

**CALIFORNIA COASTAL COMMISSION**

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# Th15a

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## STAFF REPORT: REGULAR CALENDAR

**Application No.:** 6-18-0182

**Applicant:** Scott and Lisa Harris

**Agent:** Jim Dyjack

**Location:** 601 West Circle Drive, Solana Beach, San Diego County  
(APN 263-21-01)

**Project Description:** Interior and exterior remodel of an existing one story 1,544 sq. ft. single family home including conversion of the existing 281 sq. ft. garage to habitable area and construction of a new 559 sq. ft. partially enclosed covered patio on a 6,139 sq. bluff top lot.

**Staff Recommendation:** Denial

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## SUMMARY OF STAFF RECOMMENDATION

Commission staff recommends **denial** of coastal development permit application 6-18-0182. The subject application involves a sizeable addition, as well as extensive remodeling work to the majority of the major structural components of an existing blufftop residence located in a non-conforming, hazardous location. The home was constructed 67 years ago, and the extensive remodeling is expected to increase the life of the structure significantly. Since all of the changes to the structure being made are seaward of the Geologic Setback Line (GSL), the project substantially increases the potential that the structure will require shoreline protection.

The proposed project involves alteration and expansion to an existing 1,544 sq. ft., 67 year old home, and located 13 ft. from the bluff edge on a 6,139 sq. ft. bluff top lot in the City of Solana Beach ([Exhibit 1](#)). There is currently no shoreline protection below the structure ([Exhibit 4](#)). The development includes conversion of the 281 sq. ft. existing garage to habitable floor area and the construction of a 559 sq. ft. covered patio, which combined result in an 840 sq. ft. increase to the floor area of the home ([Exhibits 5-13](#)). The project also includes a substantial renovation to the majority of the major structural components of the existing house. As proposed, 30% of the exterior walls, 20% of the floor structure, and 14% of the roof structure will be altered.

Because none of the proposed major structural component alterations exceed 50%, the proposed improvements do not meet the definition of “Bluff Top Redevelopment” in the City of Solana Beach’s certified Land Use Plan (LUP). However, even when a residence is not being entirely demolished and rebuilt, improvements that increase the economic life of the structure in a hazardous location are inconsistent with the Coastal Act and can reduce the incentive to move the structure landward to reduce risk and the need for shoreline protection. Significant improvements that extend the life of a non-conforming structure in its current location must be limited to those that would not result in the need for future shoreline protection to be consistent with Chapter 3 policies, particularly improvements to portions of blufftop structures located seaward of the Geologic Setback Line (GSL). Staff identified these Coastal Act and LCP policy concerns in a letter to the applicant soon after submittal of the application ([Exhibit 17](#)).

Determining a precise location of the GSL has become more complicated in recent years given sea level rise and the probable resulting increase in erosion rates. In addition to simply evaluating historic retreat rates, it is now necessary to estimate future rates of erosion that may accelerate over time. There are various models and methods to do this. In the case of the subject site, the applicant determined that the GSL would be approximately 56 feet from the bluff edge. The Commission’s geologist has reviewed several estimates with different methods and levels of risk, and with a future bluff retreat analysis accounting for the higher sea level rise projections recommended by the new Sea Level Rise State Guidance, finds that the GSL could be located up to 86.5 ft. from the bluff edge. Because the existing bluff top home is located between approximately 13 and 55 ft. from the bluff edge, regardless of whether the GSL on the subject site is located 56 ft. or a greater distance from the bluff edge, the entire residence and all of the proposed alterations to the major structural components of the house would be located seaward of the GSL.

Neither the City nor the Commission is required to approve bluff top development projects even when the proposed alterations remain below the 50% bluff top redevelopment threshold. This is especially critical when proposed improvements to non-conforming structures would increase the degree of non-conformity. If bluff top properties are allowed to increase the degree of non-conformity of bluff top structures by undertaking substantial improvements seaward of the GLS and thus extending the life of the structures indefinitely, eventually the structures will require shoreline protection. As the coastline of Solana Beach continues to become more fortified and sea levels continue

to rise, it will be even more likely that the public beach fronting the bluffs will become inaccessible at all but the lowest tides.

There are alternatives that would allow the applicant to continue to enjoy reasonable use of the home. Repair and maintenance of the structure is permitted. The applicant could potentially redevelop the site and construct a home with a significantly larger setback from the bluff edge than currently exists. As proposed, extending the life of a nonconforming structure in a hazardous location without resolving the non-conformance is not consistent with the policies of the Coastal Act and LUP that call for avoiding and minimizing existing and future impacts to coastal resources and the potential need for future bluff retention devices. Therefore, the Commission finds the permit application must be denied.

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## I. MOTION AND RESOLUTION

### Motion:

*I move that the Commission **approve** Coastal Development Permit No. 6-18-0182 for the development proposed by the applicant.*

Staff recommends a **NO** vote. Failure of this motion will result in denial of the permit and adoption of the following resolution and findings. The motion passes only by affirmative vote of a majority of the Commissioners present.

### Resolution:

*The Commission hereby denies a coastal development permit for the proposed development on the ground that the development will not conform with the policies of Chapter 3 of the Coastal Act and will prejudice the ability of the local government having jurisdiction over the area to prepare a Local Coastal Program conforming to the provisions of Chapter 3. Approval of the permit would not comply with the California Environmental Quality Act because there are feasible mitigation measures or alternatives that would substantially lessen the significant adverse impacts of the development on the environment.*

## II. FINDINGS AND DECLARATIONS

### A. PROJECT DESCRIPTION

The proposed project involves a substantial remodel to an existing 1,544 sq. ft. bluff top single family home with an existing attached 281 sq. ft. one-car garage on a 6,139 sq. ft. lot. The existing home is located approximately 13 ft. from the edge of the coastal bluff. As proposed, approximately 30% of the existing exterior walls would be altered, approximately 20% of the existing floor structure would be altered, and approximately 14% of the existing roof structure would be altered. In addition, the 281 sq. ft. garage is proposed to be converted into living space and construction of 559 sq. ft. of new, partially enclosed patios is proposed. Currently, the single car garage is the only off-street parking space on site. The existing garage parking space is proposed to be replaced as an uncovered space located in the front yard of the subject site ([Exhibit 2](#)). The proposed covered patio will be partially supported by two new spread foundation footings in the front yard area. The garage conversion and new patios are considered additions to the floor area of the home. Under the provisions of the City's certified Land Use Plan, "floor area" is defined as the total enclosed area of the home excluding required parking of 200 sq. ft. per parking space. Per this definition, the existing floor area of the home is 1,625 sq. ft., and the proposed improvements would result in an approximately 2,384 sq. ft. home, a 47% increase in floor area.

The subject site is a bluff top lot on an approximately 65 ft.-high coastal bluff. The Tide Beach Park public access stairway is located approximately 800 feet south of the site ([Exhibit 1](#)).

#### Site History/Past Permits

The existing home was constructed in 1951 and is currently located approximately 13 feet from the bluff edge at its closest point.

In April 1997, the Commission approved a Coastal Development Permit (CDP) to construct a 357 sq. ft. addition to the home. The approved addition was located on the landward side of the home, as close as 36 ft. from the bluff edge (6-97-008/Bjorklund).

In 2014, a CDP exemption was granted for replacement of the existing asphalt roofing, exterior stucco, exterior doors and windows, a new shade structure, and interior improvements (CDP Exemption #6-14-0323-X). The applicant has indicated that no work was undertaken pursuant to this exemption.

The applicant's western property line extends just past the bluff edge. The remaining portion of the bluff and the beach seaward of the applicants' property are owned by California Department of Parks and Recreation. There is no existing armoring fronting the subject site and in the past, California Department of Parks and Recreation has indicated, for a nearby site, that it would not allow shoreline armoring to be constructed on Parks property.

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

## **B. GEOLOGIC STABILITY/BLUFF TOP DEVELOPMENT**

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

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

### **Section 30235**

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

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

Coastal Act Section 30253 addresses the need to ensure long-term structural integrity, minimize future risk, and mandates that new development cannot require the construction of protective devices that substantially alter natural landforms. Section 30253 provides, in applicable part:

**Section 30253**

*New development shall do all of the following:*

*(a) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.*

*(b) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.*

*[ . . . ]*

In addition, the following certified City of Solana Beach Land Use Plan (LUP) policies provide additional guidance regarding geologic hazards and development on bluff top property:

***Policy 4.14:*** *Existing, lawfully established structures that are located between the sea and the first public road paralleling the sea (or lagoon) built prior to the adopted date of the LUP that do not conform to the provisions of the LCP shall be considered legal non-conforming structures. Such structures may be maintained and repaired, as long as the improvements do not increase the size or degree of non-conformity. Additions and improvements to such structures that are not considered Bluff Top Redevelopment, as defined herein, may be permitted provided that such additions or improvements themselves comply with the current policies and standards of the LCP. Bluff Top Redevelopment is not permitted unless the entire structure is brought into conformance with the policies and standards of the LCP...*

***Policy 4.17:*** *New development shall be set back a safe distance from the bluff edge, with a reasonable margin of safety, to eliminate the need for bluff retention devices to protect the new improvements. All new development, including additions to existing structures, on bluff property shall be landward of the Geologic Setback Line (GSL) as set forth in Policy 4.25. This requirement shall apply to the principal structure and accessory or ancillary structures such as guesthouses, pools, tennis courts, cabanas, and septic systems, etc. Accessory structures such as decks, patios, and walkways, which are at-grade and do not require structural*

*foundations may extend into the setback area no closer than five feet from the bluff edge...*

***Policy 4.23:*** *Where setbacks and other development standards could preclude the construction of a home the City may consider options including but not limited to reduction of the two car onsite parking space requirement to a one car onsite parking requirement or construction within five feet of the public right of way front yard setback for all stories as long as adequate architectural relief (e.g., recessed windows or doorways or building articulation) is maintained as determined by the City. The City may also consider options including a caisson foundation with a minimum 40 foot bluff top setback to meet the stability requirement and avoid alteration of the natural landform along the bluffs. A condition of the permit for any such home shall expressly require waiver of any rights to new or additional bluff retention devices which may exist and recording of said waiver on the title of the bluff property.*

***Policy 4.25:*** *All new bluff property development shall be set back from the bluff edge a sufficient distance to ensure that it will not be in danger from erosion and that it will ensure stability for its projected 75-economic life. To determine the GSL, applications for bluff property development must include a geotechnical report, from a licensed Geotechnical Engineer or a certified Engineering Geologist, that establishes the Geologic Setback Line (GSL) for the proposed development. This setback line shall establish the location on the bluff top where stability can be reasonably assured for the economic life of the development. Such assurance will take the form of a quantitative slope analysis demonstrating a minimum factor of safety against sliding of 1.5 (static) or 1.2 (pseudostatic, k-0.15 or determined through analysis by the geotechnical engineer), using shear strength parameters derived from relatively undeformed samples collected at the site. In no case shall the setback be less than 40 feet from the bluff edge, and only if it can be demonstrated that the structure will remain stable, as defined above, at such a location for its 75-year economic life and has been sited safely without reliance on existing or future bluff retention devices, other than a caisson foundation.*

*Furthermore, all new development including, but not limited to principal structures, additions, and ancillary structures, shall be specifically designed and constructed such that it could be removed in the event of endangerment.*

*The predicted bluff retreat shall be evaluated considering not only historical bluff retreat data, but also acceleration of bluff retreat made possible by continued and accelerated sea level rise, future increase in storm or El Niño events, the presence of clean sands and their potential effect on the pattern of erosion at the site, an analysis of the ongoing process of retreat of the subject segment of the shoreline, and any known site-specific conditions. To the extent the MEIR or geology reports previously accepted by the City address the issues referenced above and remain current, technical information in the MEIR and previously accepted geology reports may be utilized by an applicant. Any such report must also consider the*

*long-term effects of any sand replenishment and/or retention projects to the extent not addressed in the MEIR or the EIR for the specific application.*

**Policy 4.29:** *A bluff home may continue its legal non-conforming status; however, a Bluff Top Redevelopment shall constitute new development and cause the pre-existing non-conforming bluff home to be brought into conformity with the LCP. Entirely new bluff homes shall also conform to the LCP.*

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

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

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

**Floor Area** *means the enclosed interior space inside a bluff home, excluding required parking of 200 square feet per parking space, both before and/or after completion of any remodel.*

**Geologic Setback Area (GSA)** *is that portion of the bluff property located between the bluff edge and the Geologic Setback Line.*

**Geologic Setback Line (GSL)** *is the line marking the distance from the bluff edge that will assure stability for new development, to be determined on a case-by-case basis for each bluff property.*

The subject application involves an 840 sq. ft. increase in floor area, as well as extensive remodeling work, to an existing, non-conforming blufftop residence located in a hazardous area. There is no existing shoreline armoring fronting the subject site, and the existing home is located as close as 13 ft. from the bluff edge. The project therefore raises concerns about whether the proposed improvements are likely to result in the need for shoreline armoring. Both the Coastal Act and certified LUP policies require that new development meet the Geologic Setback Line (GSL) setback and provide for a 75 year

economic life without reliance on shoreline protection. In this case, as described below, the proposed project does not meet these standards.

### **Bluff Top Redevelopment Threshold**

The Commission draws a distinction between the requirements for new development and improvements to existing non-conforming structures, including structures that are located in areas that are no longer considered safe from hazard (e.g., CDP #s 6-17-0239/Mansukhani, 6-14-0679/WJK Trust, and A-6-LJS-14-0063/City of San Diego). New structures are typically required to meet all current setback and other standards, while improvements to existing structures that do not increase the degree of non-conformity may be permitted without bringing the entire structure into compliance. However, even when a residence is not completely demolished and rebuilt, improvements that increase the economic life of the structure in a non-conforming and hazardous location reduce the incentive to move the structure landward to reduce risk and the need for shoreline protection. Retention and improvement of development too close to the bluff edge increases risk and may lead to emergency or permit applications to allow shoreline armoring, which results in landform alteration and impacts to public resources. Therefore, just as with new development, significant improvements that extend the life of a non-conforming structure in its current location must be limited to those that would not result in the need for future shoreline protection to be consistent with Section 30253, particularly improvements to portions of bluff top structures located seaward of the GSL.

The definition of “Bluff Top Redevelopment” in the City’s LUP is intended to identify and prohibit redevelopment projects that essentially consist of rebuilding non-conforming, existing structures in hazardous locations, unless the entire structure is brought into conformance. The definition allows a reasonable amount of changes to an existing structure, including up to a 50% alteration of major structural components and up to a 50% increase in the size of the structure, while prohibiting mischaracterizations of “repair and maintenance” or “improvements” such as stripping a house to the studs, or gutting the entire interior, or demolishing everything but one wall, which would perpetuate the non-conforming structure. Further refinement of how to implement the definition of “redevelopment” and how regulatory review will be codified is expected to occur in the future when the City’s Implementation Plan is developed. At this point, using the LUP for guidance, in order to determine whether or not an improvement is considered redevelopment (that is, a new structure), it is necessary to examine the extent of modifications proposed to the major structural elements of the existing structure.

Major structural components are defined in the LUP as exterior walls, the structural components of the floor and roof, and the foundation of an existing home. The definition provides that alterations to major structural components are not additive between individual major structural components, while alterations to individual major structural components are cumulative over time from the date of certification of the LUP (June 12, 2013). That is, alterations to 25% of the exterior walls and 30% of the foundation would *not* mean 55% of the home has been altered and thus should be considered a new structure. However, a 25% alteration to the exterior walls (or floors, etc.) approved today, would mean any future alteration of the exterior walls more than 24% *would* result in a

new structure. Similarly, additions are also cumulative over time from the date of certification of the LUP, such that an initial 25% addition would not be considered redevelopment; however, if a subsequent 25% addition was proposed in the future, that would result in a cumulative 50% increase in floor area and would thus constitute “Bluff Top Redevelopment.”

The proposed development includes alterations to the exterior walls, floor and roof structure major structural components of the home ([Exhibits 14-16](#)). Based on plans submitted by the applicant, below is a summary of the proposed alterations:

- **Exterior Walls:** Alteration of approximately 79 linear feet of the existing 263 linear feet of exterior walls (30%). As calculated in this case, the total alteration of existing exterior wall is a combination of exterior walls altered through demolition or replacement and exterior walls altered through removal or resizing of windows or doors. A significant proportion of the exterior wall modifications are along the western seawardmost portion of the home.
- **Floor Structure:** Alteration of approximately 364 sq. ft. of the existing 1,825 sq. ft. of floor structure (20%). The altered floor structure area primarily consists of the construction of new structural floor area above existing concrete slab floors.
- **Roof Structure:** Alteration of approximately 336 sq. ft. of the existing 2,406 sq. ft. of roof structure (14%). The altered roof structure area consists of the existing roof structure area that will be modified in order to construct the roof of the proposed patio.

The certified LUP defines floor area as the enclosed interior space inside a home, excluding required parking of 200 sq. ft. The area of the existing home and the existing garage is 1,825 sq. ft. Thus, excluding 200 sq. ft. of exempted garage area, the calculated floor area is 1,625 sq. ft. As proposed, the project will increase the floor area by 47%, from 1,625 sq. ft. to 2,384 sq. ft. The floor area increase results from the conversion of the existing 281 sq. ft. garage to habitable space and from the construction of the proposed 559 partially enclosed covered patio in the front yard of the home. (Although not included in the LUP definition of floor area, the City’s municipal code includes covered courtyards in the gross floor area calculation).

While the proposed alterations affect all of the major structural components of the home, except for the foundation, the project does not exceed the 50% threshold in any one component and therefore does not meet the definition of Bluff Top Redevelopment. Nevertheless, the substantial amount of alterations suggests that the project will likely increase the lifespan of the structure. The existing home on the subject site is a pre-coastal structure and, pursuant to Section 30235, may be entitled to some form of shoreline armoring to provide protection for the life of the home, provided that the home was shown to be in imminent danger from erosion and the shoreline protection was designed to eliminate or mitigate adverse impacts on local shoreline sand supply. As discussed below, since all of the changes to the structure being made are seaward of the GSL, extending the life of the structure increases the potential that it will require shoreline protection at some point.

### **Geologic Setback Line (GSL) Determination**

Due to the natural process of continual bluff retreat, coastal bluffs in this area of San Diego County are considered a hazardous area. When reviewing development on a bluff top lot, to find it consistent with Section 30253, the Commission must determine that the development is sited with an adequate setback that ensures it is reasonably safe from failure and erosion over its lifetime without having to propose any shore or bluff stabilization devices that would substantially alter natural landforms along the bluffs to protect the structure. The Coastal Act and certified LUP acknowledge that seawalls, revetments, cliff retaining walls, groins and other such structural or “hard” methods designed to forestall erosion alter natural landforms and natural shoreline processes resulting in a variety of negative impacts on coastal resources, including adverse effects on sand supply, public access and recreation, coastal views, natural landforms, and overall shoreline beach dynamics on and off site, including ultimately the loss of beach.

Because shoreline armoring directly encroaches upon the beach and fixes the shoreline position, it reduces the beach area available for public use and halts passive erosion, such that additional public beach area can no longer be created. Furthermore, shoreline armoring constrains the possible responses and evolution of beach ecosystems to adjust to changes in sea level and other dynamic coastal processes, resulting in loss of biodiversity and ecosystem services. Thus, safe siting of development is critical not only for the inhabitants of the development but to prevent permanent impacts to coastal resources. As evidenced by the extensive armoring of the bluff located just five houses to the north and four houses to the south of the subject site, the active erosion at the site in both the upper and lower bluff, and past large slope failures in the near vicinity, the existing home is clearly in a hazardous location and will likely be threatened by shoreline erosion in the future.

The location where new development would have to be sited in order to assure stability and structural integrity and not be in danger from erosion over a period of 75 years is known as the geologic setback line (GSL). The GSL for a bluff top site is determined by combining the setback necessary to assure the stability of the slope against sliding in the present day with an additional setback to account for the future retreat of the bluff. Quantitative slope stability analyses typically calculate a “factor of safety” as an indicator of stability. In theory, slope failure is imminent when the factor of safety drops below 1.0, while values above 1.0 indicate increasing confidence in the stability of a slope. The industry wide standard for assuring stability, which the Commission has consistently applied for many years in evaluating bluff top development, is a factor of safety of 1.5 or greater (or 1.1 for pseudostatic, or seismic, conditions). To establish a safe setback for slope stability from the edge of a coastal bluff, it is necessary to find the distance inland of the bluff edge at which the factor of safety is equal to 1.5.

In addition to this landslide potential, the bluff is also subject to erosion and retreat over time. In order to assure that this same minimum level of slope stability will be maintained over the life of a development, it is also necessary to estimate the amount of cliff retreat, and thus the future position of the bluff edge, 75 years in the future, and measure the slope stability setback from that location. As the bluff retreats, the factor of safety at the

location of the development can also be expected to decrease. Thus, establishing the required GSL includes estimating long-term bluff retreat as well as slope stability.

The applicants have submitted various geotechnical reports for the subject site that include site-specific quantitative slope stability analyses. A geotechnical report dated July 20, 2011 by Geotechnical Exploration, Inc. (GEI) found that the factor of safety of 1.5 occurs 25 feet landward of the bluff edge for the subject site. More recently, the applicants' geotechnical consultant, GEI, has submitted various geotechnical memoranda reaffirming the conclusion that the 1.5 Factor of safety is located 25 ft. landward of the bluff edge. However, a separate geotechnical report dated July 8, 2013 by TerraCosta Consulting Group (TerraCosta) found that the factor of safety of 1.5 occurs approximately 40 feet landward of the bluff edge for the subject site. The different results of the two analyses appear to stem, at least in part, from GEI's use of less conservative values for the shear strength of the "clean sands" layer of the lower portion of the upper bluff terrace deposits than were used in the TerraCosta slope stability analysis. These clean sands, which are characterized by extremely low to zero cohesion, have been linked to significant slope failures at other Solana Beach locations.

While it is not uncommon for different slope stability analyses, using different input values, methods and analysis software, to yield different results, the TerraCosta analysis indicates that a setback of significantly greater than 25 feet may be necessary to assure present-day slope stability at the project site. The Commission's geologist has reviewed the available site information and geotechnical reports, has directly observed the bluffs seaward of the project site, and agrees that the 40 foot setback from the western bluff edge indicated by the TerraCosta slope stability analysis is necessary to provide reasonable assurance that the development will not be threatened by landslides and other slope failures if built today.

The consultants then applied or referenced two separate methods for addressing the effects of future sea level rise (SLR) on bluff retreat. The September 15, 2017 coastal hazards analysis provided by GeoSoils, Inc. (GSI) relied on a simple equation estimating the future bluff retreat rate as a function of the historical retreat rate, historical SLR, and projected future SLR by 2100 of 125 cm (4.1 ft):

$$R_2 = R_1 (S_2 / S_1)^m \quad (\text{Equation 1})^1$$

$R_1$  and  $R_2$  represent past and future cliff retreat rates and  $S_1$  and  $S_2$  are past and future rates of sea level rise, respectively, and the value of exponent  $m$  is determined empirically for different coastal types. GSI uses a value of  $m = 0.5$ , which has previously been found to be applicable for simulations of soft-rock, low beach volume coasts under equilibrium conditions (Ashton et al. 2011; Young et al. 2014). Using this equation, GSI (2017) calculated a future bluff retreat rate (in 2100) of 0.58 ft/yr. They then averaged the assumed historic erosion rate (0.24 ft. /yr.) and the estimated future erosion rate to arrive

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<sup>1</sup> Equation 1 is a "best fit" equation derived from the Soft Cliff and Platform Erosion (SCAPE) model of Walkden and Hall (2005) and Walkden and Dickson (2008), a process-based numerical model developed to simulate cliff retreat in response to sea level changes.

at an average erosion rate of 0.41 ft. /yr. for the subject site for the 2017 – 2100 period. Over the 75-year project life, this translates to a total bluff retreat of 30.75 ft.

The October 27, 2017 geotechnical response submitted by GEI, Inc. references the GSI (2017) analysis, but attributes the estimated future bluff erosion rate of 0.58 ft. /yr. to “COSMOS.” This acronym refers to the Coastal Storm Modeling System 3.0 (CoSMoS), developed by the United States Geological Survey (USGS) for simulating the effects of future SLR. CoSMoS 3.0 includes a cliff retreat module that projects future cliff retreat based on various sea level rise (SLR) scenarios (Barnard et al. 2018; Limber et al. 2018).<sup>2</sup> It is unclear whether GEI (2017) applied CoSMoS as an independent means of evaluating the potential effects of SLR at the site, or whether the method used by GSI (2017) was simply mischaracterized. Staff has reviewed the CoSMoS cliff retreat model results for the transect corresponding to the project site (Transect 664), and notes that an average bluff retreat rate of 0.58 ft/yr (between 2010 – 2100) is the projection corresponding to SLR of 100 cm (3.3 ft). Over 75 years, this retreat rate would result in 43.5 feet of bluff recession, which does not match the 30.75 feet of retreat cited by GEI (2017).

The Commission’s staff geologist and senior engineer have reviewed the applicants’ long-term bluff retreat analyses, and agree that, in the present case, both Equation 1 (simplified SCAPE model) and the CoSMoS cliff retreat model can be used to evaluate the potential effects of SLR on future bluff retreat at the project site. Nonetheless, both approaches have limitations and yield results with a high degree of uncertainty, and must be interpreted with caution. For example, the use of Equation 1 assumes a certain set of geologic conditions (uniform “soft rock” cliff composition, limited volume of fronting beach, equilibrium response of cliff retreat rate to sea level rise rate) that are an imperfect fit for the subject site, and may result in an overestimate of cliff retreat for a given amount of SLR; on the other hand, this simple equation cannot account for other factors, such as direct storm wave erosion of the highly-erodible lower layers of the upper bluff terrace deposits, that are likely to become increasingly important with SLR. CoSMoS cliff retreat projections are also characterized by high uncertainty, related in part to the historical erosion rate data and the multi-model ensemble underlying the tool. Unlike Equation 1, however, CoSMoS allows the user to evaluate the range of uncertainty in its cliff retreat estimates. Applied narrowly along the transects for which data are available, CoSMoS is capable of providing useful estimates of future cliff retreat for a given amount of SLR.

Given the inherent uncertainties in projecting future SLR and its effects, it is prudent to consider different technical methods, but also necessary to evaluate the full range of 21<sup>st</sup> century SLR scenarios, including those that are projected to occur with “business as usual” greenhouse gas emissions and relatively rapid ice sheet loss. The applicants’ estimated future average bluff retreat rate of 0.41 ft. /yr. is based on projected SLR 125 cm (4.1 feet) by 2100, accounts for only a portion of the range of available SLR projections along the Southern California coast, and does not address the potential for

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<sup>2</sup> CoSMoS Cliff Retreat integrates eight complex cliff retreat models which take into account changes in mean sea level (and the rate of SLR), the historical bluff retreat rate (which is assumed to capture site-specific factors, such as geology), a range of likely wave climates based on historical variability and global climate models, and the progressive evolution of the shore and cliff profiles over time.

higher erosion rates and greater amounts of cliff retreat under higher SLR scenarios.

The Commission’s 2015 SLR Policy Guidance recommends the use of region-specific SLR projections contained in the NRC 2012 science report as the best available science. Projected amounts of SLR for Southern California in 2100 in the NRC (2012) report ranged from 42 cm (1.4 ft.) under a low greenhouse-gas emissions scenario to 167 cm (5.5 ft) under a high emissions scenario. In the time since the CCC Guidance was released, the California Ocean Protection Council (OPC) has released two reports that, taken together, update the Commission’s understanding of sea level rise science and best practices for planning for and adapting to sea level rise impacts. The first of these reports, *Rising Seas in California: An Update on Sea-Level Rise Science* (Griggs et al. 2017), synthesizes recent evolving research on sea level rise science, and provides new, California-specific projections of future sea level rise, under several GHG emissions scenarios, within a quasi-probabilistic framework.<sup>3</sup> For high (RPC 8.5), medium (RPC 4.5) and low (RPC 2.6) emissions pathways, the *Rising Seas* report provides sea level rise projections corresponding to the “median” (50% probability of exceedance, a “likely range” (33% - 66% probability of exceedance), 1-in-20 chance (5% probability of exceedance), and 1-in-200 chance (0.5% probability of exceedance) for a range of future years. The projections also include an extreme SLR scenario (“H++”) based on recent studies suggesting the potential for rapid, high magnitude ice sheet loss, for which no probability is estimated. Within the probabilistic framework, the *Rising Seas* report estimates that the San Diego coast could experience as much as 2.16 m (7.1 feet) (1-in-200 probability level) by 2100 under the high emissions scenario. The extreme SLR (H++) projection exceeds 3 m (10 feet) of SLR.

The second report, the *State of California Sea-Level Rise Guidance 2018 Update* (OPC 2018), builds on the science report and provides recommendations for how to plan for and address sea level rise impacts, including the recommendation that the new, region-specific sea level rise projects be used throughout the State. For example, the new State Guidance recommends specific sea level rise projections from the *Rising Seas* report for use in different types of planning and policy decisions, depending on the appropriate level of “risk aversion” that applies to a decision. The 2018 State Guidance recommends that the 1-in-200 chance (0.5% probability) projections be used for “medium-high risk aversion” decisions, including the siting of residential development, for which the consequences of being wrong are higher, potentially risking life and property, and the range of adaptation options is more limited.

In the framework of the *Rising Seas* report and 2018 State Guidance, the 125 cm (4.1 ft.) of sea level rise by 2100 assumed in the applicants’ analyses was simulated to have an approximately 10% chance of exceedance under a “high emissions” scenario (OPC 2018,

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<sup>3</sup> Following the method of Kopp et al. (2014), the “probabilistic projections” provided in the *Rising Seas* report (Griggs et al. 2017) do not provide actual probabilities of occurrence of sea-level rise, but rather provide probabilities that the ensemble of climate models used to estimate contributions of sea-level rise (from processes such as thermal expansion, glacier and ice sheet mass balance, and oceanographic conditions, among others) will predict a certain amount of sea-level rise. These probability distributions will be updated in future updates to the State guidance documents as climate science continues to evolve and models are updated.

Table 32). This falls above the OPC (2018) “likely range” (up to 3.6 feet by 2100), below the “1-in-20 probability” range (up to 4.6 ft. by 2100), and far below the “1-in-200 probability range (up to 7.1 feet by 2100) recommended by the State Guidance for use in evaluating residential development. In other words, the applicants’ analysis provides a plausible estimate of future SLR, but does not account for the higher amounts of SLR that remain likely based on current science and GHG emissions trajectories.

In order to adequately evaluate the “*acceleration of bluff retreat made possible by continued and accelerated sea level rise,*” as required in Policy 4.25 of the certified LUP, the Commission’s geologist and senior engineer recommend that the effects of these greater sea level rise amounts, reflecting the higher end of the available sea level rise projections, also be considered. For example, with 4.6 feet (140 cm) of SLR (OPC 2018 “1-in-20” projection), GSI’s approach (Eqn. 1, simplified SCAPE model) projects a future bluff retreat rate of 0.77 ft./yr.; with 7.1 ft (216 cm) of SLR (the OPC (2018) *recommended* “1-in-200” projection), Eqn. 1 projects a future bluff retreat rate of 1.0 ft./yr. The applicants’ method of averaging the estimated historic erosion rate (0.24 ft./yr.)<sup>4</sup> and the projected future retreat rates in the year 2100 for the higher end SLR scenarios yields average erosion rates of 0.49 to 0.62 ft./yr. Over the 75-year expected life of the proposed structures, these rates translate into 37 to 46.5 feet of future bluff retreat, compared to the applicant’s estimate of 31 feet. In a number of previous decisions, the Commission has approved 75-year setbacks determined by applying a local maximum historical erosion rate of 0.49 ft/yr, taken from a previous study by Benumoff & Griggs (1999). For purposes of comparison, erosion at this rate for 75 years would result in approximately 37 feet of bluff retreat, a value that falls within the range of values calculated using Eqn. 1 for 125 to 200 cm of SLR.

For purposes of comparison, the CoSMoS cliff retreat tool projects large amounts of bluff retreat along the transect corresponding to the subject parcel, with even the 125 cm (4.1 ft) of SLR assumed by the applicants’ consultants, resulting in the retreat of the bluff edge to a point inland of the existing residence. For 2 m (6.6 ft) of SLR, CoSMoS suggests that bluff erosion could undermine the street.

Combining the setbacks for both present-day slope stability and future bluff erosion, the applicants’ analysis indicates that the GSL for the subject site would be approximately 56 feet (25 feet plus 31 feet) inland of the bluff edge. However, as discussed above, based on the more precautionary slope stability analysis of TerraCosta (2013) and a future bluff retreat analysis accounting for the higher sea level rise projections recommended by the new State Guidance, the GSL could be located up to 86.5 ft. (40 ft. plus 46.5 ft.) from the bluff edge ([Exhibit 3](#)).

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<sup>4</sup> The Commission geologist is also concerned that applicants’ consultants have not adequately described how they derived the historic rate of erosion identified for the subject site, and that the rate of 0.24 ft/yr may underestimate past erosion. However, due to the relatively large long-term erosion setback calculated through the applicants’ identified approach, further investigation into the appropriate historic erosion rate is not necessary in this case.

The existing bluff top home is located between approximately 13 and 55 ft. from the bluff edge and the bluff top lot has a depth of only 60-80 feet from the bluff edge to the inland property boundary. Thus, regardless of whether the GSL on the subject site is located 56 ft. or 86.5 ft. from the bluff edge, the entire residence and all of the proposed improvements would be located seaward of the GSL. Furthermore, there is little to no room on the landward side of the home where an expansion would be safe for 75 years.

Only two other major bluff top remodel projects have been approved by the Commission in Solana Beach since certification of the LUP (CDP Nos. 6-14-0679/WJK Trust located at 355 Pacific Avenue and 6-17-0239/Mansukhani located at 475 Pacific Avenue), which were approved by the Commission in May 2015 and June 2017, respectively. The project at 355 Pacific Avenue consisted nearly entirely of changes to major structural components located on the *landward* side of the existing home, approximately 51 to 74 feet from the bluff edge. The changes to 475 Pacific Avenue, excluding the voluntary removal of the seawardmost portion of the home, were all located more than 40 ft. from the bluff edge. In contrast, at the subject site, a significant portion of the proposed major structure alterations and increased floor area would be located seaward of 40 ft. from the bluff edge, the entirety of the home and the proposed improvements are located seaward of the GSL, and the applicant is not proposing to remove of any of the seawardmost portions of the home.

#### **Inconsistency with the Coastal Act and the City of Solana Beach Certified Land Use Plan**

A substantial increase to the floor area is proposed and significant alterations to the exterior walls and to the floor and roof structure would occur to the portions of the home seaward of the GSL. The portions of the existing home seaward of the GSL (and any improvements) will likely be threatened by erosion within the next 75 years. Retention of development too close to the bluff edge can lead to further landform alteration and impacts to public resources. Improvements and upgrades to the non-conforming portions of a bluff top home that increase the economic life of the structure in a hazardous location, such as those proposed with this application, reduce the incentive to increase the setback to reduce risk and avoid bluff retention devices in the future. Policy 4.25 of the certified LUP requires that new bluff development be located landward of the GSL. If bluff top property owners are allowed to increase the degree of non-conformity of bluff top structures by undertaking substantial improvements and thus perpetuating non-conforming bluff top homes in Solana Beach, the likelihood of homes redeveloping further from the bluff edge will be severely diminished and complete armoring of the Solana Beach coastline is very likely to occur. As the coastline of Solana Beach continues to become more fortified and sea levels continue to rise, it will be even more likely that the public beach fronting the bluffs will become inaccessible at all but the lowest tides.

Neither the City nor the Commission is required to approve bluff top development projects, even if the proposed alterations remain below the 50% bluff top redevelopment threshold. This is especially important when proposed improvements to non-conforming structures would increase the degree of non-conformity. Policy 4.14 of the LUP allows

non-conforming bluff top structures to be maintained and repaired only if the improvements do not increase the size or degree of non-conformity. Improvements to non-conforming bluff top structures may only be permitted if the improvements comply with the current policies and standards of the LCP. The proposed changes to major structural components and extensive interior and exterior remodeling clearly go beyond repair and maintenance of the structure, and would extend the time that the home will be located in its current non-conforming location. This is particularly relevant given that the subject residence was constructed in 1951 and is thus 67 years old. Policy 4.25 of the certified LUP defines a structure's economic life as 75 years. This is the point at which the home is expected to need extensive remodeling or reconstruction in order to continue being useful. Extending the life of a nonconforming structure in a hazardous location without resolving the non-conformance is not consistent with the policies of the LUP that call for avoiding and minimizing existing and future impacts to coastal resources and the potential need for future bluff retention devices.

As detailed in Policy 4.14 of the LUP, improvements to non-conforming bluff top structures may only be permitted if the improvements comply with the current policies and standards of the LCP. As proposed, the new floor area and the reconstructed portions of the home will not be located landward of the GSL and will therefore not be safe for the extended economic life of the structure. Major alterations to structural components in hazardous locations are clearly inconsistent with the intent of the LUP, which is to incentivize property owners to modify homes in order to increase bluff edge setbacks and avoid bluff retention devices. Approval of the substantial alterations to major structural components of the home without addressing the seaward portions of the home would significantly reduce the opportunity or likelihood for landward redevelopment in the future at this site and will increase the degree of non-conformity of the structure. As proposed, this project results in a significant investment in the aging home and is not consistent with Section 30253 of the Coastal Act or the certified LUP.

The applicant currently has reasonable use of the site with the existing home, and could continue to have use of the site without any of the proposed improvements. Consistent with the certified LUP policy 4.14, the structure "...may be maintained and repaired..." An example of appropriate maintenance and repair is the development approved pursuant to the 2014 exemption granted for the structure that included replacement of the existing asphalt roofing, exterior stucco, exterior doors and windows, a new shade structure, and interior improvements (CDP Exemption #6-14-0323-X).

Alternatively, the applicant could potentially redevelop the site and construct a home with a significantly larger setback from the bluff edge than currently exists. In June 2016, the Commission approved the demolition of an accessory structure and an existing home and construction of a new home on a bluff top site at 225 Pacific Avenue in Solana Beach, approximately ½ mile to the south of the subject site (CDP No. 6-15-1717/Barr). The accessory structure and the home approved for demolition at 225 Pacific had 0 ft. and 25 ft. setbacks from the bluff edge, respectively. The Commission approved the construction of the foundation elements of the new home with a 46 ft. setback from the bluff edge with an allowance to build cantilevered first and second floor areas as close as 36 ft. from the bluff edge. Because of the limited depth of the lot at 225 Pacific Avenue,

the Commission allowed the foundation of the new home be located landward of the location of the current 1.5 Factor of Safety with an additional five foot buffer instead of requiring the home be sited landward of the GSL. While a similar proposal at the subject site would have to be considered on a project specific basis, it is likely that the applicant would be able to construct a reasonably sized home with a significantly larger bluff edge setback that would reduce the risk from continued shoreline erosion. Thus, there are feasible alternatives to the proposed project. Therefore, the Commission finds the permit application must be denied.

### C. PUBLIC ACCESS/RECREATION

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

#### Section 30210

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

#### Section 30211

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

#### Section 30221

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

In addition, the following certified City of Solana Beach LUP language provides additional guidance regarding protection of public access and recreation:

***Policy 2.2:*** *Maintain a safe, wide sandy beach to the extent feasible to increase the general quality of life for the citizens and visitors of Solana Beach. A safe, wide sandy beach enhances recreational opportunities such as surfing, sunbathing, fishing, walking, volleyball, and other such activities. This has beneficial economic impacts to the City, its residents, and businesses by resulting in increased business*

*income, sales taxes, transient occupancy taxes, and public and private property values.*

The subject site is located between the Pacific Ocean and the first public roadway, which in this case is West Circle Drive. The site is located within a developed single-family residential neighborhood on an approximately 65 foot-high coastal bluff top lot. The Tide Beach Park public access stairway is located approximately 800 feet south of the site. Vertical access through the site is neither necessary given the proximity of public coastal access nor warranted given the fragile nature of the bluffs.

As discussed above, it is important to ensure that structures located in hazardous areas do not include or require the construction of future bluff or shoreline protective devices. The physical encroachment of a protective structure on the beach reduces the beach area available for public use and is therefore a significant adverse impact. Furthermore, when the back beach is fixed with a shoreline armoring device, passive erosion is halted and additional public beach area can no longer be created.

As proposed, the project would result in a significant investment in the aging structure and would increase the likelihood that the property owner would pursue the construction of shoreline armoring in the future. Therefore, the project cannot be found consistent with the public access policies of the Coastal Act and the certified LUP. There are feasible alternatives to the proposed project. Therefore, the Commission finds the permit application must be denied.

#### **D. VISUAL RESOURCES**

Section 30251 of the Coastal Act requires that the scenic and visual qualities of coastal areas be protected:

*The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas.*

In addition, the following certified City of Solana Beach LUP language provides additional guidance regarding protection of scenic resources:

***Policy 6.3:*** *Public views to the beach, lagoons, and along the shoreline as well as to other scenic resources from major public viewpoints, as identified in Exhibit 6-1 shall be protected. Development that may affect an existing or potential public view shall be designed and sited in a manner so as to preserve or enhance designated view opportunities. Street trees and vegetation shall be chosen and sited so as not to block views upon maturity.*

**Policy 6.4:** *Locations along public roads, railways, trails, parklands, and beaches that offer views of scenic resources are considered public viewing areas. Existing public roads where there are major views of the ocean and other scenic resources are considered Scenic Roads and include:*

- *Highway 101/Pacific Coast Highway and Railway Corridor*
- *I-5*
- *Lomas Santa Fe Drive*

*Public views to scenic resources from Scenic Roads shall also be protected.*

**Policy 6.9:** *The impacts of proposed development on existing public views of scenic resources shall be assessed by the City prior to approval of proposed development or redevelopment to preserve the existing character of established neighborhoods. Existing public views of the ocean and scenic resources shall be protected.*

The subject development involves the remodel and addition to an existing bluff top residence. The proposed development is located in a residential neighborhood consisting of single-family homes of similar bulk and scale to the proposed development.

The city's certified LUP requires that existing or potential public views shall be designed and sited in a manner so as to preserve or enhance designated view opportunities. The subject site slopes downward from east to west. The elevation of the sidewalk fronting the site is approximately five feet higher in elevation than the rear yard of the site and thus there is significant potential for public views of the ocean through the side yards of the property. However, the entire frontage of the site is bordered by tall vegetation the entirely eliminates any public views of the coast from the street. In Solana Beach, the Commission typically requires that any gates or fencing on side yards be a minimum 75% transparent and that landscaping be a maximum of three feet in height to allow for public views of the ocean (Ref: CDP Nos 6-15-1717/Barr, 6-17-0239/Mansukhani, 6-14-0679/WJK Trust). The current application, as approved by the City, does not propose to modify the existing vegetation that acts to eliminate public views of the coast through the site. Thus, the project cannot be found consistent with the view preservation policies of the Coastal Act and the certified LUP. If the proposed project were not inconsistent with the geologic stability and public access and recreation policies of the Coastal Act, it is likely that the project could be conditioned to create view corridors and resolve the inconsistency with the visual resource policies. In this case, for the reasons described above, the permit application must be denied.

## **E. LOCAL COASTAL PLANNING**

Section 30604(a) also requires that a coastal development permit shall be issued only if the Commission finds that the permitted development will not prejudice the ability of the local government to prepare a Local Coastal Program (LCP) in conformity with the provisions of Chapter 3 of the Coastal Act. In this case, such a finding cannot be made.

6-18-0182 (**Scott and Lisa Harris**)

Based on the above discussion, the proposed development has been found to be inconsistent with the Chapter 3 policies of the Coastal Act and the certified LUP provisions that require new development to meet the Geologic Setback Line (GSL) and provide for a 75 year economic life. The Commission finds that approval of the proposed development as proposed would prejudice the ability of the City of Solana Beach to prepare a Local Coastal Program that is in conformity with Chapter 3 policies. Therefore, it must be denied.

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APPENDIX A – SUBSTANTIVE FILE DOCUMENTS

- City of Solana Beach certified LUP
- City of Solana Beach General Plan and Zoning Ordinance
- Benumof, Benjamin & Griggs, Gary. “The Dependence of Seacliff Erosion Rates on Cliff Material Properties and Physical Processes: San Diego County, California.” Shore & Beach Vol. 67, No. 4, October 1999, pp. 29-41
- Report of Limited Geotechnical Investigation and Coastal Bluff Stability Evaluation by Geotechnical Exploration, Inc. dated July 20, 2011
- Geotechnical Memorandum. Response to Geotechnical Reviewer Comments by Geotechnical Exploration, Inc. dated April 2, 2013
- Geotechnical Investigation and Bluff Stability Study 601 West Circle Drive Solana Beach, California by TerraCosta Consulting Group dated July 8, 2013
- Plan Review and Updated Geotechnical Investigation Harris Residence 601 W. Circle Drive Solana Beach, California by Geotechnical Exploration, Inc. dated May 24, 2017
- Response to Geotechnical Reviewer Comments Harris Residence 601 W. Circle Drive Solana Beach, California by Geotechnical Exploration, Inc. dated August 11, 2017
- Coastal Hazards Discussion for Proposed Single-Family Residential Remodel 141 Pacific Avenue by Geotechnical Reviewer Comments by Geotechnical Exploration, Inc. dated September 15, 2017
- Geotechnical Memorandum. Response to Geotechnical Reviewer Comments by Geotechnical Exploration, Inc. dated October 27, 2017
- Geotechnical Memorandum. Response to Coastal Commission Comments by Geotechnical Exploration, Inc. dated May 10, 2018
- Geotechnical Memorandum. Response to Coastal Commission Comments by Geotechnical Exploration, Inc. dated September 20, 2018
- CoSMoS Southern California v3.0 Phase 2 projections of coastal cliff retreat due to 21st century sea-level rise, available at <https://www.sciencebase.gov/catalog/item/57f4234de4b0bc0bec033f90>
- Rising Seas in California: An Update on Sea-Level Rise Science (Griggs et al. 2017)
- State of California Sea-Level Rise Guidance 2018 Update (OPC 2018)
- CDPs
  - 6-15-1717/Barr
  - 6-17-0239/Mansukhani
  - 6-14-0679/WJK Trust
  - A-6-LJS-14-0063/City of San Diego