP. The Staff report argues that the Johnsson Method is "stated explicitly" in the LCP as follows:

> This slope failure analysis shall be performed according to geotechnical engineering standards, and shall:
>
> - Cover all types of slope failure
> - Demonstrate a safety factor against slope failure of 1.5
> - Address a time period of analysis of 75 years

However, this language does not state that the setback line must be located at a location where there will be a 1.5 factor of safety *after* 75 years. It simply requires the engineer to address a 75 year time period

when arriving at the conclusion that the home will be "reasonably safe" for its "economic lifetime." In other words, it simply defines what the LIP means by "economic lifetime" (i.e., 75 years).

The California Building Code (24 CCR, Part 2, 1808.7.2) requires a 1.5 factor of safety at the time of construction, not after 75 years. This was the applicable standard at the time the LCP was certified (and remains so today). Dr. Johnsson's idea that bluff homes should be sited at the location where there will be a 1.5 factor of safety after 75 years was not conceived until almost a decade after the City's LCP language was certified. Moreover, the Commission itself did not employ the Johnsson method – over the objections of applicants and the City – until 2006.

Please also note that the Staff report omits key language from this most pertinent section of the LIP. This material omission is unfortunate because the omitted language indicates that the cited requirements are applicable only when a structure is proposed to be *closer* than 40 feet from the bluff edge, as expressly allowed by the LCP in certain circumstances. It has no application to structures proposed to be 40 feet or further from the bluff edge, such as Mr. Meardon's home. The full section, with omitted language in *italics*, is as follows:

> *In addition to the above, each geotechnical report shall include identification of the daylight line behind the top of the bluff established by a bluff slope failure plane analysis.* This slope failure analysis shall be performed according to geotechnical engineering standards, and shall:
>
> - Cover all types of slope failure
> - Demonstrate a safety factor against slope failure of 1.5
> - Address a time period of analysis of 75 years"
>
> *Any newly proposed structure, other than a minor accessory structure or improvement, or a preemptive measure,* ***which is proposed closer than 40 feet*** *to the edge of the bluff shall be demonstrated to be behind the identified daylight line. Analysis methods alternate to a slope failure plane analysis which predict an equivalent level of safety may be proposed, and must be accepted in the City's review of the geotechnical report. (emphasis added).*

Commission staff and the appellants also assert that the erosion rate determined by the project engineers was too low. Although neither Coastal staff nor Dr. Johnsson have conducted tests of their own, they conclude that an erosion rate of 0.49 feet per year is fitting for this site. This conclusion is not based on data, but through reference to a 1999 erosion study conducted by Benumof and Griggs, which studied a small section of the Encinitas coastline that did not include the ocean bluff fronting the Meardon property.

The only erosion rate data for this project is the data collected and reported by the project engineers, yet this is ignored in favor the inapplicable Benumof-Griggs report. Moreover, the erosion rate calculated by Benumof and Griggs at the point in their study closest to the Meardon property was calculated to be just 0.26 feet per year, and trending downwards. Nevertheless, Dr. Johnsson asserts that the erosion rate for the Meardon property should be estimated at 0.49 inches per year, almost double what Benumof and Griggs found at the northernmost limit of their study area, and double the rate determined by the project engineers based on actual data and analysis.

For all these reasons, we believe the City properly applied its LCP to this project, and the appeal does not raise a substantial issue with respect to the bluff edge setback.

Seawall Waiver "Requirement"

The Staff report also asserts that a seawall waiver is required in order for the project to be consistent with the City's LCP. However, the LCP does NOT require this waiver, and it never has. The idea of a seawall waiver is a controversial Commission policy that is not required by the LCP or the Coastal Act and violates the unconstitutional conditions doctrine. Putting application of the City's LCP and the Coastal Act aside, the Commission may only impose conditions that squarely address project impacts. However, there is no reasonable relationship between any actual or theorized impacts of the Meardon home and the allegedly required for a seawall waiver. Thus, the absence of a seawall waiver in the City's approval is not a "substantial issue" supporting this appeal.

Alternatives Analysis Requirement

The Staff report also criticizes the reports submitted by the project engineers for failure to "analyze alternative solutions for any potential impacts." According to the report, "no alternative project designs or siting that would reduce potential impacts on bluff stability have been evaluated."

The flaw in Staff's argument is that it assumes, without any substantiation in the Staff report, that the home as designed and sited 40-feet from the bluff edge would have an impact on bluff stability. However, since both the project engineers and the City concluded that the home would not impact bluff stability with a 40-foot setback, there was no reason for the City to require an analysis of an alternative siting at 83 feet or any other location greater than 40 feet to alleviate this impact (i.e., because it did not exist in the first place). This issue, as raised by the appellants and Coastal staff, is just another way of arguing for an increased bluff edge setback to 83 feet as an alternative to the home as approved by the City. The Staff report telegraphs this intent in Section C., first paragraph, where it states, "The subject lot … is approximately 120 feet in length, and 50 feet in width. Thus, "a smaller size home … will likely be necessary."

Because there is no evidence that the home as sited and designed would itself have any impact bluff stability, the criticism that the project engineers did not evaluate impacts on bluff stability if the home was sited at 83-feet does not raise a substantial issue on appeal.

Visual Resources Claim

The visual resources claim is based on the unsubstantiated notion that the foundation of the home will be exposed within the home's economic lifetime, if sited at 40-feet from the bluff edge. However, this contention is really just another complaint about the bluff edge setback, not visual resources. However, the highly qualified project engineers determined, and the City expressly found, that the bluff will not retreat to the principal structure within the home's economic lifetime. There is no evidence to the contrary, other than Dr. Johnsson's preference to use an erosion rate that is almost double the rate determined by the project engineers and almost double the rate that Benumof and Griggs found at the point in their study area which is closest to the Meardon's home. Even if you applied Dr. Johnsson's

double erosion rate, the bluff retreat would be less than 40 feet (0.49 x 75 = 36.75), and the foundation would not be exposed during the economic lifetime of the home. If you use the erosion rate calculated by the project engineers and approved by the City, there would be a 20-foot margin against foundational exposure. Thus, the visual resources claim does not raise a substantial issue for this appeal.

Future Removal of Development

The appellants also contend that the City's approval does not conform to the LCP's requirement that new construction shall be designed such that it could be removed in the event of endangerment. However, the Staff report offers no evidence that this is the case with the Meardon home. To support the appellants' contention and the Staff recommendation, the report simply concludes, "[i]t is unlikely that the basement could be specifically designed and constructed such that it could be removed in case of endangerment." This capricious conclusion is not supported.

Nevertheless, the Staff report criticizes the City for not requiring the applicant to develop a "removal plan." However, the LCP does not require any such plan. Furthermore, the project engineers and the City both concluded that the home will not be endangered during its lifetime. Thus, this issue does not raise a substantial issue for appeal.

Conclusion

We respectfully request that the Commission find no substantial issue for this appeal. If substantial issue is found, the applicant requests that you conduct the de novo hearing forthwith.

Sincerely yours,

AXELSON & CORN, P.C.

Jon Corn

cc: Eric Stevens
Manjeet Ranu
James Knowlton
Craig Lewis
David Skelly
Paul Meardon

Enclosures

EXHIBIT A

City of Encinitas

October 5, 2006

Ms. Sherilyn Sarb, Deputy Director
Mr. Gary Cannon, Coastal Program Analyst
San Diego Coast District
California Coastal Commission
7575 Metropolitan Drive, Suite 103
San Diego, CA 92108

Subject: Response to Appeals of Two Coastal Properties in the City of Encinitas
Zagara Residence -282 Neptune Avenue, Encinitas, CA
Albani Residence – 629 4th Street, Encinitas, CA
Coastal Commission Appeal A-6-ENC-06-100(Zagara)
Coastal Commission Appeal A-6-ENC-06-101 (Albani)

Dear Ms. Sarb and Mr. Cannon:

This letter is being sent in response to the Coastal Commission Appeal of two coastal development projects located in the City of Encinitas. These two projects, the Zagara Residence and Albani Residence, have been processed by the Planning & Building Department of the City of Encinitas and were found to be in conformance with the Certified Implementing Plan (IP) of the Local Coastal Program (LCP) of the City of Encinitas and approved by the Planning Commission of the City of Encinitas. The Coastal Commission has appealed those approvals.

Before addressing the specifics of the appeals a short summary of history and events leading up to these appeals is necessary. The Certified Implementing Plan (IP) of the Local Coastal Plan for the City of Encinitas was approved and amended by Ordinance 95-04 and Resolution 95-31. The Coastal Commission approved the LCP on May 11, 1995 and the City assumed Coastal Development Permit authority on May 15, 1995. The City of Encinitas has been reviewing and approving coastal bluff development in accordance with the specific sections of the City Municipal Code since the Local Coastal Plan was approved. These reviews and approvals, along with the third party geotechnical review, have been consistent, with only minor changes, since implementation of the LCP. Requests for a possible change in the interpretation of the geotechnical portion of the LCP (Section 30.34.020D of the Encinitas Municipal Code) were suggested almost four years ago at a meeting between City of Encinitas staff, their geotechnical consultant and staff members of the San Diego Coast District Office of the Coastal Commission. This

request came about after the hiring of Dr. Marc Johnsson as the Coastal Commission's geologist. The City of Encinitas and their geotechnical consultant at that time stated that the requested change, which will be discussed later in this letter, was not consistent with the current standard of practice, City of Encinitas Municipal Code and current review policies. To date, the City of Encinitas has never been officially provided with References 6 and 7 (listed below) nor has the California Coastal Commission adopted the policies. In fact, it clearly states in reference #6 that the proposed "methodology does not represent a formal policy or position of the coastal commission".

An appeal similar to the subject appeals was reviewed on a coastal bluff property by the San Diego Coast District Office in 2004. This was the Hendrick Residence at 736 4th Street (CCC Appeal No. A-6-ENC-04-81). The Coastal Commission determined that no substantial issue existed and the City's approval was upheld. The same methodology for determining a bluff setback was utilized for the Hendrick residence as is utilized for the Zagara and Albani residence.

The current Coastal Commission Appeals for the Zagara Residence and Albani Residence state that the geotechnical reports for both properties do not meet the standards of Section 30.34.020(D). This section requires that the geotechnical consultant state that the development proposed will have no adverse affect on the stability of the bluff, will not endanger life or property, and that any proposed structure or facility is expected to be reasonably safe from failure and erosion over its lifetime (being defined as 75 years) without having to propose any shore or bluff stabilization to protect the structure in the future. Also, the geotechnical consultant has to state a professional opinion as to whether the project can be designed or located so that it will neither be subject to nor contribute to significant geologic instability throughout the life span of the project.

The professionals for both of the subject projects, GeoTek, Inc. and Christian Wheeler Engineering, based upon their geotechnical investigations and analyses, have provided professional opinions that satisfy Section 30.34.020D. In fact, the City of Encinitas has approved approximately four other coastal bluff developments between the time of the Hendrick appeal and the current appeal(s), and none of those developments were appealed and they were reviewed and approved with the exact same review process and requirements as the two projects up for appeal.

The City of Encinitas LCP requirements do not clearly specify the methodology to be utilized for the bluff setback determination; however, the requirements stipulate that the methodology meet current standards of practice for geotechnical engineering. The current practice for determining bluff setback accepted by the City of Encinitas requires that the geotechnical consultants perform two separate calculations to determine the appropriate bluff setback. First, the consultant is to determine the amount of erosion, based upon current published and accepted studies that will take place in 75 years. Secondly, the geotechnical consultant, based upon site specific testing, is to perform a slope stability analysis and determine a setback distance that defines a 1.5 safety factor for the slope.

The larger of the two setback determinations is then utilized as the minimum required bluff setback; in no case can the bluff setback be less than 40 feet. In summary, Dr. Marc Johnsson's proposed method for determining bluff setback recommends that design professionals combine the slope stability analysis with the erosion rate. As recommended by Dr. Johnsson, two methods could be utilized to calculate the overall bluff setback. The bluff setback for the 1.5 safety factor would be determined and the erosion rate for 75 years would be added to determine the overall bluff setback, alternatively, the other method would calculate the slope stability analysis from the toe of the slope created by the 75 year erosion rate to obtain the overall bluff setback. Both of these procedures will result in a significantly larger setback than the procedure currently utilized.

In conclusion, the City of Encinitas is interpreting and enforcing its LCP in accordance with current legally adopted ordinances, policies and practices. It is our opinion that changes in policies or procedures should not be carried out through the appeal process, but with meetings and discussions between the local agencies and the Coastal Commission Staff. We have requested that these new policies be adopted by the Coastal Commission and distributed to the local agencies for their use and implementation. We would recommend that this policy be reviewed and have consensus of the local communities and their consultants and then be considered by the Coastal Commission as the procedure for coastal bluff setbacks for all areas.

The Zagara and Albani residences have been reviewed and approved consistent with the City's certified IP and LCP whereby the subject appeals are unwarranted. Therefore, the Coastal Commission should find that no Substantial Issue exists regarding both projects.

Sincerely,

Bill Weedman
City Planner

cc: Lee McEachern
Dr. Mark Johnsson
Phil Cotton, City Manager
Patrick Murphy, Planning & Building Director
James Knowlton, Geopacifica
Diane S. Langager, Senior Planner

References:

1. Appeal of Permit for Construction of Zagara Residence (282 Neptune, Encinitas, CA) – Commission Appeal No. A-6-ENC-06-100
2. Appeal of Permit for Construction of Albani Residence (629 4th Street, Encinitas, CA) - Commission Appeal No. A-6-ENC-06-101

3. Response to Appeal of Permit for Construction of Zagara Residence (282 Neptune, Encinitas, CA) - Commission Appeal No. A-6-ENC-06-100, by Jackson/DeMarco/Tildus/Peckenpaugh, dated September 19, 2006
4. Response to California Coastal Commission Notification of Appeal No. A-6-ENC-06-101, Proposed Single-Family Residence, 629 4th Street, Encinitas, California, by Christian Wheeler Engineering, dated September 18, 2006
5. CCC Appeal No. A-6-ENC-06-101 (Response to Appeal), by Architectsmagnus, dated September 21, 2006
6. Establishing Development Setbacks From Coastal Bluffs, by Dr. Marc Johnsson, Coastal Commission Memorandum, dated 2003
7. Sample Policy for Planners Developing, Amending or Reviewing LCP Policies on Shoreline Protective Structures, Hazards, and Beach Erosion, by California Coastal Commission, undated

EXHIBIT B

Exhibit D

STATE OF CALIFORNIA—THE RESOURCES AGENCY GRAY DAVIS, GOVERNOR

CALIFORNIA COASTAL COMMISSION
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SAN FRANCISCO, CA 94105-2219
VOICE AND TDD (415) 904-5200
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SAMPLE POLICIES FOR PLANNERS DEVELOPING, AMENDING OR REVIEWING LCP POLICIES ON SHORELINE PROTECTIVE STRUCTURES, HAZARDS, AND BEACH EROSION

Numerous studies of coastline and shoreline processes (some of which are cited in Exhibit A of this document) demonstrate that shoreline protective structures can have deleterious effects on beaches at their base and on more distant beaches due to interruption of sand supplies. There are also beach types that behave differently from one another in terms of erosion and accretion and different methods of shoreline protection that may have more or less applicability in any given situation.

The following sample policies are provided for planners who are working on LCP policies relating to hazards, beach erosion, and shoreline protective devices. They are organized in three parts that address new development, existing development, and long-range planning. These policies stem from Coastal Act sections 30253 and 30235. The discussion following each policy is explanatory only.

This information is intended to provide suggestions and ideas for local governments, however, it must be customized for particular situations and locations. Provision of these sample policies is not intended to represent that these policies are required or that, for any particular jurisdiction, the Coastal Commission would consider these policies adequate to carry out the applicable policies of the Coastal Act.

1. *Policy Guidance*: Ensure that new development will not need a shoreline protective device for the duration of its economic life.

Discussion: Coastal Act section 30253(2) says new development may not "in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs." Shoreline protective devices can and do substantially alter natural landforms by greatly reducing erosion of the bluffs behind the device and accelerating erosion of the beach seaward of the device and of the bluffs on either side of the device. In addition, construction of shoreline protective devices can involve substantial grading of the bluff.

New development should be sited far enough from the bluff edge, or top of bluff, that it will not require a seawall, revetment or any other bluff alteration for the full life of the development. This is a two step effort — determining a safe distance from the bluff edge for development, and determining the location and configuration of the bluff edge at some time in the future, often taken to be the life of the development.

2. *Policy Guidance*: Define the economic lifetime of structures as a minimum of 75 years (100 years is preferable).

Discussion: While the Coastal Act does not define the economic lifetime of a structure, the Commission's ReCAP effort has shown that most structures last at least 75 years. Economic life may be developed from the general neighborhood character. However, structures will generally remain in good condition with regular repair and maintenance for at least 75 years after construction.

3. *Policy Guidance*: Require all applications for a permit for new blufftop development to include a geologic report of the entire site with special attention to the area of demonstration, i.e., that area which lies 50 feet inland from the edge of the bluff or that area which lies between the top of the bluff and the point at which a line from the toe of the bluff inclined 20 degrees above horizontal intersects the surface, whichever is greater. The geologic report should be required to include a predicted erosion rate and a setback that will ensure the development will not require shoreline protection during its economic life, based on either a or b, below.

a. Develop a long-term annual average erosion rate, multiply this by the economic life of the structure and either multiply that by a safety factor or add a safety factor as a set distance. For example, if the rate of erosion is determined to be 3 inches per year, the economic life of the structure is 100 years, and the safety factor is 1.2, then the minimum setback is 30 feet (3 in. x 100 yrs. = 300 in., 300 in. = 25 feet, 25 feet x 1.2 = 30 feet). If the safety factor were a set distance of, say, 10 feet, and the rate of erosion and economic life of the structure were the same as in the preceding example, then the setback would be 35 feet. The safety factor may vary regionally, based on the quality of the shoreline change data and the size or magnitude of extreme erosion events.

Factor of Safety
erosion
20.25 x 1.5 = 30.37

b. Require the geologist to provide 75-year and 100-year setback lines and give the methodology for determining the setback.

Discussion: The erosion rate and setback recommended by the geologist will enable the local government to ensure that new development on bluff tops and cliffs is safe from erosion and will not require shoreline protection during its useful life. The local government and coastal analysts will need information on the methodology both to check the thoroughness of the analysis and to compare it with other projects in the vicinity.

4. *Policy Guidance*: In-fill development, i.e., new development between adjacent developed parcels, should be allowed no closer to the bluff edge than as indicated by the geologic report.

Discussion: In areas where a vacant lot lies between two adjacent developed lots, the applicant will often propose a setback distance comparable to that of the adjoining developed properties. This has been found to be appropriate if:

1) the bluff edge is essentially a straight line and not concave at the location of the vacant lot and,
2) the existing structures are currently set back a distance that would equal the erosion rate appropriate to the economic lifetime of the proposed structure.

However, the required geologic report should still determine the full setback that would be necessary for the life of the development and this should be used in site design if it indicates a greater setback is needed.

5. ***Policy Guidance*: Define the bluff edge as the upper termination of a bluff, cliff, or sea cliff. In cases where the top edge of the cliff is rounded away from the face of the cliff as a result of erosion processes related to the presence of the steep cliff face, the bluff line or edge is that point nearest the cliff beyond which the downward gradient of the surface increases more or less continuously until it reaches the general gradient of the cliff. In a case where there is a step-like feature at the top of the cliff face, the landward edge of the uppermost riser is taken to be the cliff edge.**

Discussion: There are many instances where the edge of the blufftop is not a clear and there is not a dramatic change from a horizontal to a vertical surface. Often parcels are not horizontal but slope toward the sea, or there may be a stair-stepped configuration, or there may be gullies present which have cut landward back into the bluff top. Because erosion features, such as gullies, may be evidence of weaker, less stable areas, they must be considered when determining the blufftop setback. Where there may be confusion about the location of the blufftop, it may be appropriate to map the blufftop and include the map in the LCP, clearly identifying the date of the determination as a tool of comparison for future references.

6. ***Policy Guidance*: Require that blufftop landscaping use drought tolerant, native species.**

Discussion: Drought tolerant species do not need as much watering as other species. Adding water to the top of a bluff or bluff face can lead to accelerated bluff failure. Native species are adapted to the harsh conditions of bluff tops (wind, salt spray, etc.)

7. ***Policy Guidance*: Define an "area of high geologic hazard" as fault zones and land subject to dangers from liquefaction and other severe seismic impacts, unstable slopes regardless of slope angle, landslides, areas of coastal cliff instability, tsunamis, and slopes steeper than 30%.**

Discussion: Coastal Act section 30253(1) states that "new development shall minimize risks to life and property in areas of high geologic hazard." These areas should be identified in the LCP and on adopted maps to enable minimization of risk. Depending on the local geologic structure, the appropriate slope percentage that constitutes an area of geologic hazard may be greater or less than 30 percent.

8. ***Policy Guidance*: Accessory structures (e.g. patios, gazebos, etc.), if allowed, should be constructed in such a manner as to be easily relocated landward should they become threatened by shoreline erosion. CDPs authorizing accessory structures should be conditioned with the requirement that the permittee (and all successors in interest) shall remove the accessory structure(s) if threatened by shoreline erosion and that no shoreline protection device shall be allowed for the sole purpose of protecting the accessory structure(s). Accessory structures should not be considered structures for the purposes of shoreline protection as provided in Section 30235 of the Coastal Act.**

Discussion: In certain circumstances such as a small parcel it may be appropriate to allow some accessory structures in the setback area. However, unless there is no other developable area large enough for the minimum development consistent with the zone district, this development should only be allowed if conditionally authorized such that, once threatened, it is relocated or removed. There could also be a situation where a permanent structure is proposed to be located significantly landward of the required bluff setback and a temporary structure is proposed between the permanent structure and the bluff setback area. Again, the temporary structure should only be allowed if it can be relocated if threatened by erosion. Armoring should not be used to protect temporary structures.

9. ***Policy Guidance*: Ensure that land divisions of coastal fronting property will result in new parcels that can be developed with structures that will not require shoreline protection during a 75 or 100 year economic life. Prohibit land divisions that will result in parcels that are unbuildable, e.g., exclusively areas of high geologic hazard; and that each new parcel has at least the minimum developable area, consistent with the zone district, outside of any high geologic hazard area.**

Discussion: Coastal Act section 30106 defines land divisions and lot splits as development. Such divisions should not be authorized if the increase in parcel numbers will increase the demand for shoreline protection. Land divisions should not create unbuildable lots, e.g., entirely on a bluff face, or lots too small to allow for a single-family residence landward of the bluff setback.

10. ***Policy Guidance*: Allow new development on sand dunes only when required to avoid a "taking" of property. Establish a sand dune preservation zone district in the zoning ordinance to provide standards for development on sand dunes when such development must be allowed. Site new development on sand dunes 1) landward of the most seaward**

line of vegetation, 2) in a way that avoids or minimizes adverse impacts to natural dune formation, and 3) in a way that does not adversely affect sandy beach habitat. Require a geologic report to substantiate the stability and integrity of the dune and a biologic report to identify potential biologic impacts and mitigation therefore. Where there is no vegetation, require a geologic report to establish a line seaward of which no new development will be allowed. Ensure that no new development is allowed seaward of the inland extent of the estimated wave runup from the 100-year design storm. Where existing subdivided lots lie entirely seaward of the most seaward line of vegetation or seaward of the inland extent of the estimated 100 year storm wave runup, allow only minimum development, and limit site cover and site disturbance to the extent necessary for the minimum development.

Discussion: The existence of vegetation on dunes is evidence that some amount of stability exists and that the area is not subject to regular wave runup, although this needs to be substantiated by a geologic report, and a biologic report is needed to identify impacts to flora and/or fauna and to identify mitigation. If there is no vegetation, it is more difficult to intuitively discern the area of stability; in those cases it is imperative that a geologic report determine the inland extent of the wave runup from the 100-year storm. Alternatively, this could already be mapped on the land use plan and zoning maps. There are subdivisions that include lots well onto the beach. If these are in fact legal lots of record, then some development must be allowed. In those cases, the amount of development should be limited to reduce impacts to coastal resources and to limit the amount of loss when the inevitable destructive storm occurs.

Policy Guidance for Existing Development

1. *Policy Guidance*: Allow shoreline protective devices only in the following instances:
a. when required to serve coastal-dependent uses, or
b. when required to protect existing principal structures in danger from erosion, or
c. when required to protect public beaches in danger from erosion, AND,
d. when impacts to shoreline sand supply are mitigated.

Discussion: Coastal Act Section 30235 sets up several tests to determine if shoreline protection is an appropriate response to erosion. First, is the subject property a coastal dependent use, existing structure or public beach? If yes, is there a documented danger from erosion. And, third, if yes, does the proposed protection minimize or eliminate impacts to sand supply. Almost every shore protection structure will have some unavoidable impacts on sand supply, as well as the visual character of the shoreline. For areas where there are accessory buildings seaward of the principal structure, the local government may want to consider adding the language to the LCP to prohibit the use of armoring to protect accessory structures. The Coastal Commission has found that relocating ancillary

facilities may be a feasible, less environmentally damaging alternative than constructing a shoreline protective device. In general, accessory structures can usually be relocated, while it is more problematic to relocate the principal residence or building. Shoreline protective devices should only be authorized when necessary and only to protect those structures that cannot feasibly be protected in any other manner and that are or contain the principal use of the site, and when impacts to shoreline sand supply are mitigated. For all situations, the applicant should consider alternatives to shoreline protective devices; for accessory structures relocation should be thoroughly reviewed.

2. ***Policy Guidance*: Define principal structures as any primary living quarters, main commercial buildings, and functionally necessary appurtenances to those structures such as septic systems and infrastructure. Facilities such as privately owned, non-coastal dependent pipelines, roads, utilities and accessory structures (e.g. storage sheds, decks, patios, gazebos, walkways, landscaping, etc.) are not considered to be principal structures.**

Discussion: The Coastal Act simply uses the words "existing structures" without any qualifications or definitions in Section 30235. By limiting development for which shoreline protective devices may be constructed, coastal armoring and consequent beach erosion may be slowed. The Coastal Commission has found that it is generally feasible to relocate ancillary structures while it is more problematic, although not necessarily infeasible, when considering the principal residence or building. Relocation of ancillary facilities may be environmentally less damaging than a seawall and more protective of coastal resources. Coastal Act section 30235 states that seawalls shall be permitted when required to protect existing structures. If it is feasible to relocate structures, then a seawall is not required for protection.

3. ***Policy Guidance*: Require applications to include an analysis of alternatives that are capable of protecting the existing structure from erosion including, but not limited to: a) no action; b) involvement in regional beach nourishment; and/or c) the relocation of the threatened structure. Require the following information also: amount of beach that will be covered by the shoreline protective device; the amount of beach that will be lost over time, through passive erosion; total lineal feet of shoreline protective devices within the littoral cell where the device is proposed; and, the cumulative impact of added shoreline protective devices for the littoral cell within which the proposed device will be located.**

Discussion: LCPs should establish thorough and understandable filing requirements that take into account local and regional shoreline situations. This will allow an analysis of cumulative impacts within the littoral cell and allow the impacts of the individual project to be considered in a regional context. This in turn can provide the basis for non-armored responses to coastal bluff erosion.

4. *Policy Guidance*: Define the replacement of residences destroyed by storm waves or bluff failure as "minor development," or require submittal of plans but waive the requirement for actually obtaining a permit if the replacement residence conforms to applicable existing zoning requirements, is for the same use as the destroyed structure, does not exceed either the floor area, height, or bulk of the destroyed structure by more than 10 percent, and if the replacement residence is setback on the parcel at least 60 percent of the minimum bluff edge setback for new structures in the same area with the same geologic structure. Do not allow a structure to be relocated to a wetland, stream, or other sensitive habitat.

Discussion: The Coastal Act states that structures destroyed by a disaster may be replaced without need for a coastal development permit if the structure conforms to applicable existing zoning requirements, is for the same use, does not exceed the floor area, height, or bulk of the destroyed structure by more than 10 percent and if the structure is sited at the same location as the destroyed structure. However, it may be physically impossible, or at least infeasible, to locate the replacement structure in the same location as the destroyed structure because, for example, bluff failure may result in the physical loss of the original location. This means that a coastal development permit would be necessary to relocate the structure away from the original location to a safer location. However, in some cases, a landowner may seek to locate a replacement residence in its original location simply to avoid permit requirements. This could result in the residence not being placed in the safest area on the site. If the relocation is defined as a "minor development," then, while a permit would be required, there would no requirement for a public hearing. Alternatively, the requirement for actually obtaining a permit could be waived. In that case, the applicant would submit plans for review, but no permit would be issued or necessary. Under either of these alternatives, the owner would have an incentive to relocate the structure to a safer location where shoreline protection would not be necessary. This would further the goals of protecting existing structures, reducing the need for shoreline protective structures, and reducing beach erosion. The proposed policy guidance reduces the immediate and future need for shorelines protective structures without causing beach erosion and its relocation provisions may be more economically feasible than reconstructing in the same location with armoring.

5. *Policy Guidance*: Encourage the relocation of threatened structures, rather than constructing shoreline protective devices, by waiving permit filing fees for applications to relocate structures or providing variances from zoning requirements such as side or front yard setbacks, etc.

Discussion: Relocation of a structure away from an eroding bluff or out of the reach of storm waves may provide the applicant with many years of future site use without the costs and effects of long term shoreline protection.

6. *Policy Guidance*: Annually notify in writing all blufftop property owners that the placement of emergency shoreline protective devices shall be allowed only when the need for such protection was in fact caused by a sudden, unexpected occurrence demanding immediate action to prevent or mitigate loss or damage to life, health, property, or essential public services. Emergency permits will become void and the structure authorized by them considered a public nuisance unless the property owner makes an application for a regular coastal development permit within 30 days of the issuance of the emergency authorization.

Discussion: Emergency permits are available as a possible response to a sudden, unexpected occurrence. It is not an emergency if a condition has been known for a long time, but no action is taken to address the condition until it becomes critical. Unfortunately, emergency shoreline protection is often installed during difficult conditions and often cannot be designed or constructed with the same level of care as shoreline protection that is designed and constructed in a timely manner. Annual notices will encourage coastal property owners to plan ahead and should suggest that coastal property owners retain an engineering geologist to assess whether the property is stable or in need of some form of stabilization. Also all emergency permits must be followed up by regular permit applications to ensure that the standards for shoreline protective structures are met and to verify that the emergency device is still needed. It can be quite costly to remedy poorly designed or constructed emergency structures, so proper planning and design initially is important.

7. *Policy Guidance*: Prohibit new shoreline protective structures from extending onto a beach farther than a straight line connecting the nearest corners of adjacent shoreline protective structures, if any. Require new shoreline protective devices to cover the least amount of beach area as is necessary to provide adequate protection for the existing principal structure.

Discussion: If a new shoreline protective structure is designed to fill in between two existing shoreline protective structures, the "in-fill" should only be allowed for one or two urban lots, at a maximum. Since shoreline protection will interfere with shoreline access and sediment transport during some conditions, shore protection structures should be sited as far landward as possible to minimize these effects.

8. *Policy Guidance*: Send notices of shoreline protective device permit applications to all local governments with shoreline within the same littoral cell.

Discussion: The littoral cell is the natural boundary for dealing with beach sand supply and movement. Without knowing the range of shore developments that is proposed for a littoral cell regardless of political jurisdiction, other jurisdictions cannot take any sort of coordinated action to preserve and/or restore beaches.

9. *Policy Guidance*: Prohibit additional permanent structures on bluff faces, except for engineered public beach access where no feasible alternative means of public access exists.

Discussion: New structures such as stairways added to bluff faces could become existing structures eligible for a shoreline protective device when threatened by erosion. This in turn adds to shoreline armoring. Among other things, the Coastal Act protects and encourages public access to beaches. Therefore, local governments should consider prohibiting all new stairways on bluff faces unless no feasible alternative means of public access to a beach exists.

10. *Policy Guidance*: Require that blufftop landscaping use drought tolerant native species whenever possible.

Discussion: Drought tolerant native species do not need as much watering as other species. Adding water to the top of a bluff can lead to accelerated bluff failure. Blufftop landscaping should be designed to minimize irrigation and avoid artificial soil saturation. Native species are adapted to the harsh conditions of bluff tops (wind, salt spray, etc.).

11. *Policy Guidance*: Require all existing, non-permitted shoreline protective structures constructed after January 1, 1973 to obtain a coastal development permit. Declare non-permitted shoreline protective structures a public nuisance. Require the property owner to apply for a coastal development permit for such structures no later than one year from the date of certification of this policy by the Coastal Commission. Failure to meet the deadline may result in the local government posting the property with a notice of violation and recording it against the property.

Discussion: Shoreline protective devices that were built after January 1, 1973, without coastal permits, are illegal. Many of these devices were not built according to standard engineering practices and so may pose a hazard to the public or to the property owner through premature failure. To require these unpermitted structures to obtain a permit would allow for review and possible correction of substandard structures.

12. *Policy Guidance*: If an in lieu fee mitigation program exists, require payment of an in lieu fee to support beach nourishment efforts in a manner proportionate to the quantifiable effects of the shoreline protective device on the amount of sand that would have been nourishing the beach in the absence of the shoreline protective device.

Discussion: The Commission has designed and implemented a methodology for making such a calculation. In many areas with shoreline erosion problems, it may be appropriate to incorporate an analogous methodology into the LCP.

Policy Guidance For Long-Range Planning

1. *Policy Guidance*: Inventory available studies on local and regional coastal processes and beach resources; participate in studies to fill in information gaps about regional effects of shoreline protective structures on beach erosion and methods to counteract beach erosion. Establish an Overlay or Geologic Hazard Assessment District (include tsunamis) and designate areas of coastal resource significance (e.g., sand dunes and areas of high geologic hazard) on the LUP and zoning maps, to limit in-filling for relatively undeveloped areas and to limit seaward encroachment of development.

Discussion: This type of information, whether compiled from existing sources or undertaken by the local government itself, will provide a basis for implementing long range solutions, other than armoring, to the hazards associated with shoreline erosion.

2. *Policy Guidance*: Create and maintain a database/file of geotechnical reports from individual projects for use in analysis of regional effects of shoreline protective structures, including documentation of interference with sand transport, loss of sand from the beach, the amount of beach area already covered by shoreline protection devices, location of such encroachments, and the cumulative impacts of those devices on recreational use.

Discussion: Such a data base can serve both the local government and applicants by allowed rapid recall of past project information.

3. *Policy Guidance*: Develop an in-lieu fee mitigation program to allow for mitigation of seawall impacts through payment of an in-lieu fee that is used to replenish beaches in the same littoral cell as the seawall.

Discussion: In natural areas and/or areas not already stabilized by shoreline protective devices, armoring halts erosion of the area behind the protective device and hence eliminates a source of future beach material, causes increased erosion of the beach seaward of the device, and can interfere with longshore transport of sand within the littoral cell. This type of policy encourages local governments to develop programs for collecting in-lieu fees that can be used to mitigate some of the permanent and adverse effects of armoring on public resources. Such a policy would enable the creation of a fund with which the relevant local government could fund beach nourishment. Utilize information and expertise from the SANDAG (San Diego Association of Governments) and BEACON (Beach Erosion Authority for Control and Nourishment) experiences as appropriate (Contact the Coastal Commission's San Diego or Ventura office for further information).

4. *Policy Guidance*: Monitor and comment on other jurisdiction's activities which may affect natural sand movement and supply on the local governments beaches.

Discussion: Ideally there would be a multi-jurisdictional entity that would study shoreline processes, shoreline change and long-term trends and provide a forum to discuss projects that could affect other jurisdictions within the littoral cell. In any event, local tracking of projects will help to keep all jurisdictions aware of activities and provide them an opportunity to comment on projects that may result in adverse effects on their beaches.

5. *Policy Guidance*: Develop a comprehensive shoreline protection program that includes regular shoreline surveys to develop short and long-term shoreline trends, identifying priorities for types of shoreline protection, and developing programs for opportunistic beach nourishment using clean dredge material, clean material from flood control structures, clean excavation material and other innovative sources. Identify which beaches have priority for nourishment.

Discussion: The littoral cell is the most reasonable geographic division for studying shoreline processes and shoreline trends. Since jurisdictional boundaries were not established with concern for littoral cell boundaries, a regional, multi-jurisdictional entity would be the ideal forum for a comprehensive shoreline program. If no such program exists, local jurisdictions can undertake a great deal of useful study and examination of shoreline processes on a smaller and more manageable section of shoreline within their local boundaries. Such program should identify the major factors that influence coastal processes within the cell and concentrate on those factors over which the local jurisdiction has control.

6. *Policy Guidance*: Rank the types of permissible shoreline protective devices in order of least to most potential coastal impact and set forth technical criteria and standards for the structural design of shoreline protective devices.

Discussion: This will depend on the local shoreline characteristics and access considerations.

7. *Policy Guidance*: Encourage voluntary consolidation or purchase of property, or development of a transfer of development credit program as a means to reduce development potential of coastal fronting land.

8. *Policy Guidance*: Seek federal and state funds to conduct the following types of studies: source of harbor deposition material, the impact of beach erosion on beach access, the effect harbor deposition has on beach replenishment downcoast of the harbor; the impact of harbor dredging on potential tsunami hazard, and the direct and indirect costs of harbor dredging to the local government or Harbor District.

TYPE OF POLICY	JURISDICTION
Setbacks for Development on Blufftops and Sand Dunes 1f	Mendocino County Coastal Element Hazards Policy 3.4-7 The County shall require that new structures be set back a sufficient distance from the edges of bluffs to ensure their safety from bluff erosion and cliff retreat during their economic life spans (75 years). Setbacks shall be of sufficient distance to eliminate the need for shoreline protective works. Adequate setback distance will be determined from information derived from the required geologic investigation and from the following setback formula: Setback (meters) = Structure life (years) x retreat rate (meters/year) The retreat rate shall be determined from historical observation (e.g., aerial photographs) and/or from a complete geotechnical investigation.
Setbacks for Development on Blufftops and Sand Dunes 1g **Setbacks for Development on Blufftops and Sand Dunes 1g (cont'd)**	City of Encinitas Hazard Policy 1.6f: The City shall provide for the reduction of unnatural causes of bluff erosion, as detailed in the Zoning Code, by:... Requiring new structures and improvements to existing structures to be set back...40 feet from coastal blufftop edge with exceptions to allow a minimum coastal blufftop setback of no less than 25 feet. For all development proposed on coastal blufftops, a site-specific geotechnical report shall be required. The report shall indicate that the coastal blufftop setback will not result in risk of foundation damage resulting from bluff erosion or retreat to the principal structure within its economic life and with other engineering evidence to justify the coastal blufftop setback. On coastal bluffs, exceptions to allow a minimum setback of not less than 25 feet shall be limited to additions or expansions to existing principal structures which are already located seaward of the 40 foot coastal blufftop setback, provided the proposed addition or expansion is located no further seaward than the existing principal structure, is set back a minimum of 25 feet from the coastal blufftop edge, and the applicant agrees to remove the proposed addition or expansion, either in part or entirely, should it become threatened in the future. In all cases, all new construction shall be specifically designed and constructed such that it could be removed in the event of endangerment and the applicant shall agree to participate in any comprehensive plan adopted by the City to address coastal bluff recession and shoreline erosion problems in the City This does not apply to minor structures that do not require a building permit, except that no structures, including walkways, patios, patio covers, cabanas, windscreens, sundecks, lighting standards, walls, temporary accessory building not exceeding 200 square feet in area, and similar structures shall be allowed within five feet from the bluff top edge... .

EXHIBIT C

Date	Address	City Number	Setback	Methodology	CCC Action	CCC Number	CCC Methodology
8/31/95	1630 Neptune	95-111 CDP	40 Feet	Geotech Cert	None	N/A	N/A
5/28/98	1320 Neptune	98-010 CDP	40 Feet	Geotech Cert	None	N/A	N/A
2/24/00	112 Neptune	99-241 CDP	40 Feet	Geotech Cert	None	N/A	N/A
3/30/00	150 Neptune	99-254 CDP	40 Feet	Geotech Cert	None	N/A	N/A
4/27/00	462 Moonlight Lane	99-278 CDP	40 Feet	Geotech Cert	None	N/A	N/A
11/16/00	1360 Hwy 101	00-108 CDP	40 Feet	Geotech Cert	None	N/A	N/A
3/15/01	**1616 Neptune**	**00-303 CDP**	**40 Feet**	**Geotech Cert**	**APPEAL**	**A-6-ENC-01-116**	**Geotech Cert**
12/6/01	**1264 Neptune**	**01-062 CDP**	**40 Feet**	**Geotech Cert**	**APPEAL**	**A-6-ENC-02-3**	**Geotech Cert**
5/9/02	544 Fourth	01-264 CDP	40 Feet	Geotech Cert	None	N/A	N/A
11/20/03	104 Neptune	02-245 CDP	40 Feet	Geotech Cert	None	N/A	N/A
6/3/04	**736 Fourth**	**03-165 CDP**	**40 Feet**	**Geotech Cert**	**APPEAL**	**A-6-ENC-04-81**	**No Substantial Issue (JM Sought by Staff)**
6/17/04	1610 Neptune	03-157 CDP	40 Feet	Geotech Cert	None	N/A	N/A
12/16/04	560 Neptune	01-197 CDP	40 Feet	Geotech Cert	None	N/A	N/A
6/16/05	1350 Hwy 101	03-265 CDP	40 Feet	Geotech Cert	None	N/A	N/A
7/20/06	**282 Neptune**	**05-161 CDP**	**40 Feet**	**Geotech Cert**	**APPEAL**	**A-6-ENC-06-100**	**Johnsson Method**
7/20/06	**629 Fourth**	**05-068 CDP**	**40 Feet**	**Geotech Cert**	**APPEAL**	**A-6-ENC-06-101**	**Johnsson Method**
8/21/08	1230 Neptune	02-237 CDP	40 Feet	Geotech Cert	None	N/A	N/A
12/18/08	**708 Fourth**	**07-022 CDP**	**40 Feet**	**Geotech Cert**	**APPEAL**	**A-6-ENC-09-2**	**Johnsson Method**
6/4/09	828 Neptune	07-155 CDP	40 Feet	Geotech Cert	APPEAL	A-6-ENC-09-40	Hybrid - 47 Feet
6/2/11	1550 Neptune	10-129 CDP	40 Feet	Geotech Cert	None	N/A	N/A

CALIFORNIA COASTAL COMMISSION
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Th16a

Addendum

August 4, 2016

To: Commissioners and Interested Persons

From: California Coastal Commission
San Diego Staff

Subject: Addendum to **Item Th16a**, Coastal Commission Permit Application **#A-6-ENC-16-0067 (Meardon)**, for the Commission Meeting of August 11, 2016

The purpose of this addendum is to make minor corrections to the staff report. Staff recommends the following changes be made to the above-referenced staff report. Deletions shall be marked by a ~~strikethrough~~ and additions shall be underlined:

1. On Page 1 of the staff report, the Project Description shall be corrected as follows:

   Demolition of an existing single family residence and construction of a new, 2-story, 3,756 sq. ft. home over a 1,113 sq. ft. basement with a 795 sq. ft. attached garage on a 6,440 sq. ft. ~~vacant~~ coastal bluff lot.

2. On Page 2 of the staff report, the second complete paragraph shall be revised as follows:

   The proposed project consists of demolition of an existing single family residence and construction of a new, 2-story, 3,756 sq. ft. home over a 1,113 sq. ft. basement with a 795 sq. ft. attached garage on a 6,440 sq. ft. coastal bluff lot. The basement and first floor are proposed to be located approximately 40 ft. from the coastal bluff edge and the second floor deck is proposed to cantilever within 32 ft. of the bluff edge…

3. On Page 8 of the staff report, the first complete paragraph shall be revised as follows:

   The project approved by the City of Encinitas on June 2, 2016 allows for the demolition of an approximately 2,000 sq. ft. existing single family residence and construction of a new, 2-story, 3,756 sq. ft. home over a 1,113 sq. ft. basement with a 795 sq. ft. attached garage on a 6,440 sq. ft. coastal bluff lot. The basement and first floor are proposed to be located approximately 40 ft. from the coastal bluff edge and the second floor deck is proposed to cantilever within 32 ft. of the bluff edge…

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Th16a

Filed:	7/12/2016
49th Day:	8/30/2016
Staff:	E.Stevens-SD
Staff Report:	07/28/2016
Hearing Date:	08/11/2016

STAFF REPORT AND RECOMMENDATION ON APPEAL SUBSTANTIAL ISSUE DETERMINATION

Local Government:	**City of Encinitas**
Decision:	**Approved with Conditions**
Appeal Number:	**A-6-ENC-16-0067**
Applicant:	**Paul Meardon**
Location:	438 Neptune Avenue, Encinitas, San Diego County (APN #256-282-05)
Project Description:	Demolition of an existing single family residence and construction of a new, 2-story, 3,756 sq. ft. home over a 1,113 sq. ft. basement with a 795 sq. ft. attached garage on a 6,440 sq. ft. vacant coastal bluff lot
Appellants:	Chair Commissioner Steve Kinsey and Commissioner Mary Shallenberger
Staff Recommendation:	Substantial Issue

IMPORTANT HEARING PROCEDURE NOTE

The Commission will not take testimony on this "substantial issue" recommendation unless at least three commissioners request it. The Commission may ask questions of the applicant, any aggrieved person, the Attorney General or the executive director prior to determining whether or not to take testimony regarding whether the appeal raises a substantial issue. If the Commission takes testimony regarding whether the appeal raises a substantial issue, testimony is generally and at the discretion of the Chair limited to 3 minutes total per side. Only the applicant, persons who opposed the application before the local government (or their representatives), and the local government shall be qualified to testify during this phase of the hearing. Others may submit comments in writing.

If the Commission finds that the appeal raises a substantial issue, the de novo phase of the hearing will occur at a future Commission meeting, during which it will take public testimony.

SUMMARY OF STAFF RECOMMENDATION

The staff recommends that the Commission, after public hearing, determine that substantial issue exists with respect to the grounds on which the appeal has been filed.

The proposed project consists of demolition of an existing single family residence and construction of a new, 2-story, 3,756 sq. ft. home over a 1,113 sq. ft. basement with a 795 sq. ft. attached garage on a 6,440 sq. ft. coastal bluff lot. The basement and first floor are proposed to be located approximately 40 ft. from the coastal bluff edge and the second floor is proposed to cantilever within 32 ft. of the bluff edge. The basement is proposed to provide the foundation for the house, where the finished floor elevation would be approximately 10 feet below existing grade. The subject site is located on the west side of Neptune Avenue, approximately ½ mile north of the Moonlight Beach Park and ½ mile south of Beacon's Beach, in the City of Encinitas. No shoreline armoring fronts the site.

The City found that the subject single-family residence is consistent with the public access, public recreation, and blufftop development provisions of the certified Local Coastal Program (LCP). However, the development, as approved by the City, raises several LCP consistency issues with regard to geologic stability, future shoreline protection, the lack of an alternatives analysis, protection of visual resources, and future removal of development threatened by erosion.

The City's certified LCP requires that new development on bluff top lots be set back such that it will be safe from instability and erosion over its lifetime. In order to find the appropriate geologic setback, the certified LCP requires that a geotechnical analysis must demonstrate that an adequate factor of safety of 1.5 exists under present conditions, and that an adequate factor of safety of 1.5 will be maintained over 75 years, for all types of slope failure. In this case, the City approved a setback of 40 ft. from the bluff edge based on a geotechnical analysis that the Commission's geologist determined did not appropriately calculate the factor of safety or the erosion rate. Furthermore, the City failed to determine where the factor of safety of 1.5 would be located after 75 years of erosion. After reviewing the project and the submitted geotechnical information, the Commission's geologist provisionally determined that a setback of 83 feet from the bluff edge is required to maintain a factor of safety of 1.5 for 75 years. Thus, the approved setback of 40 feet from the bluff edge is inadequate to achieve a 1.5 factor of safety and account for 75 years of erosion, and therefore places the home as currently proposed to be sited at risk from erosion, raising a substantial issue.

The subject lot from the edge of the bluff to the eastern property line is approximately 120 feet in length, and 50 feet in width. Thus, a smaller size home than the proposed 5,664 sq. ft. home (including the proposed basement and garage), will likely be necessary. However, there was no alternatives analysis done, as required by the LCP, that examines revised project designs or the potential for reduced yard setbacks that would allow a new home to be sited safely on the site. The lack of information on alternatives to the proposed project raises a substantial issue.

Furthermore, because LCP policies prohibit development that could require structural measures to prevent collapse, the project must be conditioned to require that such future measures are prohibited to protect this new development. The permit should be conditioned to require the applicant to waive any rights to construct future shoreline protection to ensure consistency with the LCP. However, the City did not require the applicant to waive any such rights, which raises a substantial issue.

Although the proposed large basement area would initially be buried under the home, since siting the proposed residence 40 feet back from the bluff edge is likely to result in the structure being at risk from erosion and bluff instability, construction of a basement 40 feet from the bluff edge could result in the basement walls being exposed in the future as the bluff erodes. However, removing or moving back the 10-foot deep structure would likely require a great deal of alteration of the bluff that could be infeasible, and the excavation could threaten the overall stability of the bluff. Thus, construction of a basement in the proposed location raises a substantial issue.

The precedential value of the local government's decision for future interpretations of its LCP is also important with regard to this project. At the Commission's July 2016 hearing, the Commission found Substantial Issue for a project that raised nearly identical issues as the subject project located directly adjacent to the north of the site (A-6-ENC-16-0060/Martin, 444 Neptune Avenue). In addition, at the July 2016 hearing, the Commission found Substantial Issue for an additional project located approximately ½ mile south of the subject site that raised similar issues as the subject project (A-6-ENC-13-0210/Lindstrom, 132 Neptune Avenue). In the case of the property at 132 Neptune Avenue, the Commission approved the project on De Novo with special conditions that required a larger bluff setback and a waiver of rights to shoreline armoring. Furthermore, on the same agenda as the subject project, the Commission is reviewing an appeal for a new single-family residence located approximately ½ mile north of the subject site that similarly did not fully assess stability factors over 75 years (A-6-ENC-16-0068/Hurst, 808 Neptune Avenue). As part of early coordination efforts by Commission staff, on January 11, 2016, Commission staff provided City staff with a comment letter on the subject project and two other similar projects in Encinitas that identified the LCP and Coastal Act inconsistencies that are raised in this appeal (Exhibit 7). If the potential for bluff erosion in Encinitas is not accurately and fully evaluated, many new developments along the shoreline will likely be placed at risk, resulting in the need for shoreline protection in the future along significant stretches of the City's coastline.

Because of the above-described inconsistencies with the LCP, staff recommends that the Commission determine that the project raises a substantial issue regarding conformance with the certified LCP.

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APPENDICES

EXHIBITS

I. APPELLANTS CONTEND

Chair Kinsey and Commissioner Shallenberger appealed. They contend the project as approved by the City does not conform to the City of Encinitas' certified Local Coastal Program (LCP). The appellants contend that 1) the site-specific geotechnical report for the project is inadequate because it significantly underestimates the erosion potential of the bluff-top site, and thus, does not demonstrate the development will be sited in a safe location for the life of the structure so as to not require shoreline protection in the future; 2) the City failed to prohibit future shoreline protection or require the applicant to waive their rights to any future shoreline protection for the proposed new development; 3) the City did not analyze alternative solutions to reduce potential impacts on bluff stability, and 4) the City should have required the applicant to develop a plan to remove the basement along with other portions of the home or incrementally retreat from the bluff edge should erosion cause a reduction in the geologic setback in the future, and 5) the proposed home has the potential to create adverse visual impacts in the future because the amount of erosion expected at the site over the lifetime of the structure may lead to the exposure of the proposed basement, which is inconsistent with the visual resources policies of the certified LCP that requires new development to preserve the scenic qualities of the surrounding bluffs.

II. LOCAL GOVERNMENT ACTION

The coastal development permit was approved by the City of Encinitas Planning Commission on June 2, 2016. Specific conditions were attached which, among other things, prohibit permanent irrigation and grading improvements within 40 ft. of the coastal bluff edge setback, require the use of Best Management Practices to control runoff and erosion during construction and after completion of the project to divert surface water away from the bluffs, the recordation of an open space easement over the coastal bluff face that does not preclude the exercise of emergency measures if authorized in the future, submission of an "as built geotechnical report" to verify recommendations of the Geotechnical Report are implemented and on final construction plans and structural calculations for the new residence, and that the property owner participate in any comprehensive plan adopted by the City to address coastal bluff recession and shoreline erosion problems in the City.

III. APPEAL PROCEDURES

After certification of a Local Coastal Program (LCP), the Coastal Act provides for limited appeals to the Coastal Commission of certain local government actions on coastal development permits.

Section 30603(b)(1) of the Coastal Act states:

> *The grounds for an appeal pursuant to subdivision (a) shall be limited to an allegation that the development does not conform to the standards set forth in the certified local coastal program or the public access policies set forth in this division.*

Coastal Act Section 30625(b) states that the Commission shall hear an appeal unless it determines:

> *With respect to appeals to the commission after certification of a local coastal program that no substantial issue exists with respect to the grounds on which an appeal has been filed pursuant to Section 30603.*

If the staff recommends "substantial issue" and no Commissioner objects, the Commission will proceed directly to the de novo portion of the hearing on the merits of the project, then, or at a later date. If the staff recommends "no substantial issue" or the Commission decides to hear arguments and vote on the substantial issue question, those allowed to testify at the hearing will have 3 minutes per side to address whether the appeal raises a substantial issue. It takes a majority of Commissioners present to find that no substantial issue is raised. If substantial issue is found, the Commission will proceed to a full public hearing on the merits of the project then, or at a later date, reviewing the project de novo in accordance with sections 13057-13096 of the Commission's regulations. If the Commission conducts the de novo portion of the hearing on the permit application, the applicable standard of review for the Commission to consider is whether the proposed development is in conformity with the certified Local Coastal Program (LCP).

In addition, for projects located between the sea and the first public road paralleling the sea, Section 30604(c) of the Act requires that a finding must be made by the approving agency, whether the local government or the Coastal Commission on appeal, that the development is in conformity with the public access and public recreation policies of Chapter 3 of the Coastal Act. In other words, in regard to public access questions, the Commission is required to consider not only the certified LCP, but also applicable Chapter 3 policies when reviewing a project on appeal.

The only persons qualified to testify before the Commission at the "substantial issue" stage of the appeal process are the applicant, persons who opposed the application before the local government (or their representatives), and the local government. Testimony from other persons must be submitted in writing. At the time of the de novo portion of the hearing, any person may testify.

The term "substantial issue" is not defined in the Coastal Act or its implementing regulations. The Commission's regulations indicate simply that the Commission will hear an appeal unless it "finds that the appeal raises no significant question as to conformity with the certified local coastal program" or, if applicable, the public access and public recreation policies of Chapter 3 of the Coastal Act (Cal. Code Regs., tit. 14 section 13115(b)). In previous decisions on appeals, the Commission has been guided by the following factors:

1. The degree of factual and legal support for the local government's decision that the development is consistent or inconsistent with the certified LCP;

2. The extent and scope of the development as approved or denied by the local government;

3. The significance of the coastal resources affected by the decision;

4. The precedential value of the local government's decision for future interpretations of its LCP; and

5. Whether the appeal raises only local issues, or those of regional or statewide significance.

Even when the Commission chooses not to hear an appeal, appellants nevertheless may obtain judicial review of the local government's coastal permit decision by filing a petition for a writ of mandate pursuant to the Code of Civil Procedure, section 1094.5.

The City of Encinitas has a certified Local Coastal Program (LCP), and the subject site is located in an area where the Commission retains appeal jurisdiction because it is located between the first public road and the sea. Therefore, before the Commission considers the appeal de novo, the appeal must establish that a substantial issue exists with respect to the grounds on which an appeal has been filed pursuant to Section 30603. In this case, for the reasons discussed further below, the Commission exercises its discretion to determine that the development approved by the City raises substantial issue with regard to the appellant's contentions regarding coastal resources.

IV. SUBSTANTIAL ISSUE MOTION AND RESOLUTION

The staff recommends the Commission adopt the following resolution:

MOTION: ***I move that the Commission determine that Appeal No. A-6-ENC-16-0067 raises NO substantial issue with respect to the grounds on which the appeal has been filed under § 30603 of the Coastal Act.***

STAFF RECOMMENDATION:

Staff recommends a **NO** vote. Failure of this motion will result in a de novo hearing on the application, and adoption of the following resolution and findings. Passage of this motion will result in a finding of No Substantial Issue and the local action will become final and effective. The motion passes only by an affirmative vote of the majority of the appointed Commissioners present.

RESOLUTION: ***The Commission hereby finds that Appeal No. A-6-ENC-16-0067 presents a substantial issue with respect to the grounds on which the appeal has been filed under § 30603 of the Coastal Act regarding consistency with the certified Local Coastal Plan and/or the public access and recreation policies of the Coastal Act.***

V. SUBSTANTIAL ISSUE FINDINGS AND DECLARATION

The Commission finds and declares as follows:

A. PROJECT DESCRIPTION/HISTORY

The project approved by the City of Encinitas on June 2, 2016 allows for the demolition of an approximately 2,000 sq. ft. existing single family residence and construction of a new, 2-story, 3,756 sq. ft. home over a 1,113 sq. ft. basement with a 795 sq. ft. attached garage on a 6,440 sq. ft. coastal bluff lot. The basement and first floor are proposed to be located approximately 40 ft. from the coastal bluff edge and the second floor is proposed to cantilever within 32 ft. of the bluff edge. The basement is proposed to provide the foundation for the house, where the finished floor elevation would be approximately 10 feet below existing grade.

The subject site is located on the west side of Neptune Avenue, approximately ½ mile north of the Moonlight Beach Park and ½ mile south of Beacon's Beach, in the City of Encinitas (Exhibit 1). The existing home on the site was constructed in approximately 1959. The subject property is currently not protected by any shoreline armoring (Exhibit 2-4) and there is no Commission permit history on the site. However, the Commission previously approved a 13 ft. high, approximately 105 ft. long seawall to protect an existing home two lots north of the subject site (452 Neptune Ave.; CDP #6-93-136/Favero) and a 9 ft. high, shotcrete seawall fronting six non-contiguous homes approximately 250 ft. south of the subject site (312, 354, 370, 378, 396, and 402 Neptune Ave.; CDP #6-93-85/Auerbach).

The standard of review is the certified City of Encinitas Local Coastal Program and the public access and recreation policies of the Coastal Act.

B. GEOLOGIC STABILITY

Bluff Stability and Erosion

The project approved by the City is located within the Coastal Bluff Overlay Zone. The appellants contend that the development is inconsistent with LCP provisions that require the site-specific geotechnical report to demonstrate that "*any proposed structure or facility is expected to be reasonably safe from failure and erosion over its lifetime without having to propose any shore or bluff stabilization to protect the structure in the future …*" and to

analyze *"[h]istoric, current, and foreseeable-cliff erosion..."* The pertinent LCP provisions are below:

Public Safety Policy 1.3 of the City's Land Use Plan (LUP) requires that:

> *The City will rely on the Coastal Bluff and Hillside/Inland Bluff Overlay Zones to prevent future development or redevelopment that will represent a hazard to its owner or occupants, and which may require structural measures to prevent destructive erosion or collapse.*

Section 30.34.020(C) of the City's Certified Implementation Plan (IP), states in part:

> *1. Development and improvement in compliance with the development standards in paragraph B "Development Standards," proposing no structure or facility on or within 40 feet of the top edge of the coastal bluff (except for minor accessory structures and improvements allowed pursuant to Section 30.34.02(B)1b), and proposing no preemptive measure as defined below, shall be subject to the following: submittal and acceptance of a site-specific soils report and geotechnical review described by paragraph D "Application Submittal Requirements" below. The authorized decision-making authority for the proposal shall make the findings required based on the soils report and geotechnical review for any project approval. A second story cantilevered portion of a structure which is demonstrated through standard engineering practices not to create an unnecessary surcharge load upon the bluff area may be permitted 20% beyond the top edge of bluff setback if a finding can be made by the authorized agency that no private or public views would be significantly impacted by the construction of the cantilevered portion of the structure.*

Section 30.34.020(D) of the City's Certified IP states, in part:

> *APPLICATION SUBMITTAL REQUIREMENTS. Each application to the City for a permit or development approval for property under the Coastal Bluff Overlay Zone shall be accompanied by a soils report, and either a geotechnical review or geotechnical report as specified in paragraph C "Development Processing and Approval" above. Each review/report shall be prepared by a certified engineering geologist who has been pre-qualified as knowledgeable in City standards, coastal engineering and engineering geology. The review/report shall certify that the development proposed will have no adverse effect on the stability of the bluff, will not endanger life or property, and that any proposed structure or facility is expected to be reasonably safe from failure and erosion* ***over its lifetime*** *without having to propose any shore or bluff stabilization to protect the structure in the future* [emphasis added]. *Each review/report shall consider, describe and analyze the following:*
>
> 1. *Cliff geometry and site topography, extending the surveying work beyond the site as needed to depict unusual geomorphic conditions that might affect the site.*

2. *Historic, current and foreseeable cliffs erosion, including investigation or recorded land surveys and tax assessment records in addition to land use of historic maps and photographs where available and possible changes in shore configuration and sand transport.*

3. *Geologic conditions, including soil, sediment and rock types and characteristics in addition to structural features, such as bedding, joints and faults.*

4. *Evidence of past or potential landslide conditions, the implications of such conditions for the proposed development, and the potential effects of the development on landslide activity.*

5. *Impact of construction activity on the stability of the site and adjacent area.*

6. *Ground and surface water conditions and variations, including hydrologic changes caused by the development (e.g., introduction of irrigation water to the groundwater system; alterations in surface drainage).*

7. *Potential erodibility of site and mitigating measures to be used to ensure minimized erosion problems during and after construction (i.e., landscaping and drainage design).*

8. *Effects of marine erosion on seacliffs and estimated rate of erosion at the base of the bluff fronting the subject site based on current and historical data.*

9. *Potential effects of seismic forces resulting from a maximum credible earthquake.*

10. *Any other factors that might affect slope stability.*

11. *Mitigation measures and alternative solutions for any potential impacts.*

The report shall also express a professional opinion as to whether the project can be designed or located so that it will neither be subject to nor contribute to significant geologic instability ***throughout the life span of the project*** *[*emphasis added]. *The report shall use a current acceptable engineering stability analysis method and shall also describe the degree of uncertainty of analytical results due to assumptions and unknowns. The degree of analysis required shall be appropriate to the degree of potential risk presented by the site and the proposed project.*

In addition to the above, each geotechnical report shall include identification of the daylight line behind the top of the bluff established by a bluff slope failure plane analysis. This slope failure analysis shall be performed according to geotechnical engineering stands, and shall:

a. Cover all types of slope failure.

b. Demonstrate a safety factor against slope failure of 1.5.

c. Address a time period of analysis of 75 years.

[Emphasis added]

The project approved by the City is located within the certified IP Coastal Bluff Overlay Zone and the foundation of the residence would be sited approximately 40 ft. from the edge of an approximately 65 ft.-high coastal bluff subject to marine erosion. An appropriate safe setback must ensure that the residence is stable and safe from erosion hazards over its lifetime without having to rely on any shore or bluff stabilization to protect the structure in the future. Thus, in order to find the appropriate geologic setback, the Certified LCP requires that not only must an adequate factor of safety of 1.5 be shown under present conditions, but that it must also demonstrate that an adequate factor of safety of 1.5 will be maintained over 75 years, and cover all types of slope failure.

Assessing the stability of slopes against landsliding is undertaken through a quantitative slope stability analysis. In such an analysis, the forces resisting a potential landslide are first determined. These are essentially the strength of the rocks or soils making up the bluff. Next, the forces driving a potential landslide are determined. These forces are the weight of the rocks as projected along a potential slide surface. The resisting forces are divided by the driving forces to determine the "factor of safety." A value below 1.0 is theoretically impossible, as the slope would have failed already. A value of 1.0 indicates that failure is imminent. Factors of safety at increasing values above 1.0 lend increasing confidence in the stability of the slope. The industry-standard for new development is a factor of safety of 1.5. A slope stability analysis is performed by testing hundreds of potential sliding surfaces. The surface with the minimum factor of safety will be the one on which failure is most likely to occur. Generally, as one moves back from the top edge of a slope, the factor of safety against landsliding increases. Therefore, to establish a safe setback for slope stability from the edge of a coastal bluff, one needs to find the distance from the bluff edge at which the factor of safety is at least equal to 1.5.

In this case, a preliminary geotechnical evaluation by Ryan Boehmer, David Skelly and John Franklin (GeoSoils, Inc.; GSI) dated March 31, 2015 determined the 1.5 factor of safety under existing conditions would be 46 ft. from the bluff edge. In response to third-party review by the City's geotechnical consultant (Geopacifica), GSI re-analyzed slope stability for the subject site and found the 1.5 factor of safety would be located 40 ft. from the current bluff edge (response dated August 21, 2015). However, according to the Coastal Commission's staff geologist, the slope stability analysis that yielded a 40-ft. setback necessary to achieve a factor of safety of 1.5 may not be appropriately conservative. That analysis made use of the Janbu method, which is generally recognized as less conservative than the Modified (or Simplified) Bishops Method (used in the original study that yielded a necessary 46-ft. setback to achieve the same factor of safety). As recommended in Johnsson (2005):

> *In general, methods that satisfy both force and moment equilibrium, such as Spencer's (Spencer 1967; 1973), Morgenstern-Price (Morgenstern and Price 1965), and General Limit Equilibrium (Fredlund et al. 1981; Chugh 1986) are preferred. Methods based on moment equilibrium alone, such as Simplified Bishop's Method (Bishop 1955) also are acceptable. In general, methods that solve only for force equilibrium, such as Janbu's method (Janbu 1973) are discouraged due to their sensitivity to the ratio of normal to shear forces between slices (Abramson et al. 1995).*

The August 21, 2015 GeoSoil report simply countered this argument by stating that GeoSoils concludes that the Simplified Bishop Method is overly conservative, without providing evidence to that effect, and counter to industry practice.

The Commission reviews geotechnical reports for development projects throughout the California Coastal Zone, and it is critical that such analyses take into account all of the stability factors and the particular characteristics of each site. As noted, on the subject site, the preferred Simplified Bishops Method determined that a 46 setback would achieve a 1.5 factor of safety. On the site immediately north of this lot (A-6-ENC-16-0060/Martin), the Simplified Bishops Method found that a 59.5 ft. setback was necessary to achieve a 1.5 factor of safety. Such discrepancies are not uncommon—even on sites that are close by—because the analysis is highly dependent on the topographic profile of the bluff on that particular site, which can vary even between adjacent sites. In contrast, the Janbu method determined that the necessary setback for both properties was 40 feet.

In addition to problems with the way the factor of safety was determined, the preliminary geotechnical evaluation by GSI determined the long term erosion rate over 75 years would be 20.25 ft. (0.27 ft./year). To determine this rate, GSI relied on a 1996 USACE study that reported a long-term erosion rate for Encinitas of 0.3-0.9 ft./year, and 2003 geotechnical investigations for the adjoining northerly property that reported long-term erosion rates for the adjacent property of 0-0.05 ft./year and 0-0.13 ft./year (GSI response to Third-Party Geotechnical Review Comments dated March 16, 2016). A review of neighboring bluff-top properties in the City of Encinitas with slope stability analysis conducted in the last 15 years shows that the accepted historic erosion rates vary between 0.23 ft./year and 0.49 ft./year (A-6-ENC-01-047/Conway & Associates; A-6-ENC-13-0210/Lindstrom). Thus, the erosion rate used by the applicant is on the lower end of any erosion rate accepted for a past project in the City of Encinitas, and is not well supported by new data. GSI claims that review of California Coastal Records Project photographs from 1972-2013 show very little retreat of the bluff top and that a majority of the bluff retreat occurs as block failures within the sea cliff and friable terrace deposits near the contact with the underlying Torrey Sandstone, but such an analysis is qualitative in nature and only addresses past, not future, shoreline retreat.

The long-term erosion rate (0.27 ft./year) used by the geotechnical report is lower than the long-term future erosion rate (0.49 ft./year) that has been used for the five most recent new bluff top home approvals in Encinitas, all of which were approved on appeal by the Commission (Ref: CDP Nos. A-6-ENC-09-002/Wellman, A-6-ENC-09-003/Wellman, A-6-ENC-09-040/Okun, A-6-ENC-09-041/Okun, and A-6-ENC-13-0210/Lindstrom).

According to the Coastal Commission's staff geologist, the current published state-of-the-art study for establishing bluff retreat rates in this area is a FEMA-funded study conducted as part of a nationwide assessment of coastal erosion hazards (Benumof and Griggs 1999). In that study, the maximum historic rate for this stretch of coastline is 0.49 ft./yr. The Commission's geologist recommends the use of the maximum historic rate, rather than the minimum or average historic rate, to account for likely acceleration of bluff retreat rates in the future due to sea level rise and increased exposure of the bluffs to wave attack (NRC 2012; see the Commission's Adopted Sea Level Rise Guidance document)[1]. When applied over a period of 75 years, this translates into a bluff retreat of approximately 37 ft.

In the applicant's geotechnical report, dated March 31, 2016, the applicant's geotechnical consultants dismissed the need to evaluate any potential future accelerated erosion rates that may occur due to future sea level rise conditions by concluding that given the elevation of the top of the sea cliff relative to the amount of predicted sea level rise, the likelihood of accelerated bluff retreat in the future is considered low. This argument does not acknowledge any increase in bluff retreat rate that may accompany sea level rise due to bluff's being exposed to wave action for longer periods of time during each tidal cycle.

Furthermore, City staff have indicated that they interpret Section 30.34.020(D) to mean that the geologic setback should be the setback necessary to achieve a 1.5 factor of safety (40 ft.) or 75-year bluff retreat (20.25 ft.), whichever is greater but not less than the City's minimum 40 ft. bluff setback. Based on this interpretation, the City approved the home to be located approximately 40 ft. from the bluff edge.

The Commission's position has long been that such an approach does not ensure that a 1.5 factor of safety (the industry-standard definition of geologic stability against landsliding) will be maintained over the economic life of the development. Indeed, if the development is set back at the distance necessary to achieve a 1.5 factor of safety today, *any* bluff retreat will immediately reduce its stability below the industry-standard factor of safety of 1.5. This has long been the Commission's practice in establishing setbacks from coastal bluffs throughout the state (Johnsson 2005), and is stated explicitly in the City's LCP, Section 30.34.020(D):

> This slope failure analysis shall be performed according to geotechnical engineering standards, and shall:
>
> - Cover all types of slope failure.
> - Demonstrate a safety factor against slope failure of 1.5.
> - Address a time period of analysis of 75 years.

[1] Available at http://www.coastal.ca.gov/climate/slrguidance.html .

The Commission has interpreted the City's LCP as requiring a geotechnical analysis for development to look at all of these elements, since at least 2003, for a minimum of ten different permits (Ref. A-6-ENC-16-0060/Martin, A-6-ENC-13-0210/Lindstrom, A-6-ENC-09-040/Okun, A-6-ENC-09-041/Okun, A-6-ENC-09-002/Wellman, A-6-ENC-09-003/Wellman, A-6-ENC-06-100/Zagara, A-6-ENC-06-101/Albani, A-6-ENC-02-003/Berg, and A-6-ENC-01-047/Conway and Associates), although in 2004, the Commission declined to find substantial issue for a proposed home that looked at only one factor (Ref. A-6-ENC-04-081/Hendrick). The Commission Geologist, Dr. Mark Johnsson, provided a memorandum for a workshop to the Commission in 2003 with a more detailed explanation of this methodology. The memorandum was later published in 2005 (Exhibit 8). The Commission generally considers 75 years as the minimum economic life of new single family homes. Thus, a factor of safety of 1.5 must be maintained throughout the 75 year life of the home to be consistent with IP Section 30.34.020(D), and although not the standard of review, Coastal Act section 30253 as well. The best way to ensure safety for the life of the project is to find the distance from the bluff edge necessary to achieve a factor of safety of 1.5 today and add to that the expected bluff retreat over the next 75 years. The Encinitas LCP requires that new development must achieve a factor of safety of 1.5 and that 75 years is the length of time to be considered. Any other interpretation of this policy would result in a significant underestimate of the setback necessary to ensure development will be safe from failure and erosion over its lifetime.

A geologic setback of 40 ft. is the factor of safety only under present conditions (using the less conservative Janbu method). The home will not be stable with a factor of safety of 1.5 over its economic lifetime since the City failed to determine where the factor of safety of 1.5 would be located after 75 years of erosion. Thus, the approved setback of 40 feet from the bluff edge is inadequate to achieve a 1.5 factor of safety and account for 75 years of erosion.

Accordingly, the 75-year bluff retreat should more appropriately be identified as 37 ft. over the life of the structure, and when added to the suggested 40 ft. setback from the bluff edge based on the factor of safety identified for the subject site, the bluff edge setback needs to be approximately 77 feet in order for the structure to have a factor of safety of 1.5 for 75 years. If the more conservative slope stability analysis performed by the Simplified Bishop Method is used, a 46 foot setback is needed to achieve a factor of safety of 1.5. Adding that distance to the expected future bluff retreat (37 feet), a setback of 83 feet would be required to maintain a factor of safety of 1.5 for 75 years. Without further evaluation of the reason that the Modified Bishops method yielded a distance from the bluff edge to the 1.5 factor of safety line of only 46 feet, rather than the 59.5 feet on the adjacent lot, this recommended setback must be considered preliminary and inadequate to ensure that the home is safe for 75 years.

The City declined to ensure a factor of safety of 1.5 for the entire life of the home. As stated by the City's reviewer (quoted in GSI's response dated July 9, 2015):

> *The City of Encinitas does not recognize the California Coastal Commission policy of adding the Factor of Safety Setback and the 75-year erosion rate to determine the setback for the proposed residence. The*

> *greater of either the 75-year erosion rate or the Factor of Safety Setback shall be utilized. The City of Encinitas requires that the proposed residence be placed behind the setback. The City of Encinitas does not allow for the proposed residence to be placed closer to the bluff (but not beyond the 40-foot setback) by the use of caissons. Please revise plans and recommendation to reflect the City of Encinitas requirements.*

Thus, the plans approved by the City incorporate only a 40 foot setback. The proposed project remains inconsistent with the certified LCP requirements to ensure a factor of safety of 1.5 for the entire life of the home, and as such, the home has not been sited so that it would not require shoreline protection over its lifetime. Thus, a substantial issue has been raised.

Future Shoreline Protection

For the project to be consistent with Section 30.34.020(D), applicants proposing new development must waive any rights to construct future shoreline protection. The waiver of future shoreline protection is intended to ensure that if there are deficiencies in the predictions made in geotechnical studies, no shoreline protection will ever be constructed at the site.

The uncertainty about future shoreline conditions in the face of anticipated sea level rise further emphasizes the importance of having new development not be allowed to rely on future shoreline protection. Since the City did not require the property owners to assume the current and future risks in the form of a deed restriction and waiver of rights to any future shoreline armoring, the development raises a substantial issue regarding conformity with the LCP.

C. ALTERNATIVE ANALYSIS

Section 30.34.020(D)11, which requires geotechnical reports to analyze "*alternative solutions for any potential impacts*," such as siting or design options that would reduce encroachment into the geologic setback and mitigate bluff erosion impacts. As previously described, based on the information submitted at this point, a setback of 83 feet from the bluff is required to maintain a factor of safety of 1.5 for 75 years. The subject lot from the edge of the bluff to the eastern property line is approximately 120 feet in length, and 50 feet in width. Thus, a smaller size home than the proposed 5,664 sq. ft. home (including the proposed basement and garage), will likely be necessary.

As approved, the proposed development complies with all of the City's applicable yard setback standards, including a 25-ft. front-yard setback. A smaller front-yard setback, in combination with a smaller home, could potentially allow a new home to be sited safely on the site. However, no alternative project designs or siting that would reduce potential impacts on bluff stability have been evaluated.

As detailed above, the proposed development does not meet the stability requirements of the LCP. Thus, the lack of an alternatives analysis raises a substantial issue.

D. VISUAL RESOURCES

An additional contention of the appellants is that the proposed home has the potential to create adverse visual impacts in the future if erosion exposes the western wall of the proposed basement, which is inconsistent with the visual resources policies of the certified LCP that require new development to preserve the scenic qualities of the surrounding bluffs.

Section 30.34.020B.8 of the Implementation Program states:

> *The design and exterior appearance of buildings and other structures visible from public vantage points shall be compatible with the scale and character of the surrounding development and protective of the natural scenic qualities of the bluffs.*

The seaward-most wall of the basement of the home is proposed to be located 40 feet from the bluff edge. As stated previously, the applicant's updated geotechnical report found that the factor of safety of 1.5 at the site is 40 ft. from the bluff edge, which would not result in any remaining distance to account for long term erosion over the economic life of the new home. The basement wall could become exposed if the erosion rate is slightly higher than expected. The exposure of the basement wall would be inconsistent with the LCP policies requiring structures visible from public vantage points to be protective of the natural scenic qualities of the surrounding, which are for the most part un-armored, natural bluffs. This inconsistency also raises a substantial issue.

E. FUTURE REMOVAL OF DEVELOPMENT

The proposed development includes a 1,113 sq. ft. basement to provide the foundation for the house located 40 ft. from the bluff edge. The appellants contend that since the basement is proposed to provide the foundation for the house, the basement is difficult to remove in the future and therefore inconsistent with Section 30.34.020(B)(1)(a) of the City's certified IP, which states, in part:

> *a. … Any new construction shall be specifically designed and constructed such that it could be removed in the event of endangerment …*

It is unlikely that the basement could be specifically designed and constructed such that it could be removed in case of endangerment. In addition, once exposed, it would essentially serve the same purpose as a shoreline protection device in the same manner that caissons and deepened foundations do. Furthermore, constructing a basement in a potentially geologically unstable environment such as within a coastal bluff may create impacts on the integrity of the bluff itself if the basement structure were ever required to be removed. The City did not require the applicant to develop a feasible plan to remove the basement along with other portions of the home, or incrementally retreat from the

bluff edge should erosion cause a reduction in the geologic setback in the future. Therefore, this inconsistency also raises a substantial issue.

The intent of LCP policy Section 30.34.020(B)(1)(a) is to ensure that any structures that could potentially be threatened by erosion with in the lifetime of the structure are able to be removed. As detailed above, siting the proposed residence 40 feet back from the bluff edge is likely to result in the structure being at risk from erosion and bluff instability. Construction of a basement 40 feet from the bluff edge could result in the basement walls being exposed if erosion proceeds faster than expected. However, removing the 10-foot deep structure would likely require a great deal of alteration of the bluff and could be infeasible if the excavation would threaten the overall stability of the bluff. Thus, construction of a basement in the proposed location raises a substantial issue.

F. PRECEDENT

The precedential value of the local government's decision for future interpretations of its LCP is also important with regard to this project. On the same agenda as the subject project, the Commission is reviewing an appeal for a new single-family residence located approximately ½ mile north of the subject site that similarly did not fully assess stability factors over 75 years (A-6-ENC-16-0068/Hurst, 808 Neptune Avenue). At the Commission's July 2016 hearing, the Commission found Substantial Issue for a project that raised nearly identical issues as the subject project located directly adjacent to the north of the site (A-6-ENC-16-0060/Martin, 444 Neptune Avenue). In addition, at the July 2016 hearing, the Commission found Substantial Issue for an additional project located approximately ½ mile south of the subject site that raised similar issues as the subject project (A-6-ENC-13-0210/Lindstrom, 132 Neptune Avenue).

If the potential for bluff erosion in Encinitas is not accurately and fully evaluated, new development along the shoreline will likely result in the need for shoreline protection in the future.

As part of early coordination efforts by Commission staff, on January 11, 2016, Commission staff provided City staff with a comment letter on the subject project and two other similar projects in Encinitas that identified the LCP and Coastal Act inconsistencies that are raised in this appeal (Exhibit 7).

G. CONCLUSION

Based on the information cited above, the City's approval of the construction of a new home is inconsistent with various sections of the City's certified Implementation Plan (IP) relating to siting of new development on a coastal blufftop so as to assure it will be safe from failure and erosion over its lifetime without requiring shoreline protection, prohibition of future shoreline protection, alternatives to reduce potential impacts to bluff stability, a removal plan for the new development, and protection of the natural scenic qualities of the bluffs. Therefore, the Commission finds that a substantial issue exists

with respect to the consistency of the local government action with the City's certified Local Coastal Program.

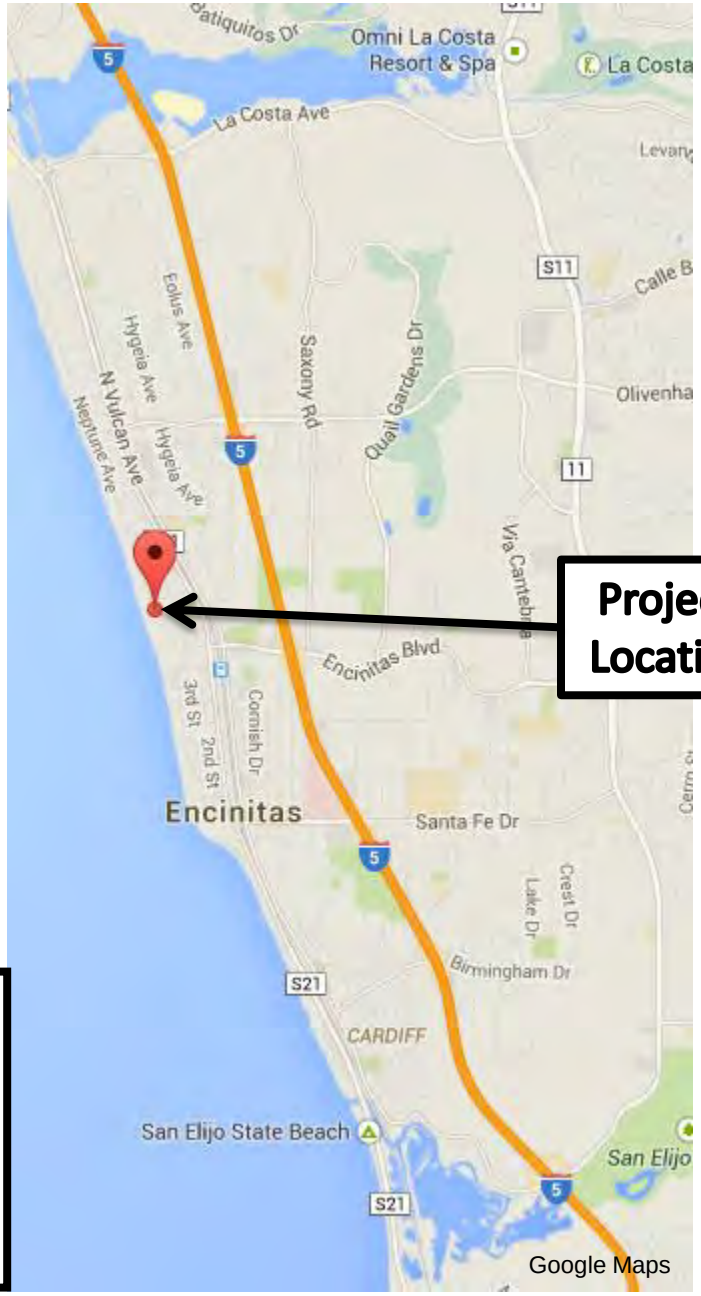
H. SUBSTANTIAL ISSUE FACTORS

As discussed above, there is inadequate factual and legal support for the City's determination that the proposed development is consistent with the certified LCP. The other factors that the Commission usually considers when evaluating whether a local government's action raises a substantial issue also support a finding of substantial issue. While the extent and scope of the particular development is a single home, the objections to the project suggested by the appellants, including geologic stability, future shoreline protection, the lack of an alternatives analysis, protection of visual resources, and future removal of development threatened by erosion, raise substantial issues of regional and statewide significance due to the frequency of development on the state's hazardous blufftops. The decision creates a poor precedent with respect to the proper interpretation of the City's LCP, as the City's failure to require an adequate geotechnical analysis are not only incorrect interpretations of the LCP, but they could also set an adverse precedent elsewhere along the coast. In addition, the coastal resources affected by the decision are significant, due to the approximately 3 miles of coastal bluffs with existing bluff top development in Encinitas.

APPENDIX A: SUBSTANTIVE FILE DOCUMENTS

- Appeal applications by Commission Steve Kinsey and Commissioner Mary Shallenberger
- Johnsson, M.J., 2005, Establishing development setbacks from coastal bluffs, in Magoon, O.T., Converse, H., Baird, B., Jines, B., and Miller-Henson, M., eds., California and the World Ocean '02: Revisiting and revising California's Ocean Agenda: Reston, Virginia, American Society of Civil Engineers, p. 396-416.
- Certified City of Encinitas Certified Local Coastal Program
- Project Plans received June 28, 2016 by Stephanie Luptan
- City of Encinitas 15-122 CDP dated June 2, 2016/Planning Commission Resolution PC 2016-34 dated June 2, 2016
- Preliminary Geotechnical Evaluation and Bluff Study, 438 Neptune Ave., Encinitas, San Diego County, California prepared by GeoSoils, Inc. dated March 31, 2015.
- Geotechnical Response to Third-Party Geotechnical Review Comments, 444 Neptune Ave., Encinitas, San Diego County, California prepared by GeoSoils, Inc. dated August 21, 2015
- Geotechnical Response to Third-Party Geotechnical Review Comments, 444 Neptune Ave., Encinitas, San Diego County, California prepared by GeoSoils, Inc. dated March 16, 2016
- CDP Nos:
    - 6-93-085/Auerbach
    - 6-93-136/Favero
    - A-6-ENC-01-047/Conway & Associates
    - A-6-ENC-02-003/Berg
    - A-6-ENC-06-100/Zagara
    - A-6-ENC-06-101/Albani
    - A-6-ENC-09-002/Wellman
    - A-6-ENC-09-003/Wellman
    - A-6-ENC-04-081/Hendrick
    - A-6-ENC-09-040/Okun
    - A-6-ENC-09-041/Okun
    - A-6-ENC-13-0210/Lindstrom
    - A-6-ENC-16-0060/Martin
    - A-6-ENC-16-0068/Hurst

PROJECT LOCATION



Project Location

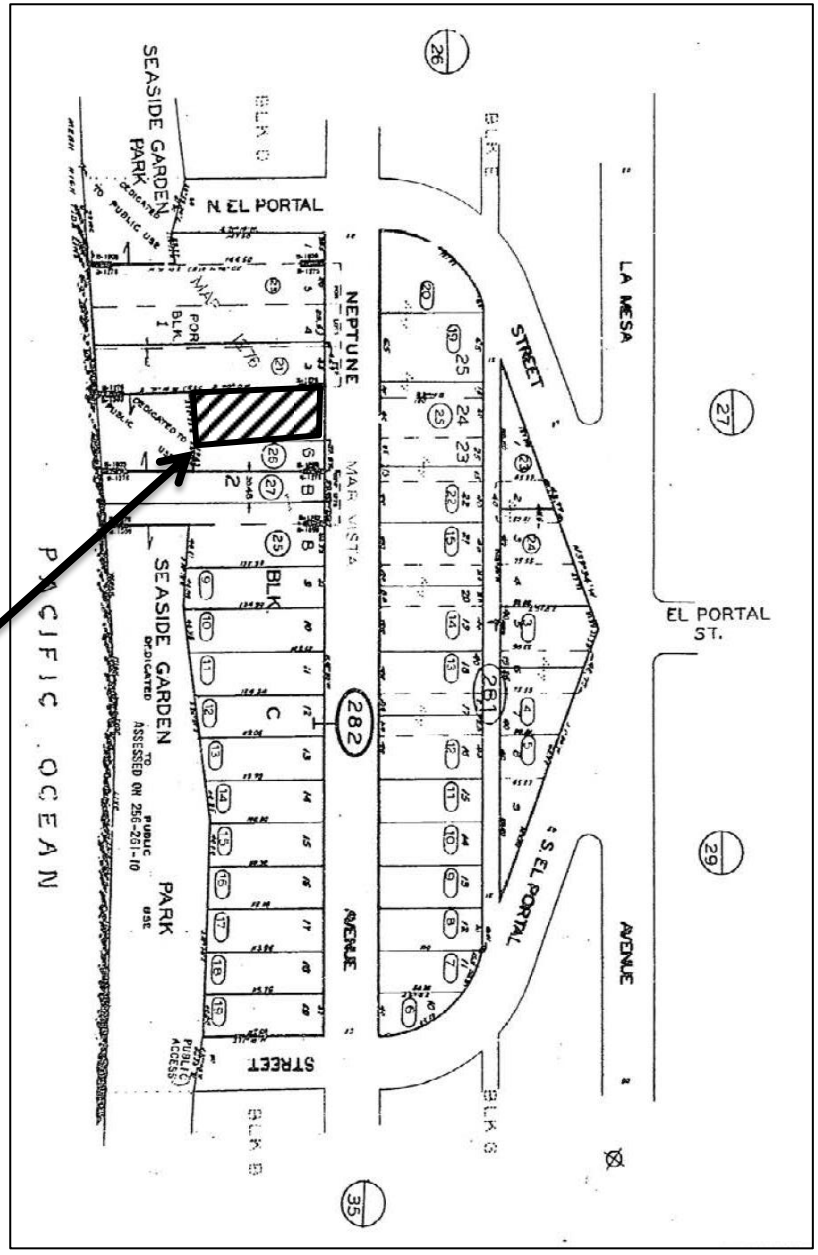


EXHIBIT NO. 1

APPLICATION NO.

A-6-ENC-16-0067

Project Location

California Coastal Commission

2013

SITE PHOTO 1

EXHIBIT NO. 2
APPLICATION NO.
A-6-ENC-16-0067
Site Photo 1
California Coastal Commission

EXHIBIT NO. 3
APPLICATION NO.
A-6-ENC-16-0067
Site Photo 2
California Coastal Commission

SITE PLAN

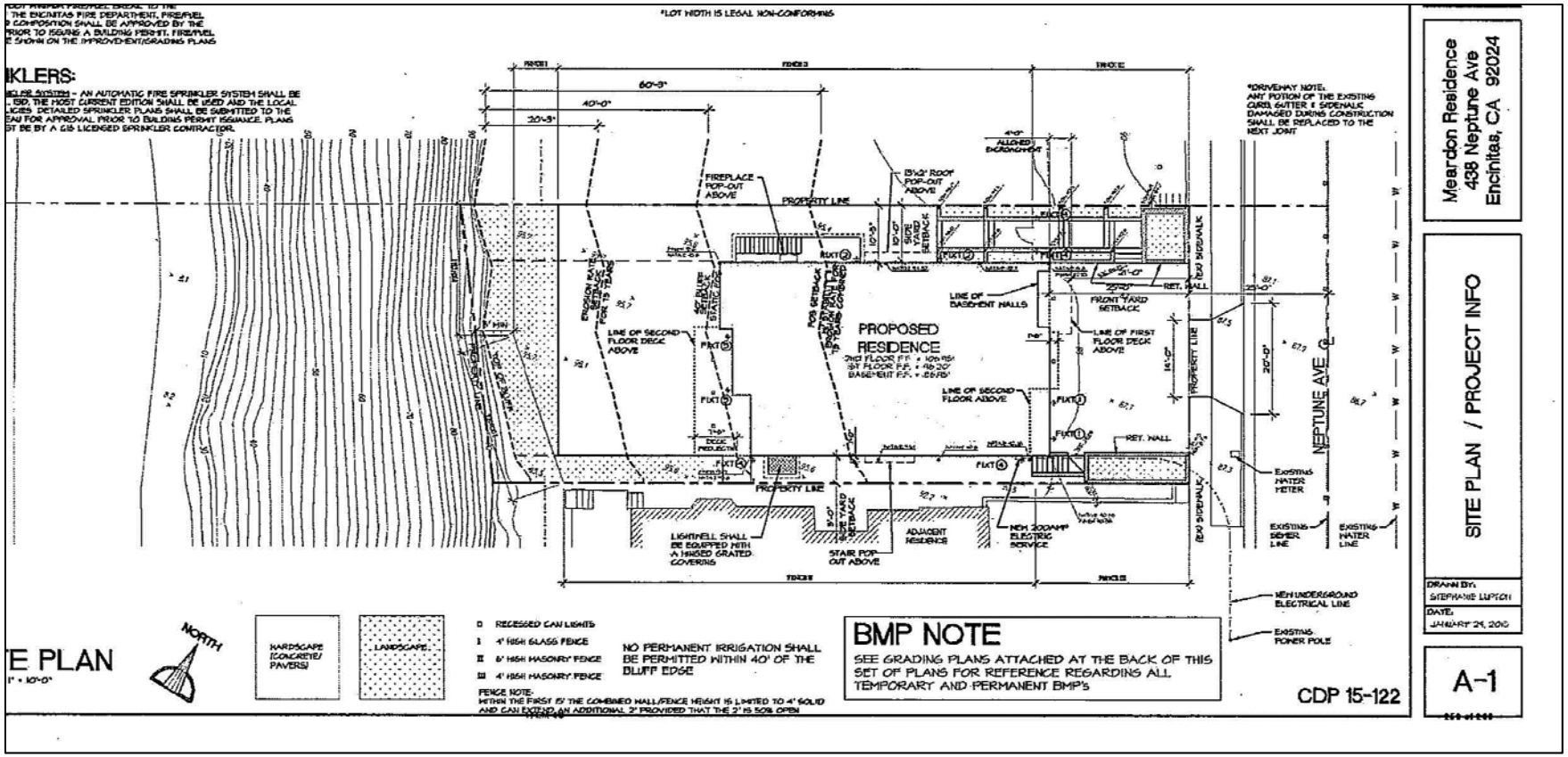


EXHIBIT NO. 4

APPLICATION NO.

A-6-ENC-16-0067

Proposed Site Plan

California Coastal Commission

CALIFORNIA COASTAL COMMISSION
SAN DIEGO AREA
7575 METROPOLITAN DRIVE, SUITE 103
SAN DIEGO, CA 92108-4402
(619) 767-2370

APPEAL FROM COASTAL PERMIT DECISION OF LOCAL GOVERNMENT

Please Review Attached Appeal Information Sheet Prior To Completing This Form.

SECTION I. Appellant(s)

Name: Commissioner Steve Kinsey
Mailing Address: 3501 Civic Center Drive
Suite 329
San Rafael, CA 94903-4193
Phone Number: (415) 499-7331

SECTION II. Decision Being Appealed

1. Name of local/port government: City of Encinitas
2. Brief description of development being appealed: Demolition of an existing single family residence and construction of a new, 2-story, 3,756 sq. ft. single-family home over a 1,113 sq. ft. basement with a 795 sq. ft. attached garage on a 5,400 sq. ft. coastal bluff lot.
3. Development's location (street address, assessor's parcel no., cross street, etc:) 438 Neptune Avenue, Encinitas
4. Description of decision being appealed:
   a. Approval; no special conditions: ☐ b. Approval with special conditions: ☒
   c. Denial: ☐ d. Other : ☐ _____
   Note: For jurisdictions with a total LCP, denial decisions by a local government cannot be appealed unless the development is a major energy or public works project. Denial decisions by port governments are not appealable.

TO BE COMPLETED BY COMMISSION:

APPEAL NO: A-6-ENC-16-0067

DATE FILED: 7/12/2016

DISTRICT: San Diego

EXHIBIT NO. 5
APPLICATION NO.
A-6-ENC-16-0067
Appeal Forms
California Coastal Commission

5. Decision being appealed was made by (check one):

a. ☐ Planning Director/Zoning Administrator

c. ☒ Planning Commission

b. ☐ City Council/Board of Supervisors

d. ☐ Other

Date of local government's decision: June 2, 2016

Local government's file number (if any): CDP 15-122

SECTION III. Identification of Other Interested Persons

Give the names and addresses of the following parties. (Use additional paper as necessary.)

Name and mailing address of permit applicant:

Applicants' Representative:
Craig Lewis
P.O. Box 968
Encinitas, CA 92007

Names and mailing addresses as available of those who testified (either verbally or in writing) at the city/county/port hearing(s). Include other parties which you know to be interested and should receive notice of this appeal.

SECTION IV. Reasons Supporting This Appeal

Note: Appeals of local government coastal permit decisions are limited by a variety of factors and requirements of the Coastal Act. Please review the appeal information sheet for assistance in completing this section, which continues on the next page.

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

See attached Appendix A

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

SECTION V. Certification

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

Signed: _____
Appellant or Agent

Date: 7/12/2016

Agent Authorization: I designate the above identified person(s) to act as my agent in all matters pertaining to this appeal.

Signed: _____

Date: _____

Appendix A
Meardon Residence Appeal
438 Neptune Avenue, Encinitas
07/12/2016

The project approved by the City of Encinitas on June 2, 2016 consists of the demolition of an existing single family residence and construction of a new, 2-story, 3,756 sq. ft. single-family home over a 1,113 sq. ft. basement with a 795 sq. ft. attached garage on a 5,400 sq. ft. coastal bluff lot. The basement and first floor are proposed to be located approximately 40 ft. from the coastal bluff edge and the second floor is proposed to cantilever within 32 ft. of the bluff edge. The basement is proposed to provide the foundation for the house, where the finished floor elevation would be approximately 10 feet below existing grade.

The City found that the subject single-family residence is consistent with the bluff top and shoreline development provisions of the certified Local Coastal Program (LCP). However, the development as approved by the City raises several LCP consistency issues with regard to geologic stability analysis, future shoreline protection, alternatives analysis, and visual resources. The pertinent LCP provisions are as follows:

Public Safety Policy 1.3 of the City's LUP requires that:

> *The City will rely on the Coastal Bluff and Hillside/Inland Bluff Overlay Zones to prevent future development or redevelopment that will represent a hazard to its owner or occupants, and which may require structural measures to prevent destructive erosion or collapse.*

Section 30.34.020(B)1a of the City's certified IP states, in part:

1. *With the following exceptions, no principal structure, accessory structure, facility or improvement shall be constructed, placed or installed within 40 feet of the top edge of the coastal bluff...*

    a. *Principal and accessory structures closer than 40 feet but not closer than 25 feet from the top edge of the coastal bluff, as reviewed and approved pursuant to subsection C "Development Processing and Approval" below. This exception to allow a minimum setback of no less than 25 feet shall be limited to additions or expansions to existing principal structures which are already located seaward of the 40 foot coastal blufftop setback, provided the proposed addition or expansion is located no further seaward than the existing principal structure, is setback a minimum of25 feet from the coastal blufftop edge and the applicant agrees to remove the proposed addition or expansion, either in part or entirely, should it become threatened in the future. Any new construction shall be specifically designed and constructed such that it could be removed in the event of endangerment...*

Section 30.34.020(C) of the City's Certified Implementation Plan (IP), states in part:

1. *Development and improvement in compliance with the development standards in paragraph B "Development Standards", proposing no structure or facility on or within 40 feet of the top edge of the coastal bluff (except for minor accessory structures and improvements allowed pursuant to Section 30.34.02(B)1b, and proposing no preemptive measure as defined below, shall be subject to the following: submittal and acceptance of a site-specific soils report and geotechnical review described by paragraph D "Application Submittal Requirements" below. The authorized decision-making authority for the proposal shall make the findings required based on the soils report and geotechnical review for any project approval. A second story cantilevered portion of a structure which is demonstrated through standard engineering practices not to create an unnecessary surcharge load upon the bluff area may be permitted 20% beyond the top edge of bluff setback if a finding can be made by the authorized agency that no private or public views would be significantly impacted by the construction of the cantilevered portion of the structure.*

Section 30.34.020(D) of the City's Certified IP states, in part:

APPLICATION SUBMITTAL REQUIREMENTS. Each application to the City for a permit or development approval for property under the Coastal Bluff Overlay Zone shall be accompanied by a soils report, and either a geotechnical review or geotechnical report as specified in paragraph C "Development Processing and Approval" above. Each review/report shall be prepared by a certified engineering geologist who has been pre-qualified as knowledgeable in City standards, coastal engineering and engineering geology. The review/report shall certify that the development proposed will have no adverse effect on the stability of the bluff, will not endanger life or property, and that any proposed structure or facility is expected to be reasonably safe from failure and erosion over its lifetime without having to propose any shore or bluff stabilization to protect the structure in the future. Each review/report shall consider, describe and analyze the following:

1. *Cliff geometry and site topography, extending the surveying work beyond the site as needed to depict unusual geomorphic conditions that might affect the site.*

2. *Historic, current and foreseeable cliffs erosion, including investigation or recorded land surveys and tax assessment records in addition to land use of historic maps and photographs where available and possible changes in shore configuration and sand transport.*

3. *Geologic conditions, including soil, sediment and rock types and characteristics in addition to structural features, such as bedding, joints and faults.*

4. *Evidence of past or potential landslide conditions, the implications of such conditions for the proposed development, and the potential effects of the development on landslide activity.*

5. *Impact of construction activity on the stability of the site and adjacent area.*

6. *Ground and surface water conditions and variations, including hydrologic changes caused by the development (e.g., introduction of irrigation water to the groundwater system; alterations in surface drainage).*

7. *Potential erodibility of site and mitigating measures to be used to ensure minimized erosion problems during and after construction (i.e., landscaping and drainage design).*

8. *Effects of marine erosion on seacliffs and estimated rate of erosion at the base of the bluff fronting the subject site based on current and historical data.*

9. *Potential effects of seismic forces resulting from a maximum credible earthquake.*

10. *Any other factors that might affect slope stability.*

11. *Mitigation measures and alternative solutions for any potential impacts.*

The report shall also express a professional opinion as to whether the project can be designed or located so that it will neither be subject to nor contribute to significant geologic instability throughout the life span of the project. The report shall use a current acceptable engineering stability analysis method and shall also describe the degree of uncertainty of analytical results due to assumptions and unknowns. The degree of analysis required shall be appropriate to the degree of potential risk presented by the site and the proposed project.

In addition to the above, each geotechnical report shall include identification of the daylight line behind the top of the bluff established by a bluff slope failure plane analysis. This slope failure analysis shall be performed according to geotechnical engineering stands, and shall:

a. *Cover all types of slope failure.*

b. *Demonstrate a safety factor against slope failure of 1.5.*

c. *Address a time period of analysis of 75 years.*

[...]

The City's decision appears inconsistent with several provisions of the City's LCP related to (1) siting of new development in a geologically safe location, (2) analyzing historic, current and foreseeable bluff erosion, (3) requiring property owners to assume current and future risks in the form of a deed restriction and waiver of rights to any future shoreline

armoring to protect the new structure, (4) designing new construction such that it could be removed in the event of endangerment, (5) analyzing alternative solutions to reduce potential impacts on bluff stability, and (6) protecting the visual resources of the natural coastal bluff.

Commission staff reviewed the proposed development early in the project design phase and raised similar issues in a letter dated Jan. 11, 2016. The applicant was made aware that the Commission may appeal the project due to these issues, if left unresolved.

Geologic Stability

The proposed single-family residence would be located on a blufftop lot that is subject to erosion. Although the subject site does not currently have or propose shoreline armoring, the Commission previously approved a 13 ft. high, approximately 105 ft. long seawall to protect an existing home two properties to the north of the subject site (452 Neptune Ave.; CDP # 6-93-136) and a 9 ft. high, shotcrete seawall fronting six non-contiguous homes approximately 200 ft. south of the subject site (312, 354, 370, 378, 396, and 402 Neptune Ave.; CDP # 6-93-85). Over the years, there have been a number of coastal development permits and emergency permits for shoreline protection along this stretch of coastline, demonstrating the potential for significant bluff failure and erosion in this area.

The City's LCP, as cited above, requires that new structures be located at least 40 ft. from the bluff edge and that a site-specific geotechnical report, which includes a slope stability analysis, be prepared to demonstrate the development will be sited in a safe location for the life of the structure so as to not require shoreline protection in the future. Thus, in order to find the appropriate geologic setback, the LCP requires a factor of safety of 1.5 be maintained over 75 years. Section 30.34.020(D) of the City's IP requires that this setback be calculated by adding the bluff retreat expected over a time period of 75 years to the calculation of where the 1.5 factor of safety would be located today. In this case, preliminary geotechnical evaluation by Ryan Boehmer, David Skelly and John Franklin (Geosoils, Inc.; GSI) dated March 31, 2015 determined the 1.5 factor of safety would be 46 ft. from the bluff edge today and the long term erosion rate over 75 years would be 20.25 ft. (0.27 ft./year). In response to third-party review by the City's geotechnical consultant (Geopacifica), GSI re-analyzed slope stability for the subject site and found the 1.5 factor of safety would be located 40 ft. from the bluff edge today (response dated August 21, 2015). The City interprets Section 30.34.020(D) to mean that the geologic setback should be the 1.5 factor of safety (40 ft.) or 75-year bluff retreat (20.25 ft.), whichever is greater but not less than the City's minimum 40 ft. bluff setback. Based on this interpretation, the City approved the home to be located approximately 40 ft. from the bluff edge. However, a geologic setback of 40 ft. meets the 1.5 factor of safety criterion only under present conditions. The home will not be stable (factor of safety of 1.5) over its economic lifetime since the City failed to determine where the factor of safety of 1.5 would be located after 75 years of erosion. Thus, the approved setback of 40 feet from the bluff edge is inadequate to achieve a 1.5 factor of safety and account for 75 years of erosion.

Indeed, as stated by the City's reviewer in GSI's response dated August 21, 2015:

> *The City of Encinitas does not recognize the CCC [California Coastal Commission] policy of adding the Factor of Safety Setback and the 75-year erosion rate to determine the setback for the proposed residence. The greater of either the 75-year erosion rate or the Factor of Safety Setback shall be utilized. The City of Encinitas requires that the proposed residence be placed behind the setback. The City of Encinitas does not allow for the proposed residence to be placed closer to the bluff (but not beyond the 40-foot setback) by the use of caissons. Please revise plans and recommendation to reflect the City of Encinitas requirements.*

This clearly indicates that the proposed project is inconsistent with the Coastal Commission's general practice for ensuring stability of new development throughout the state.

Furthermore, the long-term erosion rate (0.27 ft./year) used by the geotechnical report is lower than the long-term future erosion rate (0.49 ft./year) that has recently been required for new development in the City of Encinitas (e.g., A-6-ENC-09-002 and 003/Wellman & A-6-ENC-09-040 and 041/Okun). According to the Coastal Commission's staff geologist, the best available scientific resource for establishing bluff retreat rates in this area is a FEMA-funded study done as part of a nationwide assessment of coastal erosion hazards (Benumof and Griggs 1999). In that study, the maximum historic rate for this stretch of coastline is 0.49 ft./yr. The Commission's geologist recommends the use of the maximum historic rate, rather than the minimum or average historic rate, to account for future increases in the bluff retreat rate due to continued and accelerating sea level rise (see the Commission's Adopted Sea Level Rise Guidance Document). When applied over a period of 75 years, this translates into a bluff retreat of approximately 37 ft. In reviewing the proposed development, GSI relied on a 1996 USACE study that reported a long-term erosion rate for Encinitas of 0.3-0.9 ft./year and further advocated the use of an even lower long-term erosion rate of 0.27 ft./year. Moreover, GSI dismissed the need to evaluate any potential future accelerated erosion rates that may occur due to future sea level rise conditions by concluding that given the elevation of the top of the sea cliff relative to the amount of predicted sea level rise, the likelihood of accelerated bluff retreat in the future is considered low (Geotechnical Report dated March 31, 2015).

Since Section 30.34.020(D) requires that geotechnical reports analyze *"[h]istoric, current, and foreseeable-cliff erosion"*, the long-term erosion rate should be based on the most recent long-term study for erosion rates (Benumof and Griggs 1999) and factor in likely acceleration of bluff retreat rates in the future due to sea level rise and increased exposure of the bluffs to wave attack (NRC 2012). Accordingly, the 75-year bluff retreat should more approximately be identified as 37 ft. over the life of the structure, and when added to the suggested 40 ft. setback from the bluff edge based on the factor of safety identified for the subject site, the cumulative bluff edge setback needs to be extended significantly landward in order for the structure to be safe for 75 years.

In addition, the Commission's geologist notes that the slope stability analysis that yielded a 40 foot setback necessary to achieve a factor of safety of 1.5 may not be conservative. That analysis made use of the Janbu method, which is generally recognized as less conservative than the Modified Bishops Method (used in the original study that yielded a necessary 46 foot setback to achieve the same factor of safety). As recommended in Johnsson (2005):

> *In general, methods that satisfy both force and moment equilibrium, such as Spencer's (Spencer 1967; 1973), Morgenstern-Price (Morgenstern and Price 1965), and General Limit Equilibrium (Fredlund et al. 1981; Chugh 1986) are preferred. Methods based on moment equilibrium alone, such as Simplified Bishop's Method (Bishop 1955) also are acceptable. In general, methods that solve only for force equilibrium, such as Janbu's method (Janbu 1973) are discouraged due to their sensitivity to the ratio of normal to shear forces between slices (Abramson et al. 1995).*

Future Shoreline Protection

The City did not require the property owners to assume the current and future risks in the form of a deed restriction and waiver of rights to any future shoreline armoring which represents another inconsistency with the City's LCP. Section 30.34.020(D) states, in part: " ... *that any proposed structure or facility is expected to be reasonably safe from failure and erosion over its lifetime without having to propose any shore or bluff stabilization to protect the structure in the future ...*", thereby prohibiting new development from requiring future shoreline protection. The Commission typically requires applicants of new development to waive any rights to construct future shoreline protection. Only with this waiver can the project be found to be consistent with Section 30.34.020(D). The uncertainty about future shoreline conditions in the face of anticipated sea level rise further emphasizes the importance of having new development not be allowed reliance on future shoreline protection.

Future Removal of Development

In order to avoid the need for shoreline armoring in the future, plans and specific triggers for removal or retreat of the proposed development should be included with any project submittal. Section 30.34.020(B)1a of the City's Implementation Plan states, in part: "*...Any new construction shall be specifically designed and constructed such that it could be removed in the event of endangerment...*". Basements may be designed to support the proposed development in a hazardous location, such that their construction would substantially alter the natural landform of the coastal bluff and would essentially serve the same purpose as a shoreline protection device. Furthermore, constructing a basement in a potentially geologically unstable environment such as within a coastal bluff may create impacts on the integrity of the bluff itself if the basement structure were ever required to be removed. In this case, the basement is proposed to provide the foundation for the house, making it difficult to remove in the future and therefore inconsistent with Section 30.34.020(B)1a. The City did not require the applicant to develop a feasible plan

to incrementally retreat from the bluff edge should erosion cause a reduction in the geologic setback or identify if there would be the potential to remove the basement along with other portions of the home in the future.

Alternatives Analysis

Section 30.34.020(D) requires that geotechnical reports analyze "*alternative solutions for any potential impacts*", such as siting or design options that would reduce encroachment into the geologic setback and mitigate bluff erosion impacts. The proposed development complies with all of the City's applicable development standards, including a 25-ft. front-yard setback. While each project presents its own unique site characteristics, any new blufftop development must be sited in the way that is most protective of coastal resources. In this case, on balance, a front-yard setback variance and/or smaller home may be the most effective way to achieve this goal, but it remains unknown because the City did not require that the applicant to evaluate alternative project designs or siting that would reduce potential impacts on bluff stability and allow for the structure to located a safe distance from the bluff edge over the life of the structure.

Visual Resources

The approved home also has the potential to create adverse visual impacts in the future which is inconsistent with the certified LCP.

Section 30.34.020B.8 of the Implementation Program states:

> *The design and exterior appearance of buildings and other structures visible from public vantage points shall be compatible with the scale and character of the surrounding development and protective of the natural scenic qualities of the bluffs.*

The seaward-most wall of the basement of the home is proposed to be located 40 feet from the bluff edge. As stated previously, the Coastal Commission's staff geologist recommends that an erosion rate of 0.49 ft. /yr. be used for this section of coastline. During the 75-year design life of the new structure, approximately 37 ft. of erosion would be expected. Thus, at an erosion rate of 0.49 ft. /yr., it is likely that the basement wall could be expected to become exposed. The exposure of the basement wall would be inconsistent with the LCP policies requiring structures visible from public vantage points to be protective of the natural scenic qualities of the surrounding, which are for the most part un-armored, natural bluffs.

CALIFORNIA COASTAL COMMISSION
SAN DIEGO AREA
7575 METROPOLITAN DRIVE, SUITE 103
SAN DIEGO, CA 92108-4402
(619) 767-2370

APPEAL FROM COASTAL PERMIT DECISION OF LOCAL GOVERNMENT

Please Review Attached Appeal Information Sheet Prior To Completing This Form.

SECTION I. Appellant(s)

Name: Commissioner Mary Shallenberger
Mailing Address: P.O. Box 354
Clements, CA 95227-0354

Phone Number: _____

SECTION II. Decision Being Appealed

1. Name of local/port government: City of Encinitas
2. Brief description of development being appealed: Demolition of an existing single family residence and construction of a new, 2-story, 3,756 sq. ft. single-family home over a 1,113 sq. ft. basement with a 795 sq. ft. attached garage on a 5,400 sq. ft. coastal bluff lot.
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TO BE COMPLETED BY COMMISSION:

APPEAL NO: A-6-ENC-16-0067

DATE FILED: 7/12/2016

DISTRICT: San Diego

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c. ☒ Planning Commission

b. ☐ City Council/Board of Supervisors

d. ☐ Other

Date of local government's decision: June 2, 2016

Local government's file number (if any): CDP 15-122

SECTION III. Identification of Other Interested Persons

Give the names and addresses of the following parties. (Use additional paper as necessary.)

Name and mailing address of permit applicant:

Applicants' Representative:
Craig Lewis
P.O. Box 968
Encinitas, CA 92007

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

Signed: Mary K Shallenberger
Appellant or Agent

Date: 7/12/2016

Agent Authorization: I designate the above identified person(s) to act as my agent in all matters pertaining to this appeal.

Signed: _____

Date: _____

Appendix A
Meardon Residence Appeal
438 Neptune Avenue, Encinitas
07/12/2016

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> 1. *With the following exceptions, no principal structure, accessory structure, facility or improvement shall be constructed, placed or installed within 40 feet of the top edge of the coastal bluff...*
>
> a. *Principal and accessory structures closer than 40 feet but not closer than 25 feet from the top edge of the coastal bluff, as reviewed and approved pursuant to subsection C "Development Processing and Approval" below. This exception to allow a minimum setback of no less than 25 feet shall be limited to additions or expansions to existing principal structures which are already located seaward of the 40 foot coastal blufftop setback, provided the proposed addition or expansion is located no further seaward than the existing principal structure, is setback a minimum of25 feet from the coastal blufftop edge and the applicant agrees to remove the proposed addition or expansion, either in part or entirely, should it become threatened in the future. Any new construction shall be specifically designed and constructed such that it could be removed in the event of endangerment...*

Section 30.34.020(C) of the City's Certified Implementation Plan (IP), states in part:

1. *Development and improvement in compliance with the development standards in paragraph B "Development Standards", proposing no structure or facility on or within 40 feet of the top edge of the coastal bluff (except for minor accessory structures and improvements allowed pursuant to Section 30.34.02(B)1b, and proposing no preemptive measure as defined below, shall be subject to the following: submittal and acceptance of a site-specific soils report and geotechnical review described by paragraph D "Application Submittal Requirements" below. The authorized decision-making authority for the proposal shall make the findings required based on the soils report and geotechnical review for any project approval. A second story cantilevered portion of a structure which is demonstrated through standard engineering practices not to create an unnecessary surcharge load upon the bluff area may be permitted 20% beyond the top edge of bluff setback if a finding can be made by the authorized agency that no private or public views would be significantly impacted by the construction of the cantilevered portion of the structure.*

Section 30.34.020(D) of the City's Certified IP states, in part:

APPLICATION SUBMITTAL REQUIREMENTS. Each application to the City for a permit or development approval for property under the Coastal Bluff Overlay Zone shall be accompanied by a soils report, and either a geotechnical review or geotechnical report as specified in paragraph C "Development Processing and Approval" above. Each review/report shall be prepared by a certified engineering geologist who has been pre-qualified as knowledgeable in City standards, coastal engineering and engineering geology. The review/report shall certify that the development proposed will have no adverse effect on the stability of the bluff, will not endanger life or property, and that any proposed structure or facility is expected to be reasonably safe from failure and erosion over its lifetime without having to propose any shore or bluff stabilization to protect the structure in the future. Each review/report shall consider, describe and analyze the following:

1. *Cliff geometry and site topography, extending the surveying work beyond the site as needed to depict unusual geomorphic conditions that might affect the site.*

2. *Historic, current and foreseeable cliffs erosion, including investigation or recorded land surveys and tax assessment records in addition to land use of historic maps and photographs where available and possible changes in shore configuration and sand transport.*

3. *Geologic conditions, including soil, sediment and rock types and characteristics in addition to structural features, such as bedding, joints and faults.*

4. *Evidence of past or potential landslide conditions, the implications of such conditions for the proposed development, and the potential effects of the development on landslide activity.*

5. *Impact of construction activity on the stability of the site and adjacent area.*

6. *Ground and surface water conditions and variations, including hydrologic changes caused by the development (e.g., introduction of irrigation water to the groundwater system; alterations in surface drainage).*

7. *Potential erodibility of site and mitigating measures to be used to ensure minimized erosion problems during and after construction (i.e., landscaping and drainage design).*

8. *Effects of marine erosion on seacliffs and estimated rate of erosion at the base of the bluff fronting the subject site based on current and historical data.*

9. *Potential effects of seismic forces resulting from a maximum credible earthquake.*

10. *Any other factors that might affect slope stability.*

11. *Mitigation measures and alternative solutions for any potential impacts.*

The report shall also express a professional opinion as to whether the project can be designed or located so that it will neither be subject to nor contribute to significant geologic instability throughout the life span of the project. The report shall use a current acceptable engineering stability analysis method and shall also describe the degree of uncertainty of analytical results due to assumptions and unknowns. The degree of analysis required shall be appropriate to the degree of potential risk presented by the site and the proposed project.

In addition to the above, each geotechnical report shall include identification of the daylight line behind the top of the bluff established by a bluff slope failure plane analysis. This slope failure analysis shall be performed according to geotechnical engineering stands, and shall:

a. *Cover all types of slope failure.*

b. *Demonstrate a safety factor against slope failure of 1.5.*

c. *Address a time period of analysis of 75 years.*

[...]

The City's decision appears inconsistent with several provisions of the City's LCP related to (1) siting of new development in a geologically safe location, (2) analyzing historic, current and foreseeable bluff erosion, (3) requiring property owners to assume current and future risks in the form of a deed restriction and waiver of rights to any future shoreline

armoring to protect the new structure, (4) designing new construction such that it could be removed in the event of endangerment, (5) analyzing alternative solutions to reduce potential impacts on bluff stability, and (6) protecting the visual resources of the natural coastal bluff.

Commission staff reviewed the proposed development early in the project design phase and raised similar issues in a letter dated Jan. 11, 2016. The applicant was made aware that the Commission may appeal the project due to these issues, if left unresolved.

Geologic Stability

The proposed single-family residence would be located on a blufftop lot that is subject to erosion. Although the subject site does not currently have or propose shoreline armoring, the Commission previously approved a 13 ft. high, approximately 105 ft. long seawall to protect an existing home two properties to the north of the subject site (452 Neptune Ave.; CDP # 6-93-136) and a 9 ft. high, shotcrete seawall fronting six non-contiguous homes approximately 200 ft. south of the subject site (312, 354, 370, 378, 396, and 402 Neptune Ave.; CDP # 6-93-85). Over the years, there have been a number of coastal development permits and emergency permits for shoreline protection along this stretch of coastline, demonstrating the potential for significant bluff failure and erosion in this area.

The City's LCP, as cited above, requires that new structures be located at least 40 ft. from the bluff edge and that a site-specific geotechnical report, which includes a slope stability analysis, be prepared to demonstrate the development will be sited in a safe location for the life of the structure so as to not require shoreline protection in the future. Thus, in order to find the appropriate geologic setback, the LCP requires a factor of safety of 1.5 be maintained over 75 years. Section 30.34.020(D) of the City's IP requires that this setback be calculated by adding the bluff retreat expected over a time period of 75 years to the calculation of where the 1.5 factor of safety would be located today. In this case, preliminary geotechnical evaluation by Ryan Boehmer, David Skelly and John Franklin (Geosoils, Inc.; GSI) dated March 31, 2015 determined the 1.5 factor of safety would be 46 ft. from the bluff edge today and the long term erosion rate over 75 years would be 20.25 ft. (0.27 ft./year). In response to third-party review by the City's geotechnical consultant (Geopacifica), GSI re-analyzed slope stability for the subject site and found the 1.5 factor of safety would be located 40 ft. from the bluff edge today (response dated August 21, 2015). The City interprets Section 30.34.020(D) to mean that the geologic setback should be the 1.5 factor of safety (40 ft.) or 75-year bluff retreat (20.25 ft.), whichever is greater but not less than the City's minimum 40 ft. bluff setback. Based on this interpretation, the City approved the home to be located approximately 40 ft. from the bluff edge. However, a geologic setback of 40 ft. meets the 1.5 factor of safety criterion only under present conditions. The home will not be stable (factor of safety of 1.5) over its economic lifetime since the City failed to determine where the factor of safety of 1.5 would be located after 75 years of erosion. Thus, the approved setback of 40 feet from the bluff edge is inadequate to achieve a 1.5 factor of safety and account for 75 years of erosion.

Indeed, as stated by the City's reviewer in GSI's response dated August 21, 2015:

> *The City of Encinitas does not recognize the CCC [California Coastal Commission] policy of adding the Factor of Safety Setback and the 75-year erosion rate to determine the setback for the proposed residence. The greater of either the 75-year erosion rate or the Factor of Safety Setback shall be utilized. The City of Encinitas requires that the proposed residence be placed behind the setback. The City of Encinitas does not allow for the proposed residence to be placed closer to the bluff (but not beyond the 40-foot setback) by the use of caissons. Please revise plans and recommendation to reflect the City of Encinitas requirements.*

This clearly indicates that the proposed project is inconsistent with the Coastal Commission's general practice for ensuring stability of new development throughout the state.

Furthermore, the long-term erosion rate (0.27 ft./year) used by the geotechnical report is lower than the long-term future erosion rate (0.49 ft./year) that has recently been required for new development in the City of Encinitas (e.g., A-6-ENC-09-002 and 003/Wellman & A-6-ENC-09-040 and 041/Okun). According to the Coastal Commission's staff geologist, the best available scientific resource for establishing bluff retreat rates in this area is a FEMA-funded study done as part of a nationwide assessment of coastal erosion hazards (Benumof and Griggs 1999). In that study, the maximum historic rate for this stretch of coastline is 0.49 ft./yr. The Commission's geologist recommends the use of the maximum historic rate, rather than the minimum or average historic rate, to account for future increases in the bluff retreat rate due to continued and accelerating sea level rise (see the Commission's Adopted Sea Level Rise Guidance Document). When applied over a period of 75 years, this translates into a bluff retreat of approximately 37 ft. In reviewing the proposed development, GSI relied on a 1996 USACE study that reported a long-term erosion rate for Encinitas of 0.3-0.9 ft./year and further advocated the use of an even lower long-term erosion rate of 0.27 ft./year. Moreover, GSI dismissed the need to evaluate any potential future accelerated erosion rates that may occur due to future sea level rise conditions by concluding that given the elevation of the top of the sea cliff relative to the amount of predicted sea level rise, the likelihood of accelerated bluff retreat in the future is considered low (Geotechnical Report dated March 31, 2015).

Since Section 30.34.020(D) requires that geotechnical reports analyze *"[h]istoric, current, and foreseeable-cliff erosion"*, the long-term erosion rate should be based on the most recent long-term study for erosion rates (Benumof and Griggs 1999) and factor in likely acceleration of bluff retreat rates in the future due to sea level rise and increased exposure of the bluffs to wave attack (NRC 2012). Accordingly, the 75-year bluff retreat should more approximately be identified as 37 ft. over the life of the structure, and when added to the suggested 40 ft. setback from the bluff edge based on the factor of safety identified for the subject site, the cumulative bluff edge setback needs to be extended significantly landward in order for the structure to be safe for 75 years.

In addition, the Commission's geologist notes that the slope stability analysis that yielded a 40 foot setback necessary to achieve a factor of safety of 1.5 may not be conservative. That analysis made use of the Janbu method, which is generally recognized as less conservative than the Modified Bishops Method (used in the original study that yielded a necessary 46 foot setback to achieve the same factor of safety). As recommended in Johnsson (2005):

> *In general, methods that satisfy both force and moment equilibrium, such as Spencer's (Spencer 1967; 1973), Morgenstern-Price (Morgenstern and Price 1965), and General Limit Equilibrium (Fredlund et al. 1981; Chugh 1986) are preferred. Methods based on moment equilibrium alone, such as Simplified Bishop's Method (Bishop 1955) also are acceptable. In general, methods that solve only for force equilibrium, such as Janbu's method (Janbu 1973) are discouraged due to their sensitivity to the ratio of normal to shear forces between slices (Abramson et al. 1995).*

Future Shoreline Protection

The City did not require the property owners to assume the current and future risks in the form of a deed restriction and waiver of rights to any future shoreline armoring which represents another inconsistency with the City's LCP. Section 30.34.020(D) states, in part: " ... *that any proposed structure or facility is expected to be reasonably safe from failure and erosion over its lifetime without having to propose any shore or bluff stabilization to protect the structure in the future* ...", thereby prohibiting new development from requiring future shoreline protection. The Commission typically requires applicants of new development to waive any rights to construct future shoreline protection. Only with this waiver can the project be found to be consistent with Section 30.34.020(D). The uncertainty about future shoreline conditions in the face of anticipated sea level rise further emphasizes the importance of having new development not be allowed reliance on future shoreline protection.

Future Removal of Development

In order to avoid the need for shoreline armoring in the future, plans and specific triggers for removal or retreat of the proposed development should be included with any project submittal. Section 30.34.020(B)1a of the City's Implementation Plan states, in part: "...*Any new construction shall be specifically designed and constructed such that it could be removed in the event of endangerment*...". Basements may be designed to support the proposed development in a hazardous location, such that their construction would substantially alter the natural landform of the coastal bluff and would essentially serve the same purpose as a shoreline protection device. Furthermore, constructing a basement in a potentially geologically unstable environment such as within a coastal bluff may create impacts on the integrity of the bluff itself if the basement structure were ever required to be removed. In this case, the basement is proposed to provide the foundation for the house, making it difficult to remove in the future and therefore inconsistent with Section 30.34.020(B)1a. The City did not require the applicant to develop a feasible plan

to incrementally retreat from the bluff edge should erosion cause a reduction in the geologic setback or identify if there would be the potential to remove the basement along with other portions of the home in the future.

Alternatives Analysis

Section 30.34.020(D) requires that geotechnical reports analyze "*alternative solutions for any potential impacts*", such as siting or design options that would reduce encroachment into the geologic setback and mitigate bluff erosion impacts. The proposed development complies with all of the City's applicable development standards, including a 25-ft. front-yard setback. While each project presents its own unique site characteristics, any new blufftop development must be sited in the way that is most protective of coastal resources. In this case, on balance, a front-yard setback variance and/or smaller home may be the most effective way to achieve this goal, but it remains unknown because the City did not require that the applicant to evaluate alternative project designs or siting that would reduce potential impacts on bluff stability and allow for the structure to located a safe distance from the bluff edge over the life of the structure.

Visual Resources

The approved home also has the potential to create adverse visual impacts in the future which is inconsistent with the certified LCP.

Section 30.34.020B.8 of the Implementation Program states:

> *The design and exterior appearance of buildings and other structures visible from public vantage points shall be compatible with the scale and character of the surrounding development and protective of the natural scenic qualities of the bluffs.*

The seaward-most wall of the basement of the home is proposed to be located 40 feet from the bluff edge. As stated previously, the Coastal Commission's staff geologist recommends that an erosion rate of 0.49 ft. /yr. be used for this section of coastline. During the 75-year design life of the new structure, approximately 37 ft. of erosion would be expected. Thus, at an erosion rate of 0.49 ft. /yr., it is likely that the basement wall could be expected to become exposed. The exposure of the basement wall would be inconsistent with the LCP policies requiring structures visible from public vantage points to be protective of the natural scenic qualities of the surrounding, which are for the most part un-armored, natural bluffs.

RESOLUTION NO. PC 2016-34

A RESOLUTION OF THE CITY OF ENCINITAS PLANNING COMMISSION APPROVING A COASTAL DEVELOPMENT PERMIT TO AUTHORIZE THE DEMOLITION OF AN EXISTING RESIDENCE AND THE CONSTRUCTION OF A NEW SINGLE FAMILY HOME WITH ASSOCIATED SITE IMPROVEMENTS AT THE PROPERTY LOCATED AT 438 NEPTUNE AVENUE

(CASE NO. 15-122 CDP; APN: 256-282-05)

WHEREAS, Paul Meardon submitted an application for a Coastal Development Permit (CDP) to authorize the demolition of an existing residence and the construction of a new single-family residence with associated site improvements located at 438 Neptune Avenue, legally described as;

Lot 3 in Block "C" of Seaside Gardens, in the City of Encinitas, County of San Diego, State of California, according to Map thereof No. 1800, filed in the Office of the County Recorder of San Diego County, August 6, 1924.

WHEREAS, the Planning Commission conducted a duly noticed public hearing on June 2, 2016;

NOW, THEREFORE, BE IT RESOLVED that the Encinitas Planning Commission hereby APPROVES Case No. 15-122 CDP based on the following Environmental Determination and Findings:

Section 1. California Environmental Quality Act Determination

The project proposes the demolition of an existing residence and the construction of a new single-family residence with a basement totaling 4,869 square feet, and an attached basement garage totaling 795 square feet. The project has been determined to be exempt from environmental review pursuant to California Environmental Quality Act (CEQA) Guidelines Sections 15301(l)(1) and 15303(a). Section 15301(l)(1) of the California Environmental Quality Act (CEQA) exempts from environmental review the demolition of a single-family residence. Section 15303(a) exempts the construction of a single-family residence from environmental review. The project meets these criteria of the exemptions. None of the exceptions in CEQA Guidelines Section 15300.2 exists and no historic resources will be impacted by the proposed project.

Section 2. Discretionary Action(s) Findings

Based on Encinitas Municipal Code Section 30.80.090 (Coastal Development Permit), findings for a Coastal Development Permit and the aforementioned analysis, Planning Commission has made the following findings to support the recommendation of approval, with conditions:

Finding for Coastal Development Permit	Explanation of Finding
1. The proposed project is consistent with the certified Local Coastal Program of the City of Encinitas.	The proposed project includes the construction of a new 3,756-square foot single-family residence with a 1113-square foot basement and a 795-square foot attached garage. The project site is located within the R-8 Zone, in the Coastal Commission's appeal jurisdiction of the Coastal Zone, Floodplain Overlay Zone and the Coastal Bluff Overlay Zone. The applicant is proposing several improvements within the 40-foot bluff setback, including a 42-inch tall glass railing, an at-grade concrete/paver patio and a six-foot tall perimeter fence with pier style footings. All minor accessory structures including the fencing will be located five feet inland from the bluff edge as per Encinitas Municipal Code Section 30.34.0201B. None of these improvements will require the issuance of a building permit. Additionally, a second-story cantilevered deck is proposed eight feet or 20% within the required 40-foot bluff setback. Encinitas Municipal Code Section 30.34.020C1 allows for a 20% encroachment into the required 40-foot bluff-top setback. With standard engineering practices the applicant must demonstrate that the second-story cantilevered deck will not create an unnecessary surcharge on the bluff and that no private or public views would be significantly impacted by the construction of the cantilevered portion of the structure. Based upon the information contained on the site-specific geotechnical analysis, the applicant has demonstrated that the structure will not create an unnecessary surcharge load on the bluff. Additionally, no private or public views would be significantly impacted by the construction of the cantilevered portion of the structure. The cantilevered deck is located on the southwest to the middle portion of the west elevation, and is facing the Pacific Ocean. A line-of-sight analysis has been provided in the application file to demonstrate that the proposed second-story deck will not affect any private views from the properties located to the north and south of the project site. No public view sheds exist within

Finding for Coastal Development Permit	Explanation of Finding
	the proximity of the project site and the cantilevered portion of the structure will be directly behind the proposed residence and not visible. Therefore, the proposed cantilevered deck and second-story floor area will not affect public or private views. The site-specific geotechnical analysis that has been completed for this project has determined that the demolition of the existing residence and construction of a new single-family home on the subject property will have no adverse effect on the stability of the coastal bluff. It has also concluded that the project will not endanger life and property. Further, it indicates that any proposed structure or facility constructed on the site is expected to be reasonably safe from failure and erosion over its lifetime, without having to propose any shore or bluff protection to protect the structure in the future, provided that the recommendations contained in the geotechnical study are properly incorporated into the project design. The City's third party geotechnical consultant (Geopacifica) concluded that the geotechnical reports and letter addendums provided as a part of the project review have addressed all site conditions and have provided all the necessary information to satisfy the requirements of the Encinitas Municipal Code. The project as proposed and conditioned conforms to the R-8 Zone development standards related to building height, setbacks, lot coverage, floor area ratio and off-street parking.

Finding for Coastal Development Permit	Explanation of Finding
2. The proposed project is consistent with the certified Local Coastal Program of the City of Encinitas. The proposed development conforms with Public Resources Code Section 21000 et al. (CEQA) and that there are no feasible mitigation measures or feasible alternatives available which would substantially lessen any significant adverse impact that the activity may have on the environment.	The project conforms with Public resources Code Section 21000 (CEQA). The project has been determined to be exempt from environmental review pursuant to California Environmental Quality Act (CEQA) Guidelines Sections 15301(l)(1) and 15303(a). Section 15301(l)(1) exempts the demolition of an existing residence and Section 15303(a) exempts the construction of a single-family residence, and associated garage, from environmental review. The project meets these criteria of the exemptions. None of the exceptions in CEQA Guidelines Section 15300.2 exists and no historic resources will be impacted by the proposed project.
3. For projects involving development between the sea or other body of water and the nearest public road, approval shall include a specific finding that such development is in conformity with the public access and public recreation policies of Section 30200 et seq. of the Coastal Act.	Public access is not available or feasible on the site because it is a steep bluff top property located on the west side of Neptune Avenue. In accordance with Section 30212 of the Coastal Act, public beach access already exists and is available at Stonesteps. Pursuant to the requirements in Section 30212 of the Coastal Act, recreational opportunities are already adequately available at North El Portal Viewpoint to allow the public to access the beach and shore.

BE IT FURTHER RESOLVED that based on the Environmental Determination and Findings hereinbefore adopted by the Planning Commission, Case No. 15-122 CDP is hereby approved subject to the conditions in Exhibit A.

PASSED AND ADOPTED this 2nd day of June, 2016 by the following vote, to wit:

AYES: O'Grady, Drakos and Boerner Horvath
NOES: None
ABSTAIN: None
ABSENT: Brandenberg

Michael Glenn O'Grady, Chair

ATTEST:

Manjeet Ranu, AICP
Secretary

EXHIBIT "A"
Resolution No. PC 2016-34
Case No. 15-122 CDP

Applicant: Paul Meardon
Location: 438 Neptune Avenue (APN: 256-282-05)

SC1 **SPECIFIC CONDITIONS:**

SC2 At any time after two years from the date of this approval, on June 2, 2018 at 5:00 pm, or the expiration date of any extension granted in accordance with the Municipal Code, the City may require a noticed public hearing to be scheduled before the authorized agency to determine if there has been demonstrated a good faith intent to proceed in reliance on this approval. If the authorized agency finds that a good faith intent to proceed has not been demonstrated, the application shall be deemed expired as of the above date (or the expiration date of any extension). The determination of the authorized agency may be appealed to the City Council within 15 days of the date of the determination.

SC5 This project is conditionally approved as set forth on the application and project drawings stamped received by the City on May 5, 2016, consisting of eight sheets including Sheet A-1 (Site Plan/Project Info), A-2 and A-3 (Floor Plans), A-4 (Exterior Elevations), L-1 (Landscape Concept Plan), EX-1 (Basement/ Lot Slope Exhibits), A-2 (Basement Plan and Exterior Elevations) and a preliminary grading plan (2 Sheets), all designated as approved by the Planning Commission on June 2, 2016, and shall not be altered without express authorization by the Planning and Building Department.

SCA The following Planning Department conditions shall be completed to the satisfaction of the Director of the Planning and Building Department:

1. The applicant shall participate in any comprehensive plan adopted by the City to address coastal bluff recession and shoreline erosion problems in the City.

2. No irrigation shall be permitted within the 40-foot bluff setback.

3. No improvements shall be permitted within 5 feet of the coastal bluff edge except for landscaping.

4. No grading improvements (i.e. shoring) associated with the construction of the single-family structure including the basement shall be permitted within the 40-foot bluff setback except as specifically permitted herein.

5. An open space easement shall be executed and recorded to the satisfaction of the Planning and Building Department to conserve the coastal bluff face between the coastal bluff edge and the most westerly property line. Said coastal bluff conservation action shall prohibit the alteration of land forms, removal of vegetation, or the removal/erection of structures of any type except as permitted herein and/or by written authorization by the City of Encinitas Planning and Building Department. This does not preclude the exercise of emergency measures as directed and authorized by the City of Encinitas Planning and Building Department and California Coastal Commission in accordance with Section 30.34.0202B2 of the Encinitas Municipal Code. Said open space easement shall be clearly depicted on the plans submitted for building and grading permit issuance in reliance on this approval to the satisfaction of the Planning and Building Department and Engineering Services Department and shall be recorded prior to issuance of said building and grading permits.

6. The type of landscaping/irrigation installed on the site shall be subject to the review and approval of the Planning and Building Department.

SCB The following conditions shall be completed to the satisfaction of the Engineering Division:

1. The applicant shall provide public improvements along the frontage by removing and replacing the curb, gutter, and sidewalk and providing a half width AC grind and overlay along the property's frontage. The proposed driveway curb cut shall not occupy more than 40% of the property frontage as shown on the CDP site plan.

2. As proposed on the Coastal Development Permit (CDP) site plan, all drainage shall be directed toward the street; no runoff shall be allowed to discharge over the face of the bluff. Prior to discharge from the site, all runoff generated by new and/or removed and replaced impervious surfaces shall be treated by permanent post construction BMP facilities. The CDP site plan identifies the use of impermeable liners in the bioretention basins because of the proximity to the bluff; because of this, a perforated underdrain pipe shall be used to discharge the filtered runoff from the system.

3. Prior to the commencement of any clearing or grading, the applicant shall obtain a grading permit from the Engineering Department for the proposed development. The required frontage improvements shall be permitted on the grading plan. If shoring is required, it shall be reviewed and permitted as part of the grading plan.

4. The undocumented fill identified in the soils report shall be removed and recompacted as part of the grading operation. Prior to approval of the grading plan, the City's Geotechnical Consultant shall review and approve the soils report as well as the project design.

SCC The following conditions shall be completed to the satisfaction of the San Dieguito Water District (SDWD):

1. The applicant shall upgrade the existing 5/8-inch water meter and service at his/her expense. The San Dieguito Water District will require that water meters are placed in front of the parcel they are serving and outside of any existing or proposed travel way.

2. The developer shall show all existing and proposed water facilities on improvement or grading plans for the approval of the San Dieguito Water District.

SCD Prior to the approval of the construction permits, the applicant shall submit project plans and all required documentation for the Leucadia Wastewater District.

G1 **STANDARD CONDITIONS:**

CONTACT THE PLANNING AND BUILDING DEPARTMENT REGARDING COMPLIANCE WITH THE FOLLOWING CONDITION(S):

G2 This approval may be appealed to the City Council within 15 calendar days from the date of this approval in accordance with Chapter 1.12 of the Municipal Code.

G3 This project is located within the Coastal Appeal Zone and may be appealed to the California Coastal Commission pursuant to Coastal Act Section 30603 and Chapter 30.04 of the City of Encinitas Municipal Code. An appeal of the Planning Commission's decision must be filed with the Coastal Commission within 10 working days following the Coastal Commission's receipt of the Notice of Final Action. Applicants will be notified by the Coastal Commission as to the date the Commission's appeal period will conclude. Appeals must be in writing to the Coastal Commission, San Diego Coast District office.

G4 Prior to **building permit issuance**, the owner shall cause a covenant regarding real property to be recorded. Said covenant shall set forth the terms and conditions of this grant of approval and shall be of a form and content satisfactory to the Planning and Building Director. The Owner(s) agree, in acceptance of the conditions of this approval, to waive any claims of liability against the City and agrees to indemnify, hold harmless and defend the City and City's employees relative to the action to approve the project.

G5 Approval of this request shall not waive compliance with any sections of the Municipal Code and all other applicable City regulations in effect at the time of Building Permit issuance unless specifically waived herein.

G7 Prior to issuing a final inspection on framing, the applicant shall provide a survey from a licensed surveyor or a registered civil engineer verifying that the building height is in compliance with the approved plans. The height certification/survey shall be supplemented with a reduced (8 ½ in. x 11 in.) copy of the site plan and elevations depicting the exact point(s) of certification. The engineer/surveyor shall contact the Planning and Building Department to identify and finalize the exact point(s) to be certified prior to conducting the survey.

G10 All retaining and other freestanding walls, fences, and enclosures shall be architecturally designed in a manner similar to, and consistent with, the primary structures (e.g. stucco-coated masonry, split-face block or slump stone). These items shall be approved by the Planning and Building Department prior to the issuance of building and/or grading permits.

G12 Prior to any use of the project site pursuant to this permit, all conditions of approval contained herein shall be completed or secured to the satisfaction of the Planning and Building Department.

G13 The applicant shall pay development fees at the established rate. Such fees may include, but not be limited to: Permit and Plan Checking Fees, Water and Sewer Service Fees, School Fees, Traffic Mitigation Fees, Flood Control Mitigation Fees, Park Mitigation Fees, and Fire Mitigation/Cost Recovery Fees. Arrangements to pay these fees shall be made prior to **building permit issuance** to the satisfaction of the Planning and Building and Engineering Services Departments. The applicant is advised to contact the Planning and Building Department regarding Park Mitigation Fees, the Engineering Services Department regarding Flood Control and Traffic Fees, applicable School District(s) regarding School Fees, the Fire Department regarding Fire Mitigation/Cost Recovery Fees, and the applicable Utility Departments or Districts regarding Water and/or Sewer Fees.

G14 A plan shall be submitted for approval by the Planning and Building Department, the Engineering Services Department, and the Fire Department regarding the security treatment of the site during the construction phase, the on- and off-site circulation and parking of construction workers' vehicles, and any heavy equipment needed for the construction of the project.

G19 Garages enclosing required parking spaces shall be kept available and usable for the parking of owner/tenant vehicles at all times, and may not be rented or conveyed separately from the appurtenant dwelling unit.

G22 Building plans for the new dwelling unit shall include installation of wiring for current or conduits for future installation of photovoltaic energy generation system(s) and an electric vehicle charging station.

G23 Any wall, fence or combination thereof exceeding 6 ft. in height and facing any neighboring property or visible from the public right-of-way shall be subject to design review pursuant to Section 23.08.040.A.1 of the Encinitas Municipal Code. Where a minimum 2 ft. horizontal offset is provided, within which screening vegetation is provided to the satisfaction of the Planning and Building Department, the fence/wall may not be considered one continuous structure for purpose of measuring height and may be exempted from design review provided none of the offset fences or walls exceed 6 ft. in height pursuant to Section 23.08.030.B.1.

G24 Newly constructed single-family dwelling units shall be pre-plumbed for a graywater system permitted and constructed in accordance with Chapter 16 of the California Plumbing Code and including a stub-out in a convenient location for integration of the graywater system with landscape irrigation systems and accepting graywater from all sources permissible in conformance with the definition of graywater as per Section 14876 of the California Water Code. Exception: A graywater system shall not be permitted where a percolation test shows the absorption capacity of the soil is unable to accommodate the discharge of a graywater irrigation system.

BLUFFTOP DEVELOPMENT:

BL1 Owner(s) shall enter into and record a covenant satisfactory to the City Attorney waiving any claims of liability against the City and agreeing to indemnify and hold harmless the City and City's employees relative to the approved project. This covenant is applicable to any bluff failure and erosion resulting from the development project.

BL2 The applicant shall execute and record a covenant to the satisfaction of the Planning and Building Department setting forth the terms and conditions of this approval prior to the issuance of building permits. Said covenant shall also provide that the property owner shall be responsible for maintaining the approved structure(s) in good visual and structural condition in a manner satisfactory to the Directors of Engineering Services and Planning and Building.

BL3 An "as-built geotechnical report" shall be submitted to the Planning and Building and Engineering Services Departments, for review and acceptance, prior to approval of the foundation inspection. The report shall outline all field test locations and results, and observations performed by the consultant during construction of the proposed structure(s), and especially relative to the depths and actual location of the foundations. The report shall also verify that the recommendations contained in the Geotechnical Investigation Report, prepared and submitted in conjunction with the application, have been properly implemented and completed.

BL4 An "as-built geotechnical report", reviewed and signed by both the soils/geotechnical engineer and the project engineering geologist, shall be completed and submitted to the City within 15 working days after completion of the project. The project shall not be considered complete (and thereby approved for use or occupancy) until the as-built report is received and the content of the report is found acceptable by the Planning and Building and Engineering Services Departments.

B1 **BUILDING CONDITION:**

CONTACT THE ENCINITAS BUILDING DIVISION REGARDING COMPLIANCE WITH THE FOLLOWING CONDITION:

B2R The applicant shall submit a complete set of construction plans to the Building Division for plancheck processing. The submittal shall include a Soils/Geotechnical Report, structural calculations, and State Energy compliance documentation (Title 24). Construction plans shall include a site plan, a foundation plan, floor and roof framing plans, floor plan(s), section details, exterior elevations, and materials specifications. Submitted plans must show compliance with the latest adopted editions of the California Building Code (The Uniform Building Code with California Amendments, the California Mechanical, Electrical and Plumbing Codes). These comments are preliminary only. A comprehensive plancheck will be completed prior to permit issuance and additional technical code requirements may be identified and changes to the originally submitted plans may be required.

F1 **FIRE CONDITIONS:**

CONTACT THE ENCINITAS FIRE DEPARTMENT REGARDING COMPLIANCE WITH THE FOLLOWING CONDITIONS:

F10 **OBSTRUCTION OF ROADWAYS DURING CONSTRUCTION:** All roadways shall be a minimum of 24 feet in width during construction and maintained free and clear, including the parking of vehicles, in accordance with the California Fire Code and the Encinitas Fire Department.

F13 **ADDRESS NUMBERS:** STREET NUMBERS: Approved numbers and/or addresses shall be placed on all new and existing buildings and at appropriate additional locations as to be plainly visible and legible from the street or roadway fronting the property from either direction of approach. Said numbers shall contrast with their background, and shall meet the following minimum standards as to size: 4 inches high with a ½- inch stroke width for residential buildings, 8 inches high with a ½-inch stroke for commercial and multi-family residential buildings, 12 inches high with a 1-inch stroke for industrial buildings. Additional numbers shall be required where deemed necessary by the Fire Marshal, such as rear access doors, building corners, and entrances to commercial centers.

F15A **AUTOMATIC FIRE SPRINKLER SYSTEM-ONE AND TWO FAMILY DWELLINGS: Structures shall be protected** by an automatic fire sprinkler system designed and installed to the satisfaction of the Fire Department. Plans for the automatic fire sprinkler system shall be approved by the Fire Department prior to installation.

F18 **CLASS "A" ROOF:** All structures shall be provided with a Class "A" Roof covering to the satisfaction of the Encinitas Fire Department.

F22 **Basement:**

- All basements shall be designed and equipped with emergency exit systems consisting of operable windows, window wells or exit door that's leads directly outside via staircase and exit door or exit door at grade.

- Window wells/Light wells that intrude into side yard or backyard setbacks of five feet or less, shall require a hinged grating covering the window well/lightwell opening. The grating shall be capable of supporting a weight of 250lb person; yet must be able to be opened by someone of minimal strength with no special knowledge, effort or use of key or tool. Any modification of previously approved plans related to this condition shall be subject to re-submittal and review by City staff (Fire, Building, Planning).

E1 **ENGINEERING CONDITIONS:**

CONTACT THE ENGINEERING SERVICES DEPARTMENT REGARDING COMPLIANCE WITH THE FOLLOWING CONDITION(S):

E2 All City Codes, regulations, and policies in effect at the time of building/grading permit issuance shall apply.

E3 All drawings submitted for Engineering permits are required to reference the NAVD 88 datum; the NGVD 29 datum will not be accepted.

EG1 **Grading Conditions**

EG3 The developer shall obtain a grading permit prior to the commencement of any clearing or grading of the site.

EG4 The grading for this project is defined in Chapter 23.24 of the Encinitas Municipal Code. Grading shall be performed under the observation of a civil engineer whose responsibility it shall be to coordinate site inspection and testing to ensure compliance of the work with the approved grading plan, submit required reports to the Engineering Services Director and verify compliance with Chapter 23.24 of the Encinitas Municipal Code.

EG5 No grading shall occur outside the limits of the project unless a letter of permission is obtained from the owners of the affected properties.

EG6 Separate grading plans shall be submitted and approved and separate grading permits issued for borrow or disposal sites if located within the city limits.

EG7 All newly created slopes within this project shall be no steeper than 2:1.

EG8 A soils/geological/hydraulic report (as applicable) shall be prepared by a qualified engineer licensed by the State of California to perform such work. The report shall be submitted with the first grading plan submittal and shall be approved prior to issuance of any grading permit for the project.

EG9 Prior to hauling dirt or construction materials to any proposed construction site within this project the developer shall submit to and receive approval from the Engineering Services Director for the proposed haul route. The developer shall comply with all conditions and requirements the Engineering Services Director may impose with regards to the hauling operation.

EG10 In accordance with Section 23.24.370 (A) of the Municipal Code, no grading permit shall be issued for work occurring between October 1st of any year and April 15th of the following year, unless the plans for such work include details of protective measures, including desilting basins or other temporary drainage or control measures, or both, as may be deemed necessary by the field inspector to protect the adjoining public and private property from damage by erosion, flooding, or the deposition of mud or debris which may originate from the site or result from such grading operations.

ED1 **Drainage Conditions**

ED2A An erosion control system shall be designed and installed onsite during all construction activity. The system shall prevent discharge of sediment and all other pollutants onto adjacent streets and into the storm drain system. The City of Encinitas Best Management Practice Manual shall be employed to determine appropriate storm water pollution control practices during construction.

ED3 A drainage system capable of handling and disposing of all surface water originating within the project site, and all surface waters that may flow onto the project site from adjacent lands, shall be required. Said drainage system shall include any easements and structures required by the Engineering Services Director to properly handle the drainage.

ED5 The owner shall pay the current local drainage area fee prior to issuance of the building permit for this project or shall construct drainage systems in conformance with the Master Drainage Plan and City of Encinitas Standards as required by the Engineering Services Director.

ES1 **Street Conditions**

ES5 Prior to any work being performed in the public right-of-way, a right-of-way construction permit shall be obtained from the Engineering Services Director and appropriate fees paid, in addition to any other permits required.

EU1 **Utilities Conditions**

EU4 All proposed utilities within the project shall be installed underground including existing utilities unless exempt by the Municipal Code.

ESW1 **Storm Water Pollution Control Conditions**

ESW5 The project must meet storm water quality and pollution control requirements. The applicant shall design and construct landscape and/or turf areas and ensure that all flows from impervious surfaces are directed across these areas prior to discharging onto the street. A Grading Plan identifying all landscape areas designed for storm water pollution control (SWPC) and Best Management Practice shall be submitted to the City for Engineering Services Department approval. A note shall be placed on the plans indicating that the modification or removal of the SWPC facilities without a permit from the City is prohibited.

ESW9 For storm water pollution control purposes, all runoff from all roof drains shall discharge onto grass and landscape areas prior to collection and discharge onto the street and/or into the public storm drain system. Grass and landscape areas designated for storm water pollution control shall not be modified without a permit from the City. A note to this effect shall be placed on the Grading plan

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January 11, 2016

Manjeet Ranu
Planning Director
Planning and Building Department
505 South Vulcan Avenue
Encinitas, CA 92024

Re: Bluff Top Development/Basements/Caisson Foundations/Shoreline Armoring

Dear Mr. Ranu:

Commission staff has been asked by the City to review two proposed bluff top development projects (444 Neptune Avenue and 808 Neptune Avenue) and Commission staff has received a neighborhood meeting notice for an additional proposed bluff top development project (438 Neptune Avenue). These projects raise various concerns related to retention of existing shoreline armoring, new shoreline armoring in the form of caissons and fortified basement retaining walls, and the potential need for future shoreline armoring to protect the proposed new homes.

The proposed homes at 438 and 444 Neptune Avenue raise similar issues. No existing shoreline armoring fronts either site, but a seawall has been constructed directly to the north and just south of the two properties. The home at 438 Neptune will require demolition of the existing bluff top home and the home at 444 Neptune is proposed to be constructed on a vacant bluff top lot. Both homes are proposed to be relatively large (approximately 5,000 sq. ft. including garage and basement area), and would occupy almost the entire developable area of each lot. Both homes are proposed to be sited 40 ft. from the bluff edge with a caisson foundation to allow the structures to meet the stability requirements of the City's certified Local Coastal Program (LCP).

The proposed home at 808 Neptune Avenue will require demolition of an existing bluff top home. The new home is proposed to be approximately 4,100 sq. ft. including the basement and garage, and would be located as close as 40 feet from the bluff edge with a cantilevered second story within 32 feet of the bluff edge. The plans submitted for review show that foundation piers are proposed to be located on the western and eastern sides of the basement. Armoring previously approved and constructed to protect the existing home on the site consists of a seawall and buried caissons near the bluff edge.

As evidenced by the proliferation of shoreline armoring throughout the City of Encinitas, the proposed bluff top homes are all located in hazardous areas that are subject to bluff erosion. The Coastal Act and the policies of the certified LCP prohibit new development that will require shoreline protection. Thus, new homes in hazardous areas must be set

back far enough inland from the bluff edge such that they will not be endangered by erosion (including sea level rise induced erosion) over the life of the structure, without the use of a shoreline protective device. The Commission geologist recommends that an estimated long term erosion rate of 0.49 ft./yr. be used in Encinitas to account for future increased erosion as a result of sea level rise and increased storm surges. As required by the City's LCP, 75 years of estimated long term erosion must be added to the 1.5 Factor of Safety bluff edge setback for bluff top sites to determine a location that will be safe for the life of the development. If an adequate setback is not feasible due to lot depth, project alternatives such as a smaller development footprint must be considered. If such alternatives are infeasible or still cannot achieve the adequate setback, the bluff setback must be maximized to the greatest extent feasible that will still allow the construction of a new home.

The Commission considers caissons a form of shoreline protection. Caissons require landform alteration and typically become exposed over time in the same manner as upper bluff protection structures. Thus, new development must not rely on caissons to assure structural stability nor to determine a safe bluff setback that would achieve the minimum required factor of safety of 1.5. Rather, homes should be sited as far back as necessary to be safe over the life of the structure, even if that means redesigning the footprint of the house, and/or reducing the required front and side yard setbacks.

Additionally, in order to avoid the need for shoreline armoring in the future, plans and specific triggers for removal or retreat of the proposed development should be included with any project submittal. Caissons or basements may be difficult to remove in the future and alternative design options should be considered. The Commission recently denied the construction of a caisson foundation to support an addition to a home in Solana Beach based on a finding that a caisson foundation that was being designed to support the proposed development in a hazardous location would substantially alter the natural landform of the coastal bluff and that it would essentially serve the same purpose as a bluff retention device (Ref: CDP 6-14-0679/WJK Trust). In addition, Section 30.34.020.B.a of the City's LCP implementation plan states, in part: "*...Any new construction shall be specifically designed and constructed such that it could be removed in the event of endangerment…*" Staff recommends that the City require applicants to develop a feasible plan to incrementally retreat from the bluff edge should erosion cause a reduction in the setback and factor of safety.

Furthermore, the Commission typically requires that current and future risks be assumed by the property owners in the form of a deed restriction and a waiver of rights to any future shoreline armoring to protect the new structures. Section 30.31.020(D) of the City's LCP implementation plan also states, in part: "*…that any proposed structure or facility is expected to be reasonably safe from failure and erosion over its lifetime without having to propose any shore or bluff stabilization to protect the structure in the future...*" The applicant must waive any rights to construct shoreline protection under 30235 of the Coastal Act. Only with this waiver can the project be found to be consistent with Section 30.34.020(D) which prohibits new development from requiring future shoreline protection.

The safe building envelope for new development must be determined using the assumption that the existing armoring (including the seawall and buried upper bluff caissons at 808 Neptune Avenue) is not present; this is true even on intensely developed, urbanized shorelines. In the case of 808 Neptune, CDP 6-03-048 authorized shoreline protection at the toe of the bluff for 22 years, and requires the property owner to apply for a permit amendment 21 years after date of the issuance of the permit to either remove the shoreline protection or propose additional mitigation beyond the initial 22-year period. The applicant should be reminded of these requirements, and made aware that the existing shoreline armoring was approved only to protect the currently existing home. If the currently existing home is demolished, then the required amendment to 6-03-048 may result in a requirement to remove the shoreline protection, because the structure it was intended to protect will no longer exist.

In summary, in regard to the proposed development under consideration, Coastal Commission staff recommends that:

- Development must be set back a sufficient distance to account for erosion at the rate of 0.49 feet/ year for at least 75 years, and achieve an additional factor of safety of 1.5 without relying upon caissons or other protective devices, including the existing shoreline protection at 808 Neptune.
    - If a safe building envelope of an adequate size to support the proposed development does not exist, options to redesign the development, including proposing a more moderately sized structure, should be analyzed.
    - If the lot does not provide an envelope that would allow for safe development for 75-years, a shorter time period may be allowable provided that the development can be removed when it is no longer safe, and that there are clearly identifiable triggers for either incremental or full removal of the development when it is no longer safe.
- Caissons at this location constitute shoreline protection devices and are therefore prohibited. Large foundations, basements, and other features that would negatively impact bluffs and/or could not be easily removed should be avoided.
- The proposed projects, if recommended for approval, must be conditioned to require that current and future risks be assumed by the property owners, that rights to any future shoreline armoring to protect the new structures is waived, and that new structures must be removed if they are threatened by coastal hazards.
- For the proposed development at 808 Neptune, if recommended for approval, the property owner must not rely on the existing protective device. Mitigation for the adverse impacts of the existing protective devices shall continue to be required in conformance with the existing CDP that authorized the armoring.

Staff notes that the issues raised in this letter have not been addressed in a comprehensive manner in the LCP for the City's blufftop and shoreline properties. The City of Encinitas has shoreline areas with differing conditions which should be evaluated regarding existing patterns of development, property ownership, geologic formations, and known

hazards and risks. Commission staff is aware of recent funding received by the City to support vulnerability assessments of the City's coastline, and encourage that the information generated from these efforts be utilized to design a future Shoreline Management Plan that could then be incorporated into the City's LCP to address these, as well as other important coastal issues.

The Commission recently adopted a Sea Level Rise policy guidance document which addresses many of the issues raised by these proposed bluff top homes, and outlines the process that should be followed when evaluating new development subject to hazard from erosion, as well as the assessment and potential removal of existing shoreline armoring when the structure it was permitted or constructed to protect no longer exists. This guidance document is designed in part to aid cities in developing updates to the LCP to address these issues. Staff would like to continue to coordinate with City staff in review of these development proposals individually, but also encourage the City to pursue an LCP update that includes a bluff and shoreline management plan and concerns related to sea level rise in a comprehensive manner.

Sincerely,

Eric Stevens
Coastal Program Analyst II

Johnsson, M.J., 2005, Establishing development setbacks from coastal bluffs, in Magoon, O.T., Converse, H., Baird, B., Jines, B., and Miller-Henson, M., eds., California and the World Ocean '02: Revisiting and revising California's Ocean Agenda: Reston, Virginia, American Society of Civil Engineers, p. 396-416.

Establishing Development Setbacks from Coastal Bluffs

Mark J. Johnsson[1]

Abstract

Responsible development, and California law, requires that coastal development be sited a sufficient distance landward of coastal bluffs that it will neither be endangered by erosion nor lead to the construction of protective coastal armoring. In order to assure that this is the case, a development setback line must be established that places the proposed structures a sufficient distance from unstable or marginally stable bluffs to assure their safety, and that takes into account bluff retreat over the life of the structures, thus assuring the stability of the structures over their design life. The goal is to assure that by the time the bluff retreats sufficiently to threaten the development, the structures themselves are obsolete. Replacement development can then be appropriately sited behind a new setback line. Uncertainty in the analysis should be considered, as should potential changes in the rate of bluff retreat and in slope stability. The deterministic approach presented here is based on established geologic and engineering principals, and similar approaches have been used to establish development setbacks from slope edges throughout the world for some time. Alternative approaches based on probabilistic methods may allow, however, for better quantification of uncertainties in the analysis. Although probabilistic coastal hazard assessment is in its infancy and data needs are large, the approach shows great promise. Developing probabilistic methods for establishing development setbacks should be a goal for future coastal zone management in California.

Introduction

In an era of sea-level rise such as has persisted on Earth for the past ~20,000 years (Curray 1965; Emery and Garrison 1967; Milliman and Emery 1968), the landward recession of coastal bluffs is an inevitable natural process wherever tectonic or isostatic uplift rates are lower than the rate of sea-level rise. New structures should be sited a sufficient distance landward of coastal bluffs that they will neither be endangered by erosion nor require the construction of coastal armoring to protect them from erosion over their design life. Because coastal bluffs are dynamic, evolving landforms, establishing responsible development setbacks from coastal bluffs is far more challenging than it is for manufactured or natural slopes not subject to erosion at the base of slope. Although internationally agreed-upon methods for establishing setbacks from static slopes have been developed, and codified in the International Building Code, no such consensus has emerged with respect to setbacks from dynamic slopes such as coastal bluffs. This paper presents a methodology for establishing such setbacks given the types of data generally available through relatively inexpensive geologic studies.

Relatively little work has been undertaken towards developing rational methodologies for establishing development setbacks from bluffs and cliffs. Coastal development setbacks have generally focused primarily on beach erosion, rather than on coastal bluff recession (*e.g.*, Healy 2002). Generally, the approach has been to simply

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extrapolate historic long-term erosion rates into the future, and establish setbacks at a particular predicted future shoreline position. This approach does not work well for shorelines with coastal bluffs, where the setback also must consider the possibility of bluff collapse (see Priest 1999 for a discussion of these issues). Komar and others (2002) presented a methodology for establishing setbacks for use on coasts where the principal hazards are wave runup and storm surge. They showed how their method could be extended to use on coasts with sea cliffs by determining the average number of hours that a sea cliff would be subject to wave attack. Their method does not, however, include a quantitative assessment of bluff stability. Given the significance of the coastal erosion threat in California, where public safety, financial investments, and environmental resources are at stake, and given the call for action urged by such recent national studies as the Heinz Center's FEMA-sponsored studies (The Heinz Center 2000a; 2000b), it is critical that a rational method be established for establishing development setbacks on coastal bluff tops.

The California Coastal Act (California Public Resource Code Sections 30000 *et seq.*) regulates coastal development in California. Section 30253 states, in part, that:

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

This law requires that new development be sited in such a way that it will not be subject to erosion or stability hazard over the course of its design life. Further, the last clause requires the finding that no seawall, revetment, jetty, groin, retaining wall, or other shoreline protective structure will be needed to protect the development over the course of its design life.

The principal challenge in meeting these requirements is predicting the amount and timing of coastal erosion to be expected at a particular site. The landward retreat of coastal bluffs is far from uniform in space or time (Komar 2000). Marine erosion tends to be concentrated at points and headlands due to wave refraction, occurs more quickly in weak rocks, and may vary along a coastline as these and other factors vary (Honeycutt et al. 2002). Further, coastal bluff retreat tends to be temporally episodic due to a variety of external and internal factors.

The mechanisms of coastal bluff retreat are complex (Emery and Kuhn 1982; Sunamura 1983; Vallejo 2002), but can be grouped into two broad categories. Bluff retreat may occur suddenly and catastrophically through slope failure involving the entire bluff, or more gradually through grain-by-grain erosion by marine, subaerial, and ground water processes. The distinction between the two categories may be blurred in

some cases—"grains" may consist of relatively large blocks of rock or shallow slumps, for example. Nevertheless, in establishing structural setbacks it is important to evaluate the susceptibility of the bluff to both catastrophic collapse and to more gradual erosion and retreat.

For both slope stability and long-term bluff retreat by "grain-by-grain" erosion, the setback must be adequate to assure safety over the design life of the development. For this reason, it is necessary to specify the design life of the structure. Many Local Coastal Programs (the implementation of the California Coastal Act at the local government level) specify a particular value, although the Coastal Act itself does not. The most commonly assumed design lives for new development range from 50 to 100 years; the most common value is 75 years. The reasoning behind establishing a setback based on the design life is that by the time the bluff retreats sufficiently to threaten the structure, the structure is obsolete and is ready to be demolished for reasons other than encroaching erosion. Replacement development can then be appropriately sited at a new setback, appropriate for conditions at the time of its construction. This process may be thwarted by limitations imposed by parcel size, and Constitutional takings issues may complicate land use decisions. Nevertheless, the only alternative to an armored coast—with all of its attendant impacts—is to continually site, and reposition, development in harmony with coastal erosion as it inevitably moves the shoreline landward.

What follows is the methodology employed by the staff of the California Coastal Commission in evaluating setbacks for bluff top development. I would suggest that this methodology is useful on other coasts with coastal bluffs, as well. This methodology does not represent a formal policy or position of the Coastal Commission. In fact, there may be other appropriate methodologies to establish development setbacks, and the Commission has the discretion to base a decision on any method that it finds technically and legally valid. Any such alternative methods should, however, be at least as protective of coastal zone resources as those outlined here. Further, as new techniques and information become available, these methodologies may change. Nevertheless, the type of analysis outlined here represents the current analytical process carried out by Coastal Commission staff in evaluating proposals for new development on the California coast, and in recommending action upon those proposals to the Commission. The Commission then makes its decisions on a case-by-case basis, based upon the site-specific evidence related to the particular development proposal.

Definition of "Bluff Edge"

Development setbacks normally are measured from the upper edge of the bluff top. Accordingly, a great deal of effort often is focused on defining that "bluff edge." The bluff edge is simply the line of intersection between the steeply sloping bluff face and the flat or more gently sloping bluff top. Defining this line can be complicated, however, by the presence of irregularities in the bluff edge, a rounded or

stepped bluff edge, a sloping bluff top, or previous grading or development near the bluff edge. Accordingly, a set of standards for defining the bluff edge is necessary.

Under the California Coastal Act, the bluff edge is defined as:

> … the upper termination of a bluff, cliff, or seacliff. In cases where the top edge of the cliff is rounded away from the face of the cliff as a result of erosional processes related to the presence of the steep cliff face, the bluff line or edge shall be defined as that point nearest the cliff beyond which the downward gradient of the surface increases more or less continuously until it reaches the general gradient of the cliff. In a case where there is a steplike feature at the top of the cliff face, the landward edge of the topmost riser shall be taken to be the cliff edge…" (California Code of Regulations, Title 14, §13577 (h) (2).

This definition is largely qualitative, and the interpretation of the topographic profile to yield a bluff edge determination at any given coastal bluff may be subject to various interpretations. Accordingly, it may be useful to use more quantitative means to define "bluff edge." One approach, adopted, for example, by the City of Laguna Beach, is to define the bluff edge as that point at which the coastal bluff attains a certain specified steepness. This steepness is equivalent to the first derivative of the topographic profile. Such a definition may, however, be inconsistent with the legal definition above. Further, ambiguous results may be obtained when the upper portion of the bluff fluctuates around the specified steepness value. Better results may be obtained by finding the point at which the second derivative, the rate of change in steepness, of the topographic profile increases sharply. This approach may be amenable to computer analysis, although such analysis is rarely employed.

The position of the bluff edge may be changed by a variety of processes, natural and anthropogenic. Most obvious is the landward retreat of the bluff edge through coastal erosion. A bluff edge also may move seaward, through tectonic processes, but such movement is rare and usually small on human time scales. More significant is the anthropogenic modification of the bluff edge by grading or the construction of structures. A landward shift of the bluff edge commonly occurs through cutting into and removing natural materials during grading operations or the construction of seawalls. Conversely, placing artificial fill on or near the bluff edge generally does not alter the position of the natural bluff edge; the natural bluff edge still exists, buried beneath fill, and the natural bluff edge is used for purposes of defining development setbacks.

Slope Stability

Once the bluff edge is located, the first aspect to consider in establishing development setbacks from the bluff edge is to determine whether the existing coastal bluff meets minimum requirements for slope stability. If the answer to this question is "yes," then no setback is necessary for slope stability considerations. If the answer is "no," then the distance from the bluff edge to a position where sufficient stability exists to assure safety must be found. In other words, we must determine how far back from the unstable or marginally slope must development be sited to assure its safety.

We are guided in this analysis by the industry-accepted standards for artificial slopes (codified in many local grading ordinances), which require that a particular minimum "factor of safety" against landsliding be attained. A more difficult situation is the case of overhanging or notched coastal bluffs, or bluffs undermined by sea caves.

Landslides. Assessing the stability of slopes against landsliding is undertaken through a quantitative slope stability analysis. In such an analysis, the forces resisting a potential landslide are first determined. These are essentially the strength of the rocks or soils making up the bluff. Next, the forces driving a potential landslide are determined. These forces are the weight of the rocks as projected along a potential slide surface. The resisting forces are divided by the driving forces to determine the "factor of safety." A value below 1.0 is theoretically impossible, as the slope would have failed already. A value of 1.0 indicates that failure is imminent. Factors of safety at increasing values above 1.0 lend increasing confidence in the stability of the slope. The industry-standard for new development is a factor of safety of 1.5, and many local grading ordinances in California and elsewhere (including the County of Los Angeles, and the Cities of Irvine, Malibu, and Saratoga, among others) require that artificial slopes meet this factor of safety.

A slope stability analysis is performed by testing hundreds of potential sliding surfaces. The surface with the minimum factor of safety will be the one on which failure is most likely to occur. Generally, as one moves back from the top edge of a slope, the factor of safety against landsliding increases. Therefore, to establish a safe setback for slope stability from the edge of a coastal bluff, one needs to find the distance from the bluff edge at which the factor of safety is equal to 1.5.

Inherent in the calculation of a slope stability analysis is the shape (topographic profile) and geologic makeup of the coastal bluff. There are many ways to calculate the forces involved in slope stability analyses. All methods must consider such factors as rock or soil strength, variations in rock and soil strength values due to different types of materials making up the slope, anisotropy in these values, and any weak planes or surfaces that may exist in the slope (Abramson et al. 1995). More subtly, other factors that must be considered include: pore water pressure, which produces a buoyant force that reduces the resisting forces, the particular failure mechanism that is most likely (*e.g.*, a block slide mechanism vs a circular failure mechanism), and seismic forces. Seismic forces normally are considered through a separate analysis, in which a force equal to 15% of the force of gravity is added to the driving forces. Because seismic driving forces are of short duration, a factor of safety of 1.1 generally is considered adequate to assure stability during an earthquake. This type of analysis is fairly crude, and other methods for evaluating slope stability based on maximum permanent displacement experienced during earthquakes do exist, but the pseudo-static method represents the current standard of practice for most development in California (Geotechnical Group of the Los Angeles Section of the American Society of Civil Engineers 2002). Guidelines for conducting slope stability analyses for review by the California Coastal Commission are presented in Table 1.

Table 1. Guidelines for performing quantitative slope stability analyses

1) The analyses should demonstrate a factor of safety greater than or equal to 1.5 for the static condition and greater than or equal to 1.1 for the seismic condition. Seismic analyses may be performed by the pseudostatic method or by displacement methods, but in any case should demonstrate a permanent displacement of less than 50 mm.

2) Slope stability analyses should be undertaken through cross-sections modeling worst case geologic and slope gradient conditions. Analyses should include postulated failure surfaces such that both the overall stability of the slope and the stability of the surficial units is examined.

3) The effects of earthquakes on slope stability (seismic stability) may be addressed through pseudostatic slope analyses assuming a horizontal seismic coefficient of 0.15g. Alternative (displacement) methods may be useful, but should be in conformance with the guidelines published by the Geotechnical Group, American Society of Civil Engineers, Los Angeles Section (2002).

4) All slope analyses should ideally be performed using shear strength parameters (friction angle and cohesion), and unit weights determined from relatively undisturbed samples collected at the site. The choice of shear strength parameters should be supported by direct shear tests, triaxial shear test, or literature references, and should be in conformance with the guidelines published by the Geotechnical Group, American Society of Civil Engineers, Los Angeles Section (2002).

5) All slope stability analyses should be undertaken with water table or potentiometric surfaces for the highest potential ground water conditions.

6) If anisotropic conditions are assumed for any geologic unit, strike and dip of weakness planes should be provided, and shear strength parameters for each orientation should be supported by reference to pertinent direct sheer tests, triaxial shear test, or literature references.

7) When planes of weakness are oriented normal to the slope or dip into the slope, or when the strength of materials is considered homogenous, circular failure surfaces should be sought through a search routine to analyze the factor of safety along postulated critical failure surfaces. In general, methods that satisfy both force and moment equilibrium, such as Spencer's (Spencer 1967; 1973), Morgenstern-Price (Morgenstern and Price 1965), and General Limit Equilibrium (Fredlund et al. 1981; Chugh 1986) are preferred. Methods based on moment equilibrium alone, such as Simplified Bishop's Method (Bishop 1955) also are acceptable. In general, methods that solve only for force equilibrium, such as Janbu's method (Janbu 1973) are discouraged due to their sensitivity to the ratio of normal to shear forces between slices (Abramson et al. 1995).

8) If anisotropic conditions are assumed for units containing critical failure surfaces determined above, and when planes of weakness are inclined at angles ranging from nearly parallel to the slope to dipping out of slope, factors of safety for translational failure surfaces should also be calculated. The use of a block failure model should be supported by geologic evidence for anisotropy in rock or soil strength. Shear strength parameters for such weak surfaces should be supported through direct shear tests, triaxial shear test, or literature references.

Establishing a safe setback line. Once the stability of the coastal bluff has been assessed, the development setback line to assure safety from marginally stable slopes is simply the line corresponding to a factor of safety of 1.5 (static) or 1.1 (pseudostatic), whichever is further landward. In establishing this line one can either use a single cross section and specify a single distance from the bluff edge at which the factor of safety rises to 1.5 (or 1.1 for the pseudostatic case), or use several cross sections and contour the factors of safety on the bluff top. Then, by choosing the 1.5 contour (or 1.1 for the pseudostatic case, if it lies further landward), a setback line is established. The latter method generally is necessary for large or complicated sites.

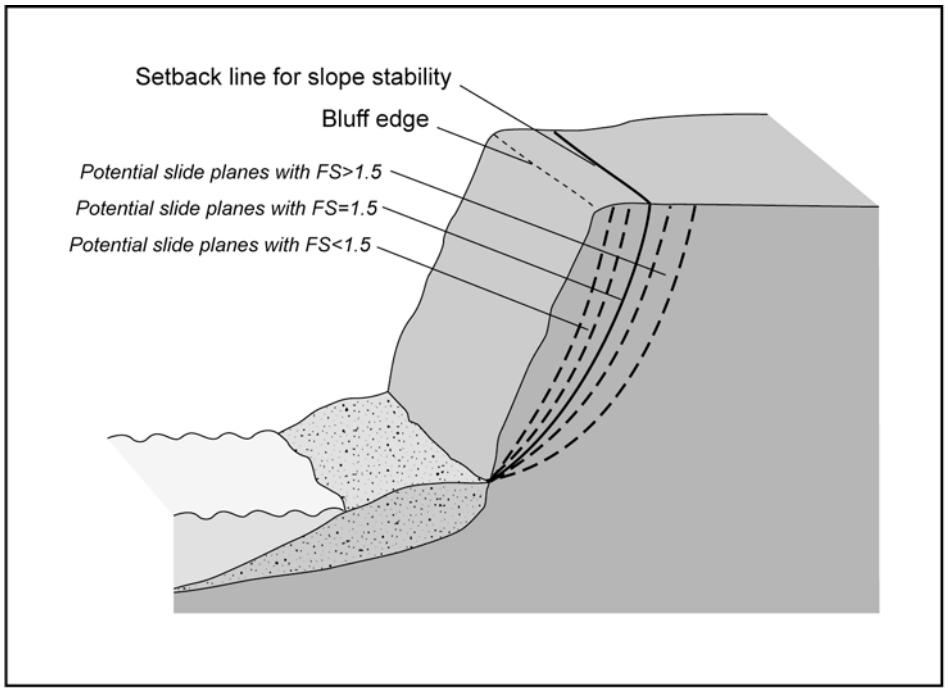

Figure 1. Establishing a development setback for slope stability. The potential slide plane possessing a defined minimum standard of stability is identified, and its intersection with the bluff edge is taken as a minimum development setback. The minimum standard for stability is usually defined as a factor of safety (FS) against sliding of 1.5 for the static case, or 1.1 for a pseudostatic (seismic) case, whichever is further landward.

Block failure of overhanging bluffs and sea caves. Assessing the factor of safety against block failure for overhanging or notched coastal bluffs, or bluffs undermined by sea caves, is far more difficult than conducting a slope stability analysis against landsliding. This is due to several factors, the most important of which are: 1) uncertainty as to the presence of local heterogeneities or planes of weakness, hidden in the bluff, that commonly control block failures, 2) difficulty in assigning shear strength values to such heterogeneities even if they can be identified, and 3) greater complexity in modeling the stress field within a bluff in terms of heterogeneities or planes of weakness as compared to a modeling a homogenous slope. The current state of the science does not allow for the calculation of a factor of safety against block failure

for such overhanging or notched coastal bluffs, or bluffs undermined by sea caves, and even makes any form of quantitative assessment of the risk of failure extremely difficult. Promise is shown in mathematical models such as that of Belov and others (1999), but translating such process-oriented models into setback methodologies has not yet been attempted.

Accordingly, establishing appropriate setbacks from overhanging or undermined coastal bluffs is problematic at best. An appropriate conservative approach is to project a vertical plane upward from the rear wall of the overhang, notch, or sea cave, and establish this as the minimum setback line. This approach has been adopted by the City of San Diego, and codified in the City's Local Coastal Program. Although it is certainly possible that failure could occur along a line inclined either seaward or landward from the rear wall of the overhang, notch, or sea cave, a vertical plane would seem to be a good default configuration to assume in the absence of more compelling evidence for another configuration. Further, vertical, bluff-parallel fractures—perhaps related to stress-relief at the free face represented by the bluff face—are a common feature of otherwise homogenous coastal bluffs. In many cases, such a plane will intersect the sloping bluff face seaward of the bluff edge, and no setback from the bluff edge would be necessary to assure stability from block collapse. In cases where the plane intersects the bluff top seaward of a setback line established for landsliding, as discussed above, no additional setback would be necessary to assure stability from block collapse. In the rather rare case, however, in which the plane intersects the bluff top landward of both the bluff edge and any setback line for landsliding, the line of intersection of the plane and the bluff top would be an appropriate setback line for slope stability considerations.

Long Term Bluff Retreat

The second aspect to be considered in the establishment of a development setback line from the edge of a coastal bluff is the issue of more gradual, or "grain by grain" erosion. In order to develop appropriate setbacks for bluff top development, we need to predict the position of the bluff edge into the future. In other words, at what distance from the bluff edge will bluff top development be safe from long-term coastal erosion?

The long-term bluff retreat rate can be defined as the average value of bluff retreat as measured over a sufficient time interval that increasing the time interval has negligible effect on the average value (a statistical basis could be applied to the term "negligible," but this is rarely done). This definition implies that the long-term bluff retreat rate is linear, an assumption that certainly is not valid over time scales of more than a few centuries, or in periods of rapid sea-level change such as the late Pleistocene/early Holocene (Curray 1965; Emery and Garrison 1967; Milliman and Emery 1968). There is some overlap between slope stability issues and long-term bluff retreat issues, in that the "grains" may be fairly large rocks, and in that shallow slump

ing is a common mechanism for gradual bluff retreat. In addition even gradual bluff retreat tends to be highly episodic due to a host of internal and external factors.

The rate at which gradual bluff retreat occurs generally is measured by examining historic data. This is somewhat problematic in that the historic bluff retreat rate may not accurately predict the future bluff retreat rate (Watson 2002). This is a particularly issue in light of the likelihood of an acceleration in the rate of sea level rise as a result of global warming (Intergovernmental Panel on Climate Change 2001) and the resulting likely increase in bluff retreat rate (Bray and Hooke 1997; Watson 2002).

Nevertheless, historic data currently are our best indicators of future erosion at any given site. Such data may include surveys that identify the bluff edge, in which case the criteria used to identify the bluff edge must be the same in the surveys that are compared. Sufficiently detailed surveys are rare, however, and vertical aerial photography is more commonly used to assess changes in bluff position through time. The best data are those compiled photogrammetrically, whereby distortions inherent to aerial photography (due, for example, to tilting of the camera, variations in the distance from the camera to various parts of the photograph, and differences in elevation across the photograph) are corrected (see, for example, Moore 2000). Sometimes such data have been gathered as parts of specific studies of coastal bluff retreat, but more commonly they are collected as part of other work, and must be sought out for coastal erosion studies.

Coastal bluff retreat tends to be temporally episodic due to a variety of external and internal factors. External factors include tides, episodic wave events (spurred by either local or distant storms), episodic rainfall events (Kuhn 2000), El Niño-Southern Oscillation events (Griggs and Johnson 1983; Griggs 1998; Griggs and Brown 1998; Lajoie and Mathieson 1998; Storlazzi and Griggs 2000), major earthquakes (Plant and Griggs 1990; Griggs and Scholar 1997) and long-term climate change on a multidecadal to century scale (Inman and Jenkins 1999). Internal factors include the autocyclicity inherent to many bluff failure mechanisms (Leighton and Associates Inc. 1979; Hampton and Dingler 1998) and bluff response to continued toe erosion (Sunamura 1992).

Despite the episodic nature of coastal bluff retreat, it is necessary to identify the future long-term bluff retreat rate in order to establish appropriate development setbacks. The episodic nature of bluff retreat makes any calculated rate highly dependent on sampling interval. To illustrate the dependence of calculated long-term bluff retreat rates on sampling interval, it is useful to perform a sensitivity analysis from real data. Unfortunately, there are insufficient data to perform a meaningful analysis for any one site in California. Accordingly, a synthetic data set was created as part of this study.

A Synthetic Data Set. Creating and examining a synthetic data set allows for testing the effects of sampling on the determination of long-term bluff retreat rates. The long-term retreat rate is, by definition, known for the synthetic data set. Further, a

synthetic data set can be created that is both longer and more complete than any such data set available from nature. The data set considered here (available upon request from the author) was created for a hypothetical 200-year period, assigned the dates 1800-2000. Figure 2 is a graphical representation of the data set, and charts the progressive retreat of the hypothetical bluff edge through that time period. Although the data are fictitious, they roughly correlate with well-known periods of episodic erosion in coastal California, at least for the second half of the data set.

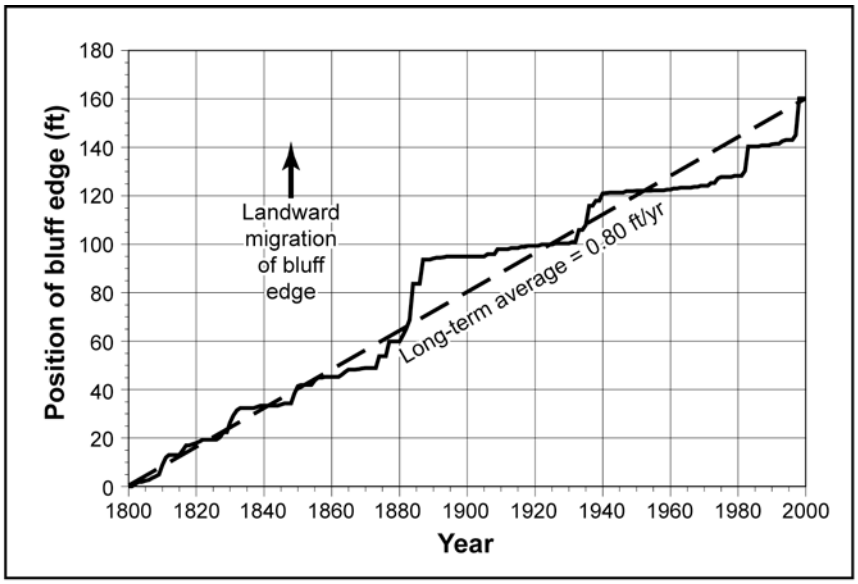

Figure 2. Plot of the position of the top edge of a hypothetical coastal bluff over time. These data represent a synthetic data set that is meant to roughly mimic typical episodic bluff retreat. Although fictitious, the data correlate well with what is know of temporal variations in erosion rate for a typical California bluff experiencing moderate erosion. The data set is far more complete than actual data available at any given site, however, making possible a sensitivity analysis of sampling interval on the calculation of the long-term bluff retreat rate.

Moving averages. A standard statistical method to smooth spikes in data is to average the data over a window of some width, while moving that window through the data set. Figure 3 shows the effect of applying this technique to the synthetic data set, using averaging windows of various widths. The first derivative of the curve representing bluff edge position through time (Figure 2) is the "instantaneous" bluff-retreat rate, and varies from 0 to 15 ft/yr for the synthetic data set (Figure 3). As the averaging window increases in width, the maximum retreat rate values decrease and the minimum values increase, effectively smoothing and broadening the "peaks" representing episodic erosion events. Depending on how the window is centered on the point representing the window average, peaks may be offset in time as well. With the widest sampling windows, peaks are essentially eliminated, and the retreat rate calculated approaches the average long-term retreat rate for the entire data set (0.80

ft/yr). Note that it is only when the window width approaches (and exceeds) 50 years in width that the calculated bluff retreat rate approaches the long-term average rate.

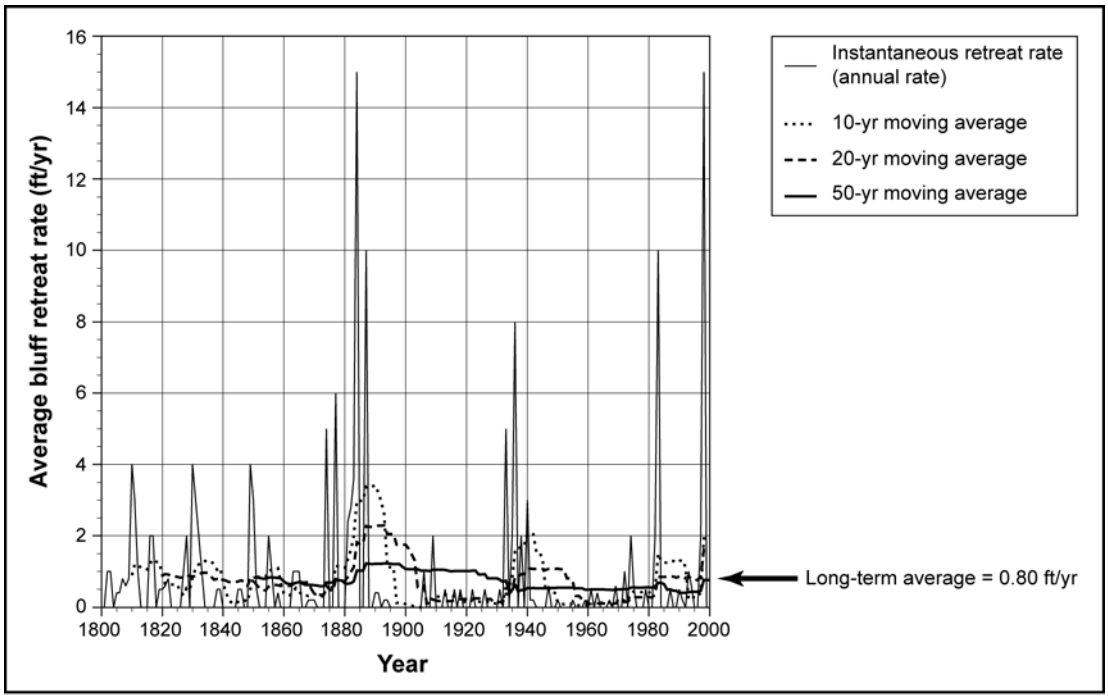

Figure 3. Average annual bluff retreat rate calculated from the synthetic data set using moving averages with various averaging window sizes. Only when data are averaged over ~50 years or more does the calculated annual bluff retreat rate approach the known long-term average for the data set.

Data gathered at intervals. Data regarding bluff edge position are almost always gathered at widely spaced intervals, corresponding to the dates of surveys or photographs. This precludes the use of a moving average technique, which depends on continuous data. Figure 4 shows the calculated bluff retreat rates at regularly spaced intervals of 10, 20, and 50 years. A wide range of values for the bluff retreat rate are obtained at the shorter sampling intervals. Although short sampling intervals give the most information on the variability of bluff retreat, the best estimate of the long-term bluff retreat rate is provided by sampling at long time intervals. Even at these long time intervals, if a statistically greater- or lesser-than-average number of "episodic events" are included in the sample, then the bluff retreat rate calculated for that interval will seriously over- or underestimate actual the long-term average bluff retreat rate.

Principal observations from the synthetic data set. A few simple generalities can be made from this limited analysis. First, instantaneous bluff retreat rates can exceed the long term average rate by a factor of many times. This is also true for data collected at short ($\leq$ ~10 years for the synthetic data set) time intervals. Second, data collected at relatively short time intervals give useful information on the episodic nature of bluff retreat, but do not provide accurate estimates of long-term average

bluff retreat rates. Third, the best estimate of long-term average bluff retreat rate is obtained by sampling over long (≥ ~50 years for the synthetic data set) time intervals. Finally, in order to accurately estimate the long-term bluff retreat rate, a stochastically appropriate number of episodic events must be included in the sampling interval. These observations, as well as similar observations from real data, lead to the general guidelines for estimating the long-term average bluff retreat rate at a site that are presented in Table 2.

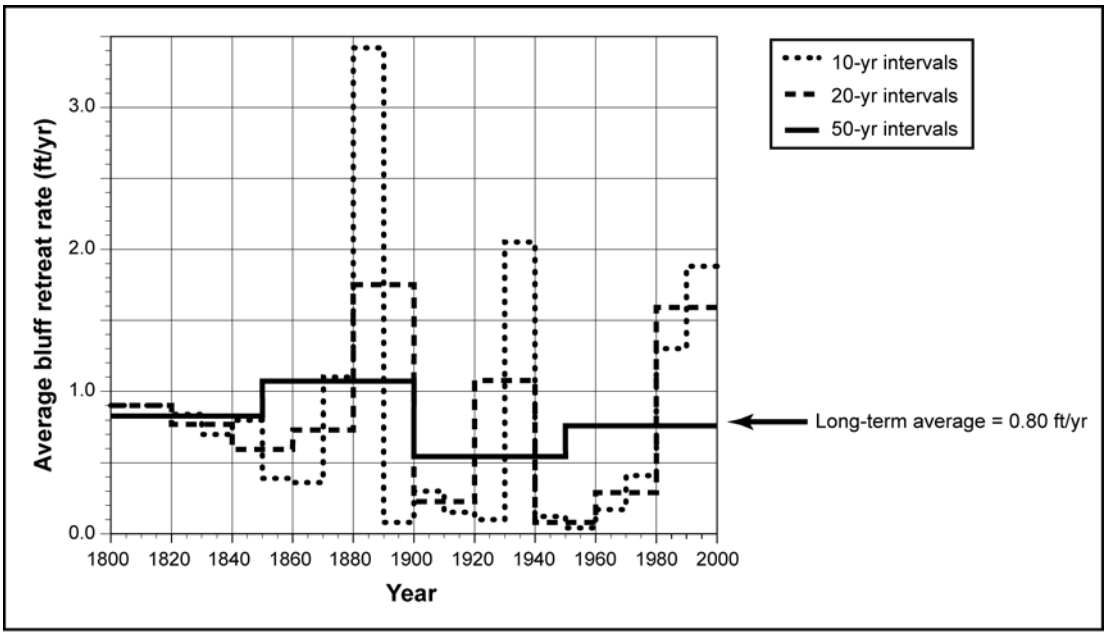

Figure 4. Average annual bluff retreat rate calculated from the synthetic data set using discrete sampling intervals of various sizes. Only when data are sampled at intervals of ~50 years or more does the calculated annual bluff retreat rate approach the known long-term average for the data set.

Establishing setbacks for long-term bluff retreat. Once an historic long-term bluff retreat rate has been estimated, establishing a setback for long-term bluff retreat rate is a simple matter of multiplying that rate, *B*, by the design life of the development, *t*. This is equivalent to predicting the position of the coastal bluff edge at the end of the design life of the structure (Figure 5).

Although this is the usual method of establishing setbacks for long-term bluff retreat in California, inherent assumptions and difficulties must be born in mind. Foremost among these is the necessity of defining the design life of the development. Because the landward retreat of an unarmored shoreline is inevitable and ongoing during a period of relative sea level rise, it is impossible to assure the safety of development from coastal erosion unless a time frame is assigned at the onset. But assigning a design life is difficult, and there is nothing in land use law that requires the abandonment of development at the end of its assigned design life.

Other problems associated with this type of analysis revolve around its inherently historic approach. There is no *a priori* reason to believe that bluff retreat rates are, or will continue to be, linear. This is especially relevant in light of expected acceleration of the historic rate of sea level rise as a result of global warming (Intergovernmental Panel on Climate Change 2001). Further, there is good evidence that erosion rates can be highly variable through time (Jones and Rogers 2002). For all of these reasons it is important to adopt a conservative approach to estimating long-term bluff retreat rates.

Table 2. Guidelines for establishing long-term bluff retreat rates

1) Determine bluff edge positions at as many times as possible, but covering a minimum of about 50 years and extending to the present. Common data sets include vertical aerial photographs, surveys that identify the bluff edge, and detailed topographic maps. These sources must be of sufficient scale or precision to locate accurately the position of the bluff edge to within a few feet.

2) If aerial photographs are used, the best results are obtained through photogrammetric methods, whereby distortions inherent to aerial photography are corrected (orthorectified). Even if photogrammetric methods are not used, the scale of the photographs must be carefully determined by comparison of the image size of known features to their actual size.

3) When comparing bluff edge positions on aerial photographs or unanchored surveys, a "shoreline reference feature" must be identified that has been static through time and is identifiable in each data set. Bluff positions throughout the area of reference can be measured relative to this feature. Common shoreline reference features are road centerlines, structures, large rock outcrops, or trees.

4) When comparing bluff edge positions on surveys, it is critical that the same criteria for the identification of the bluff edge was used in each survey. The Coastal Act definition of a bluff edge can be found in California Code of Regulations, Title 14, § 13577 (h) (2).

5) Although the short-term erosion rate for each time interval between data points provides valuable information regarding the nature of bluff retreat at the site, the long-term erosion rate should be determined from the extreme end-points of the time series examined. This time series should exceed 50 years in length, and should include both relatively quiet periods, such as the 1950's-1960's; and the more erosive subsequent time periods (especially the 1982-1983 and 1997-1998 El Niño winters).

6) In larger study areas, the bluff retreat rate should be determined at intervals along the bluff edge, paying special attention to potential differences in retreat rate between headlands and coves, and amongst areas underlain by differing geologic materials.

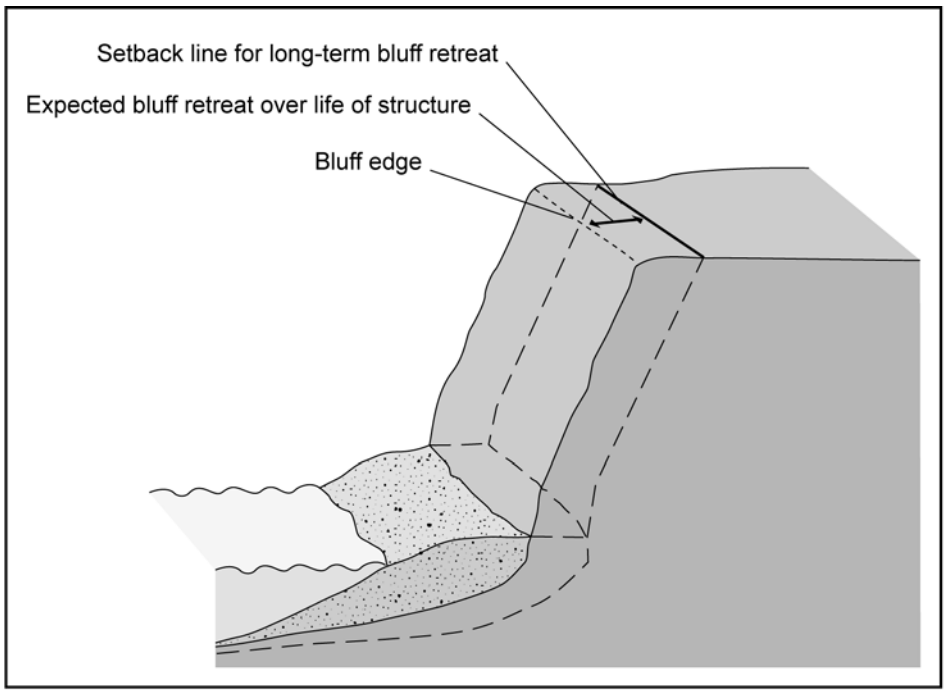

Figure 5. Establishing a development setback for long term bluff retreat. The expected bluff position at the end of the development's useful life is found by multiplying the average annual bluff retreat rate by the design life of the development; this line is taken to represent the minimum setback for long-term bluff retreat.

Uncertainty

There is a great deal of uncertainty in many parts of the analysis discussed above. The deterministic approach outlined here does not deal well with such uncertainty. Various methods have been used to build in some margin for error in establishing safe building setbacks. One approach, commonly used by geologists working in northern California, is to multiply the long-term bluff retreat rate by a factor of safety (used in a different sense than for slope stability), generally ranging from 1.5 to 4.0. More commonly, a simple "buffer" is added to the setback generated by multiplying the long-term bluff retreat rate by the design life of the structure. This buffer, generally on the order of ten feet, serves several functions: 1) it allows for uncertainty in all aspects of the analysis; 2) it allows for any future increase in bluff retreat rate due, for example, to an increase in the rate of sea level rise (Bray and Hooke 1997; Watson 2002); 3) it assures that at the end of the design life of the structure the foundations are not actually being undermined (if that were to be the case the structure would actually be imperiled well before the end of its design life); and 4) it allows access so that remedial measures, such as relocation of the structure, can be taken as erosion approaches the foundations. If a slope stability setback is required (*i.e.*, if the bluff does not meet minimum slope stability standards), that setback can do double duty as this buffer.

Summary: Defining the Total Setbacks for Bluff-Top Development

To define the total development setback, one must combine the two aspects of the setback considered above: the setback to assure safety from landsliding or block failure, and the setback for long-term bluff retreat. The resulting setback assures that minimal slope stability standards are maintained for the design life of the structure.

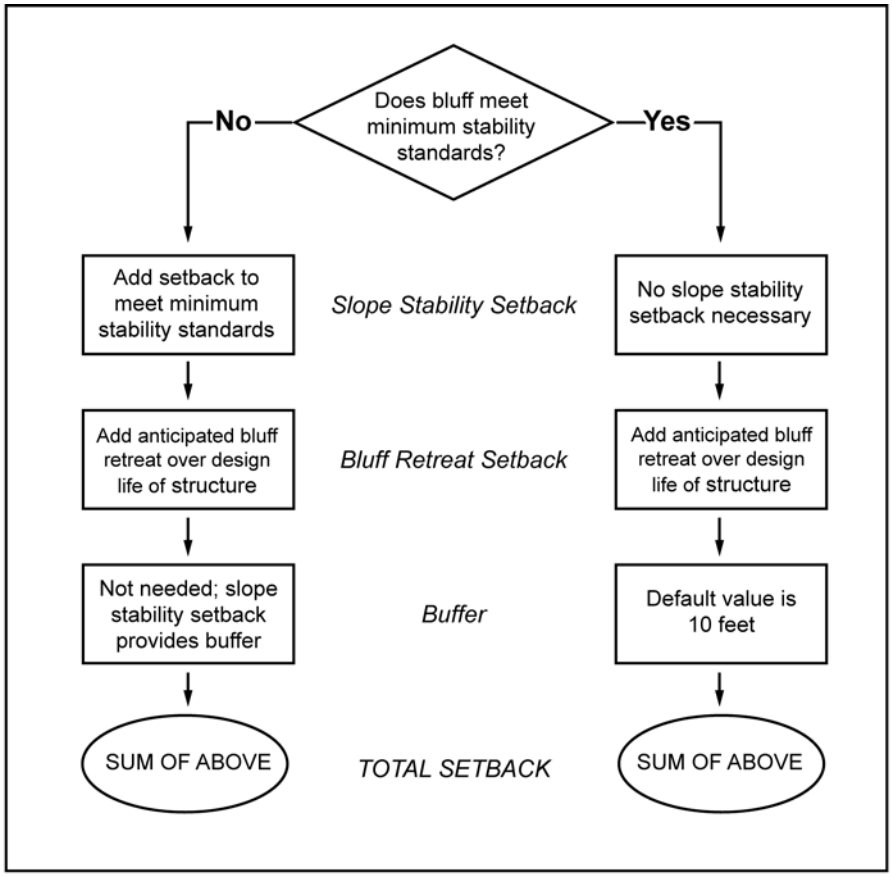

Figure 6. Flowchart for establishing bluff edge setback for development, taking into account stability of the bluff, long-term bluff retreat, and uncertainty in the analysis.

A methodology for combining these setbacks is outlined in Figure 6. First, it must be determined whether the coastal bluff meets minimum slope stability standards. Normally, this will be a factor of safety of 1.5 (static) or 1.1 (pseudostatic). If the answer to this question is “yes,” then no setback is necessary to assure slope stability. If the answer is “no,” then it is necessary to determine the position on the bluff top where the minimum slope stability standards are attained. This position, as measured relative to the bluff edge, is the setback necessary for slope stability determined as described above. In the case of block failure of an overhanging bluff or collapse of a sea cave, the setback necessary to assure stability from this type of collapse is equivalent to the slope stability setback. Although the current state of the science makes it impossible to quantitatively assess stability relative to this type of failure, a conservative, yet realistic, setback line is the projection of a vertical plane from the rear wall

of the overhang or sea cave on the bluff top. If the plane does not intersect the bluff top (*i.e.*, intersects the inclined bluff face seaward of the bluff edge), then no setback for this type of collapse is necessary.

The next step is to determine the expected bluff retreat over the design life of the structure, as described above. This setback is added to the slope stability setback, if any.

Finally, a buffer, generally a minimum of 10 feet, should be added to address uncertainty in the analysis, to allow for any future increase in the long-term bluff retreat rate, to assures that the foundation elements aren't actually undermined at the end of the design life of the development, and to allow access for remedial measures. A buffer is not necessary if the slope stability setback equals or exceeds about ten feet, as it can do "double duty" as both a setback to assure slope stability and a buffer for the purposes listed above.

The total setback is meant to assure that minimum slope stability standards are maintained for the design life of the development. Inherent in this analysis is the assumption that factors affecting slope stability (steepness and shape of the slope, ground water conditions, geometry of rock types exposed in the bluff) will remain constant through the design life of the development, that the future bluff-retreat rate will be linear and of comparable magnitude to the historic rate, and that the nature of erosion processes at the site will remain unchanged. All of these assumptions are potentially flawed, but in the absence of convincing evidence to the contrary, are a means of establishing reasonable development setbacks.

Towards Probabilistic Coastal Erosion Hazard Assessment

The deterministic approach presented above is based on established geologic and engineering principals, and similar approaches have been used to establish development setbacks from slope edges throughout the world for some time. However, the approach suffers from its limited ability to consider uncertainties in the analysis. Probabilistic approaches, on the other hand, inherently consider analytical uncertainties, and allow for a better definition of risk. This type of risk assessment has been routine for decades in the field of hydrology, where design basis and land use priorities are based on the magnitude of the "100-year flood," for example. Probabilistic coastal hazard assessment similarly can be used to quantify the likelihood that the bluff edge will erode to any particular point on a bluff top in a given time. Then, by establishing an acceptable level of risk (for example, a probability of <5% that the bluff edge will reach a certain point over the design life of the development) a setback line can be established that inherently includes uncertainties in the analysis. Just as the seismological community has moved away from deterministic methods towards probabilistic ones, such an approach allows for better consideration of the uncertainties in estimating future coastal erosion.

Probabilistic coastal hazard assessment is in its infancy, and no standardized methods have won acceptance—or even much discussion. The failure of coastal bluffs along Lake Michigan through landsliding has been assessed probabilistically by Chapman and others (2002), through the use of probabilistic slope stability analyses. Lee and others (2001) applied a variety of probabilistic methods to questions of coastal bluff retreat in England. Methods that they evaluated include the simulation of recession of episodically eroding cliffs through Monte Carlo techniques, the use of historical records and statistical experiments to model the behavior of cliffs affected by episodic landslide events, event-tree approaches, and the evaluation of the likelihood of the reactivation of ancient landslides. All of these techniques show promise, but the authors restricted themselves to specific cases. What is needed is the development of probabilistic methods that will work in more general cases, and combine both slope stability and long-term bluff retreat considerations. One way to approach this problem is to consider separately the two aspects of defining a development setback as outlined above.

Probabilistic slope stability analyses already are routine (Mostyn and Li 1993; Yang et al. 1993). In addition to quantifying the probability of slope failure (something not done in a deterministic slope stability analysis, which only establishes whether or not failure will occur), probabilistic slope stability analysis allows for consideration of variability or uncertainty in soil or rock strength parameters (Lumb 1970). Uncertainties in these input parameters are quantified by the standard deviation of each parameter. Then, using Monte Carlo techniques, a probability distribution for the factor of safety associated with any given failure plane is produced. From this, the probability of failure along the chosen potential failure plane can be calculated. The probability of failure is the probability that the factor of safety will be less than 1.0, and can be calculated for any given potential failure surface. By performing such analyses on a variety of potential failure surfaces intersecting different portions of the bluff top, a probability could be assigned to any position on the bluff top quantifying the likelihood that a failure will occur landward of that point.

Although not routine, several possibilities present themselves for developing probabilistic models for gradual, episodic, bluff retreat. Perhaps the simplest method of quantifying uncertainty is the application of a confidence interval to the estimate of the long-term average bluff retreat rate. Each time interval examined in estimating this rate is one sample of the mean value. For normally distributed data (or data that can be transformed to a normal distribution by, for example, a log transform), the sample standard deviation is a traditional estimate of uncertainty. There is a ~68.26% probability that the true mean value will lie within ±1 standard deviation of the sample mean. Different probabilities apply to different multiples of the standard deviation. Thus, uncertainties in the product (B x t), above, can be quantified and contoured on the bluff top. For populations that cannot be shown to be normally distributed (likely the case with the small sample sizes available for bluff retreat rates), a better estimate of uncertainty may be a confidence interval based on Student's t distribution, or on nonparametric statistics.

A second approach to probabilistic assessment of coastal bluff recession is to treat annual bluff retreat in a manner analogous to river floods. Thus, the recurrence interval of a particular amount of annual bluff retreat can be calculated by the formula

$$R = \frac{N+1}{M}$$

where R is the recurrence interval, N is the number of years of record, and M is the rank of the annual bluff retreat in the total data set. For the synthetic data set considered above, there are many duplicate values due to the limited precision with which bluff retreat data are generally reported. Eliminating duplicates, and ranking the annual bluff retreat rates, recurrence intervals can be calculated. These data can be graphed in order to arrive at the expected amount of bluff retreat for any particular recurrence interval (Figure 7). The inverse of the recurrence interval is the annual probability that a given amount of bluff retreat will be exceeded. Such data may be especially valuable in assessing the risk of occurrence of an episodic event sufficient to threaten an existing structure.

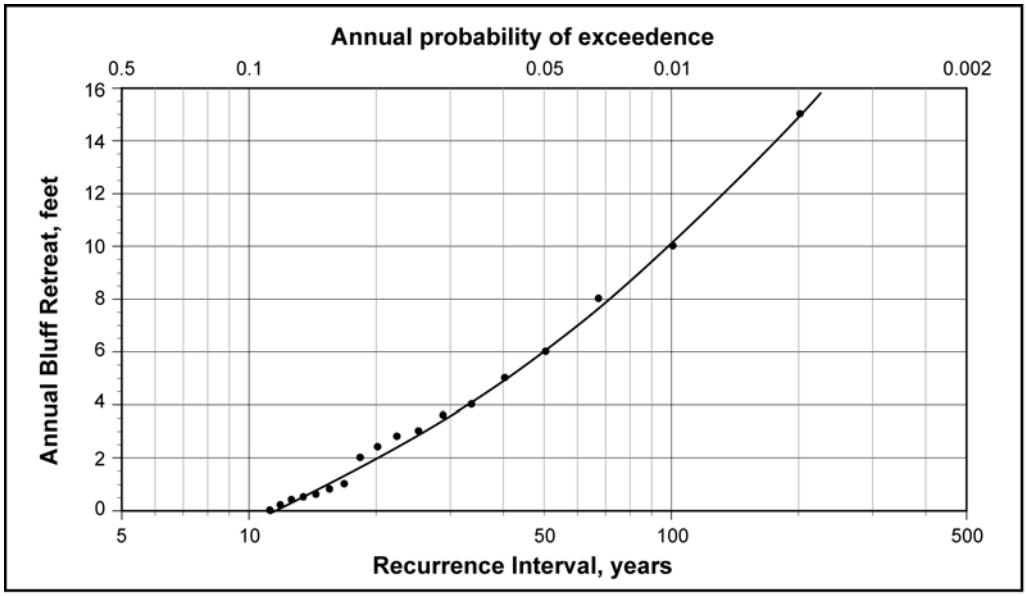

Figure 7. Recurrence interval for annual bluff retreat, calculated for the synthetic data set. The recurrence interval, calculated in a manner analogous to flood recurrence interval, gives the average time between years with a given amount of bluff retreat. The inverse of the recurrence interval is the statistical probability that a given amount of bluff retreat will occur (or be exceeded) in any given year.

The total risk to bluff-top development, which includes both long-term bluff retreat and slope failure, can be calculated by multiplying the probability of slope failure at a given position by the probability that bluff retreat will reach that point by a given time. The geotechnical and planning communities will need to establish what is an acceptable probability, or risk, that the bluff will reach a given point in order to de

velop setback criteria. Once that probability is established, the setback line can be defined as the locus of points on the bluff top at that probability.

A prime difficulty in applying probabilistic methods to assessing coastal erosion risk will be the difficulty in acquiring sufficiently rich data sets with which to work. More effort is needed at acquiring long, precise data sets on coastal erosion in a variety of geologic conditions throughout the state.

Acknowledgements

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