STATE OF CALIFORNIA -- THE RESOURCES AGENCY GRAY DAVIS, *GOVERNOR*

CALIFORNIA COASTAL COMMISSION

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Filed: January 14, 2000
49th Day: Opened and Continued
Staff: Tiffany S. Tauber
Staff Report: July 27, 2000
Hearing Date: August 11, 2000
Commission Action:

STAFF REPORT:
DE NOVO HEARING ON APPEAL

LOCAL GOVERNMENT:	County of Humboldt
DECISION:	Approval with Conditions
APPEAL NO.:	**A-1-HUM-00-001**
APPLICANT:	**KATE BELL & ORM ANILINE**
PROJECT LOCATION:	On the west side of Letz Road, approximately 200 feet north from the intersection of Letz Avenue with Airport Road (nearly opposite the underpass), on the property known as 3524 Letz Road, in the McKinleyville area of Humboldt County, APN 511-061-08.
PROJECT DESCRIPTION:	Development of an approximately 4,000-square-foot, two-story, 35-foot-high, single family residence on a vacant 5+/- acre parcel to be served by community sewer and water with a 768-square-foot attached garage, a 36-square-foot detached greenhouse, a 180-square-foot lap swimming pool, and a 12-foot-wide gravel driveway.

APPELLANTS:	**Commissioners Sara Wan & Christina Desser**
AGENT:	Wes Marshall, Ray Wolfe Construction, Inc.
SUBSTANTIVE FILE: DOCUMENTS	1) Humboldt County CDP file No. 99-22; and 2) Humboldt County Local Coastal Program

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STAFF NOTES:

1. Procedure

On March 15, 2000, the Coastal Commission found that the appeal of Humboldt County's approval raised a substantial issue with respect to the grounds on which the appeal had been filed, pursuant to Section 13115 of the Title 14 of the California Code of Regulations. As a result, the County's approval is no longer effective, and the Commission must consider the project de novo. The Commission may approve, approve with conditions (including conditions different than those imposed by the County), or deny the application. Since the proposed project is (1) within an area for which the Commission has certified a Local Coastal Program, and (2) is located between the sea and the first public road paralleling the sea, the applicable standard of review for the Commission to consider is whether the development is consistent with Humboldt County's Local Coastal Program and with the public access and public recreation policies of the Coastal Act. Testimony may be taken from all interested persons at the de novo hearing.

2. SUMMARY OF STAFF RECOMMENDATION DE NOVO: APPROVAL WITH CONDITIONS

The staff recommends that the Commission approve with conditions the coastal development permit for the proposed project on the basis that, as conditioned by the Commission, the project is consistent with the County's certified LCP and with the public access and public recreation policies of the Coastal Act.

The proposed development site is subject to dynamic bluff retreat associated with the unpredictable migration of the mouth of the Mad River which raises geologic stability issues despite the fact that the applicant is proposing a 180-foot setback. The staff has determined that the proposed project is inconsistent with the geologic hazard policies of the certified LCP requiring that new development 1) minimize risk to life and property, 2) assure stability and structural integrity and neither create nor contribute significantly to geologic instability and 3) not require construction of protective devices that would substantially alter natural landforms along bluffs and cliffs. However, staff believes that the six (6) proposed special conditions can eliminate these inconsistencies.

Special Condition No. 1 requires the submittal of revised site plans showing the proposed development setback an additional 20 feet from the bluff edge. Special Condition No. 2 requires

the submittal of final foundation, construction, and site drainage plans that incorporate all recommendations of the submitted geotechnical report intended to avoid creating or contributing to geologic hazards. Special Condition No. 3 requires recordation of a future development deed restriction that would require that all future development on the subject parcel that might otherwise be exempt from coastal permit requirements require an amendment or coastal development permit to insure that future improvements would not be sited or designed in a manner that would result in a geologic hazard. Special Condition No. 4 requires recordation of a deed restriction stating that no shoreline protective device shall be constructed on the parcel, that the landowner shall remove the house and its foundation when bluff retreat reaches the point where the structure is threatened, and that the applicant accepts sole responsibility for the removal of any structural debris resulting from landslides, slope failures, or erosion of the site. Special Condition No. 5 requires recordation of a deed restriction stating that the applicant acknowledges and assumes the inherent and extraordinary risk of developing the blufftop property and waives any claim of liability on the part of the Commission. Special Condition No. 6 requires the applicant to obtain a special permit from the County for development of a single-family residence within the airport approach zone.

As conditioned, staff has determined that the proposed project is consistent with the provisions of the certified Humboldt County LCP and with the public access and recreation policies of the Coastal Act.

I. MOTION, STAFF RECOMMENDATION DE NOVO, AND RESOLUTION:

1. MOTION:

I move that the Commission approve Coastal Development Permit No. A-1-HUM-00-001 pursuant to the staff recommendation.

RECOMMENDATION OF APPROVAL:

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

RESOLUTION TO APPROVE PERMIT:

The Commission hereby approves a coastal development permit for the proposed development and adopts the findings set forth below on grounds that the development as conditioned will be in conformity with the certified County of Humboldt LCP, is located between the sea and the nearest public road to the sea and is in conformance with the public access and public recreation policies of Chapter 3 of the Coastal Act. Approval of the permit complies with the California Environmental Quality Act because either 1) feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment, or 2) there are no further feasible mitigation measures or alternatives that

would substantially lessen any significant adverse impacts of the development on the environment.

II. STANDARD CONDITIONS: (See attached Appendix A)

III. SPECIAL CONDITIONS:

1. Revised Site Plans

A. **PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT**, the applicant shall submit revised plans to the Executive Director for review and approval. The revised plans shall show the proposed residence, garage, greenhouse, and lap pool setback at least 200 feet from the bluff edge without encroaching into the "A" Runway Protection Zone established by the certified Humboldt County Local Coastal Program.

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

2. Conformance of the Design and Construction Plans to the Geotechnical Report

A. All final design and construction plans, including foundations, grading and drainage plans, shall be consistent with the recommendations contained in the geotechnical report dated February 4, 2000 prepared by Walter B. Sweet, Incorporated. **PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT**, the applicant shall submit, for the Executive Director's review and approval, evidence that an appropriate licensed professional has reviewed and approved all final design, construction, and drainage plans and has certified that each of those plans is consistent with all of the recommendations specified in the above-referenced geotechnical report approved by the California Coastal Commission for the project site.

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

3. Future Development Deed Restriction

A. This permit is only for the development described in coastal development permit No. A-HUM-00-001. Pursuant to Title 14 California Code of Regulations section 13250(b)(6),

the exemptions otherwise provided in Public Resources Code section 30610(a) shall not apply to the parcel. Accordingly, any future improvements to the single family house authorized by this permit, including but not limited to repair and maintenance identified as requiring a permit in Public Resources section 30610(d) and Title 14 California Code of Regulations sections 13252(a)-(b), shall require an amendment to Permit No. A-HUM-00-001 from the Commission or from the applicable certified local government.

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

4. <u>No Future Bluff or Shoreline Protective Device</u>

A(1) By acceptance of this permit, the applicant agrees, on behalf of him/herself and all successors and assigns, that no bluff or shoreline protective device(s) shall ever be constructed to protect the development approved pursuant to Coastal Development Permit No. A-1-HUM-00-001, including, but not limited to, the residence, foundations, garage, greenhouse, lap pool, driveway, and any other future improvements in the event that the development is threatened with damage or destruction from waves, erosion, storm conditions, bluff retreat, landslides, or other natural hazards in the future. By acceptance of this permit, the applicant hereby waives, on behalf of himself and all successors and assigns, any rights to construct such devices that may exist under Public Resources Code Section 30235 or under Humboldt County LUP-McKinleyville Area Plan Policy 3.28 and Zoning Code Sections A314-32 and A315-16.

A(2) By acceptance of this permit, the applicant further agrees, on behalf of himself and all successors and assigns, that the landowner shall remove the development authorized by this permit, including the residence, garage, foundations, greenhouse, lap pool, and driveway, if any government agency has ordered that the structures are not to be occupied due to any of the hazards identified above. In the event that portions of the development fall to the beach before they are removed, the landowner shall remove all recoverable debris associated with the development from the beach and ocean and lawfully dispose of the material in an approved disposal site. Such removal shall require a coastal development permit.

A(3) In the event the edge of the bluff recedes to within 10 feet of the principal residence but no government agency has ordered that the structures not be occupied, a geotechnical investigation shall be prepared by a licensed geologist or civil engineer with coastal experience retained by the applicant, that addresses whether any portions of the residence

are threatened by wave, erosion, storm conditions, or other natural hazards. The report shall identify all those immediate or potential future measures that could stabilize the principal residence without shore or bluff protection, including but not limited to removal or relocation of portions of the residence. If the geotechnical report concludes that the residence or any portion of the residence is unsafe for occupancy, the permittee shall, in accordance with a coastal development permit remove the threatened portion of the structure.

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

5. Assumption of Risk, Waiver of Liability and Indemnity Agreement

A. By acceptance of this permit, the applicant acknowledges and agrees (i) that the site may be subject to hazards from landslide, bluff retreat, erosion, and earth movement; (ii) to assume the risks to the applicant and the property that is the subject of this permit of injury and damage from such hazards in connection with this permitted development; (iii) to unconditionally waive any claim of damage or liability against the Commission, its officers, agents, and employees for injury or damage from such hazards; and (iv) to indemnify and hold harmless the Commission, its officers, agents, and employees with respect to the Commission's approval of the project against any and all liability, claims, demands, damages, costs (including costs and fees incurred in defense of such claims), expenses, and amounts paid in settlement arising from any injury or damage due to such hazards.

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

6. Special Permit Issued by Humboldt County

PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, the applicant shall provide to the Executive Director a copy of a special permit issued by the Humboldt County

Planning Department and/or Public Works Department for development of a single-family residence within the airport approach zone. The applicant shall inform the Executive Director of any changes to the project required by the Humboldt County Planning Department and/or Public Works Department. Such changes shall not be incorporated into the project until the applicant obtains a Commission amendment to this coastal development permit, unless the Executive Director determines that no amendment is required.

IV. FINDINGS AND DECLARATIONS

1. Project and Site Description:

The proposed single family home site is located on the west side of Letz Avenue, approximately 200 feet north from the intersection of Letz Avenue with Airport Road (nearly opposite the underpass) on the property known as 3524 Letz Avenue in the McKinleyville area of Humboldt County. The site is located approximately ½ mile southwest of the Arcata-Eureka airport and less than 200 feet west of Highway 101 (Exhibit Nos. 1 & 2). The project is located on Lot 2 of the Seffner/Wolf subdivision in an area of large lot, blufftop residential development overlooking the Pacific Ocean. The project is located just to the south of the coastal area in which Caltrans installed rock slope protection in 1992 and 1995 to halt the northerly migration of the Mad River which posed a threat to Highway 101 near Clam Beach. The Seffner/Wolf subdivision was created in 1978 prior to the Mad River's migration north to this part of McKinleyville.

The site is a blufftop lot located approximately 130 feet above mean sea level with an abrupt break in slope at the western edge of the bluff. The overall slope gradient from the edge of bluff to the back beach is 110% and the upper approximately 12 feet of the bluff is near vertical. The topography of the site is relatively level with a slight 1-2 foot elevation gain at the western edge of the bluff. The bluff face is absent of vegetation due to recent sloughing and a large debris fan composed of loose material that has fallen off the face of the bluff is present at the base of the slope. Vegetation on the site terrace consists of brush and annual grasses. No environmentally sensitive property is known to exist on the property.

The proposed development consists of a 4,000-square-foot, two-story, less than 35-foot-high, single family residence on a vacant five acre parcel and includes a 768-square-foot attached garage, a 36-square-foot detached greenhouse and a 180-square-foot lap swimming pool. The property extends a total of approximately 700 feet from the bluff edge to Letz Avenue. The development is proposed to be setback approximately 180 feet from the bluff edge. The area is planned Residential Estates (RE) in the McKinleyville Area Plan (MAP) with a density of 0-2 units per acre. The site is zoned Residential Single Family with Airport Safety Review, Alquist-Priolo Fault Hazard Regulations and Noise Impact combining zones (RS-X/AP,G,N). (Exhibit No. 3)

2. Planning and Locating New Development

Policy 3.21 of the Humboldt County LCP McKinleyville Area Plan states that new development shall be located within or near existing developed areas able to accommodate it or in other areas with adequate public services and where it will not have significant adverse effects, either individually or cumulatively, on coastal resources. The intent of this policy is to channel development toward more urbanized areas where services are provided and potential impacts to resources are minimized.

The subject property is zoned in the County's LCP as Residential Single Family with an allowable density of 0-2 units per acre. The subject parcel is approximately five acres in size and the proposed development includes a 4,000-square-foot single family residence. The proposed development is located in an existing residential area designated and zoned in the certified LCP for residential use. The subject parcel would be served by community sewer and water. The proposed development, therefore, is consistent with MAP Policy 3.21 to the extent that it is located in a developed area and has adequate water and sewer capability.

3. Geologic Hazards

The applicant is proposing to construct a new single-family residence located on a 130-foot-high bluff top parcel. As discussed further below, available evidence demonstrates that the stretch of coastal bluff that includes the subject property has recently experienced very high rates of bluff retreat due to numerous dynamic variables. In addition, an "active fault" as defined by the Alquist-Priolo Act is located approximately 500 feet north of the site, and a portion of the site lies in an Alquist-Priolo special study zone. Thus, the development would be located in an area of high geologic hazard. The Humboldt County LCP includes policies related to geologic hazards and new development and are outlined below.

LCP Policies:

LUP Policy 3.28 of the McKinleyville Area Plan states:

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 areas or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.

Coastal Zoning Ordinance:

Zoning Section A 315-16. states in applicable part:

Supplemental Findings. *In addition to the required findings of Sections 315-14 through A315-15, as applicable, the Hearing Officer may approve or conditionally approve an application for a use permit, coastal development permit, or planned unit development permit only if the following findings (are made). Those findings that are only applicable within the County's coastal zone are indicated by "(CZ)"; those findings that apply throughout the County, within and outside of the coastal zone, are indicated by "(county-wide)".*

H. Public Safety Impact Findings.

(1)...

(2) Coastal Geologic Hazard (CZ).

(a) The development will be sited and designed to assure stability and structural integrity for the expected economic lifespan while minimizing alteration of natural landforms;

(b) Development on bluffs and cliffs (including related storm runoff, foot traffic, site preparation, construction activity, irrigation, wastewater disposal and other activities and facilities accompanying such development) will not create or contribute significantly to problems of erosion or geologic instability on the site or on surrounding areas; and

(c) Alteration of natural cliffs and bluff tops, faces, or bases by excavation or other means will be minimized. Cliff retaining walls shall be allowed only to stabilize slopes.

This language is reiterated in Zoning Section A314-16(G)(3)

Section A314-32. Shoreline Protection Structures states:

C. Limitations. *Shoreline protection structures, including revetments, breakwater bulkheads, graving yards, groin, seawalls, and other such construction, that alter natural shoreline processes may only be permitted as follows:*

(1) To protect existing principle structures or public facilities in areas subject to damage from wave action where relocation of the structures is not feasible;

(2) *When required to serve coastal dependent uses;*

(3) *To reconstruct existing bulkheads;*

(4) *In areas planned exclusive agriculture, to protect existing dikes, consistent with the regulations on modification and repair of dikes in transitional agricultural lands.*

The proposed development can only be found consistent with the above-referenced provisions if the risks to life and property from the geologic hazards are minimized, if the development will assure stability and structural integrity for the expected economic lifespan and not create or contribute to geologic instability, and if a shoreline protective device will not be needed to protect the development in the future. The residence is proposed to be setback 180 feet from the edge of the bluff. This is an appreciably large setback relative to other bluff-top setbacks commonly required along the coast statewide. However, as noted above, the site is a geologically hazardous area due to the potential for high rates of bluff retreat and the proximity of the site to an active fault zone. The conditions affecting the rate of erosion and retreat of the subject bluff are unique to the site and geologic hazards exist even with the significant setback.

The coastal bluffs adjacent to the Mad River in this area are subject to erosion from dynamic and changing conditions. The rate of erosion is dependent upon a number of complex variables, including the migration of the mouth of the Mad River, which cannot be predicted with any certainty. The mouth of the river has historically oscillated along this section of coastline. Typically, the mouth of the river has migrated northward through the sand dunes along the bluff, producing a long sand spit between the river and the sea. The river has at several times in the past naturally breached the spit, re-establishing the river's mouth several miles to the south of the subject site.

In the spring of 1991, the northward migration of the Mad River placed the integrity of Highway 101 in jeopardy. As a result, in 1992, Caltrans installed 1,600 feet of rock slope protection at the base of Vista Point, just north of the subject site. During the winter of 1994-1995, erosion intensified immediately south of the constructed revetment and Caltrans placed an additional 1,000 feet of rock slope protection to the south of the existing revetment. Several years after the rock slope protection was first installed, the rate of erosion along the bluffs along the river upstream of the revetment dramatically increased. The affected private parcels extend from the southern end of the constructed revetment, including the subject site approximately 200 feet from the southern end, to the mouth of Widow White Creek, approximately ½ mile upstream. Between 1993 and early 1999, the wide river mouth, open to the sea, was located opposite the toe of the bluff at the subject site exposing the bluff to direct wave attack from the ocean causing accelerated erosion. Evidence shows that the subject site experienced more than 60 feet of bluff retreat during this period, for an average annual rate of approximately 10 feet per year. In March 1999, the river breached naturally at a new location approximately two miles south of the subject site; the current stability of the river mouth at this location is not known. Since the river has moved away from the subject site a wide sandy beach has established itself seaward of the

coastal bluff, protecting it from wave attack to some extent. The bluff has continued to erode due to surficial processes, however, producing an accumulation of material (a "debris fan") at the base of the bluff. This material serves to help stabilize the bluff, and the bluff appears to be retreating at a much lower rate since March 1999 than during the period 1993-1999.

Due to the high geologic hazard of this area, the County required the applicants to submit a geotechnical investigation report which was prepared by Walter B. Sweet, Inc., dated February 4, 2000. This report concluded that the average bluff retreat rate over the next 75 years would not likely exceed 2.25 feet per year. Following the review of the initial geotechnical report and a site visit by the Commission's staff geologist, further information was requested to clarify and provide more information regarding slope stability, the estimated rate of bluff retreat, and the role of the migration of the Mad River in calculating the retreat rate. In response, the applicant submitted an addendum to the initial geotechnical report, prepared by Walter B. Sweet Inc. and dated June 1, 2000. A second addendum dated June 30, 2000 also was prepared following staff's request for a review of existing historic aerial photos of the site to assist in estimating a rate of bluff retreat. (Exhibit Nos. 4, 5, & 6)

The first addendum states:

> "There are many variables affecting the rate of bluff retreat at this site, including: topographic relief, slope gradient, material types, local seismicity, Mad River migration, accumulation of sand on the current back beach area, establishing vegetation on the debris fan, wave action, tidal fluctuation, wind, and longshore transport of sand offshore...Our bluff retreat rate of 2.25 feet/year was determined qualitatively based upon the above variables and a 75-year design life for the proposed residence."

In the second addendum, the applicant's geologist reiterates the interpretation expressed in the initial report. The report indicates that between 1941 and 1991 when the Mad River was at a more southerly location, the bluff was covered by vegetation and experienced only small, shallow slides. By the spring of 1991, the Mad River had migrated northward to the toe of the bluff at the subject site. The report indicates that during the period from 2/27/93 to 8/8/95, the amount of bluff retreat was approximately 10 feet at the site, or about 4 feet per year. The report also states that during the period from 8/8/95 to the present, there was approximately 50 feet of bluff retreat at the site. This would indicate a blufftop erosion rate of about 10 feet per year.

The Commission's staff geologist confirms that the migration of the Mad River is an important mechanism of bluff retreat at the subject site. The presence of the Mad River at the toe of the slope causes accelerated erosion, increasing bluff retreat rates significantly as compared to times when the river is not present at the base of the slope. When the river's mouth, open to the sea, is adjacent to the site, bluff retreat rates are at their highest—up to 10 feet per year. Although the river has naturally breached the sand spit built by its northern migration, and its mouth is now at a location two miles south of the subject site and not currently directly affecting the rate of bluff retreat at the site, the pattern of river migration is difficult to predict. A review of historic aerial

photographs indicates, however, that there is historic precedence for the river to oscillate between north and south locations. The geologic report of February 4, 2000 states:

> "The risk of the Mad River migrating north to the location of the site cannot be determined precisely. There are many variables affecting this dynamic process. Historically, the photographic coverage suggests the Mad River has migrated northward, with episodic washover and breaching that repositions the inlet further south, at least four times since 1941 (Borgeld, 1999). However, between 1941 and 1970, the mouth of the Mad River was located in an area roughly 1.1 miles wide (Borgeld, 1993). The episodes of northward migration prior to the sequence that began in approximately 1970 did not result in migration as far north as Vista Point. Borgeld (1999) states that the rate of migration will be dependent upon wave power and direction, river flow, tidal currents, and sediment supply, but a longer term trend to migrate northward should be expected to occur once again."
>
> "The debris fan at the base of the slope, and extending up the slope, in our opinion, is critical to the rate of bluff retreat. If this debris fan were to be removed, the rate of bluff retreat will accelerate. The removal of the debris fan could occur either by wave action or the Mad River may return to its previous mouth at vista point. During the time of our investigation we did not observe any clear evidence that the debris fan had been eroded by waves at the toe. However, the high tide line, or debris line, is less than 100 feet from the base of the slope and there is some large woody debris currently against the base of the slope. Consequently, under current conditions, it is possible that large storm events coincident with high tides will result in waves reaching the base of the slope."

In addition to bluff retreat affecting the integrity of the subject bluff, the geologic information also indicates that the bluff is unstable. As noted previously, an active fault is located 500 feet north of the subject site. The February 4, 2000 geologic report addressed slope stability and provided the following comments:

> "We observed many active failures on the subject slope. Our interpretation is that the entire length of the subject slope can be mapped as an active landslide. Consequently, we interpret the site slope to be unstable."
>
> "As a final note, the precipitous slope gradient and the dominantly cohesionless material types that comprise the bluff suggest that strong seismic shaking will initiate failure over a large portion of the subject slope."

The report concludes:

> "It is our opinion the site slope is unstable. Landslides will continue to occur on the subject slope. The rate of bluff retreat will be largely related to erosion at the toe, either by direct attack by waves, northward migration of the Mad River, or tidal action. Given the appreciable distance from the existing edge of bluff to the proposed location of the

> residence, a minimum of 180 feet, it is our opinion that the risk to the proposed residence is Moderate. We anticipate that over the next 75 years, the rate of bluff retreat at the site will not exceed an average of 2.25 feet/year. However, as discussed earlier, the potential for large episodic events to cause bluff retreat greater that our average annual estimate are possible during the design life of the proposed residence."

In summary, the geologist hired by the applicants contends that although the integrity of the subject bluff is affected by a multitude of unpredictable variables, the estimated rate of bluff retreat would not threaten the proposed residence over the next 75 years at the proposed 180-foot setback. However, the geologist concludes that the risk to the residence is "Moderate" indicating that the uncertainty of local variables and the chance of large episodic events to affect the rate of bluff retreat could pose a threat to the proposed development. Furthermore, the report clearly indicates that the slope is unstable and subject to failure from seismic events.

The estimated bluff retreat rate (2.25 feet/year) set forth in the geotechnical report would result in the development being safe for the 75-year life of the project. However, the Commission finds that is difficult, if not impossible, to assure *any* accurate bluff retreat rate for the next 75 years at the site due to the variability of local factors affecting the bluff, primarily the unpredictable migration of the Mad River. Historic photographic evidence indicates that the north-south oscillation of the Mad River can be expected to continue in the future. While the river mouth has only once migrated as far north as the subject site since 1941, the river could very well follow this same pattern in the future subjecting the site to increased erosion far exceeding the estimated rate of bluff retreat of 2.25 feet per year.

The uncertainty of the estimated bluff retreat rate is heightened because the geotechnical reports that have been prepared to date do not make it entirely clear how the 2.25 feet/year rate of bluff retreat was determined. The report indicates that the 2.25 feet/year estimated bluff retreat rate was "determined qualitatively based upon the variables mentioned previously and a 75-year design life for the proposed residence."

The Commission must determine whether the proposed development would assure stability and structural integrity for the economic lifespan of the development. Due to the unpredictable nature of the migration of the Mad River and its significance in determining the rate of bluff retreat at the site, the Commission must first consider the "worst case scenario" to determine consistency with the policies of the LCP. It is likely that the Mad River will migrate northward once again, potentially subjecting the bluff to accelerated erosion, probably on the order of 4-10 feet per year, as indicated by recent evidence. This would result in the residence being safe at the proposed 180-foot setback for only 18 to 45 years. This scenario results in an economic lifespan far less than the standard 75 years typically required by the Commission. However, it is entirely possible that when the Mad River is not present at the toe of the bluff, the rate of retreat may be much less—perhaps even less than the average value of 2.25 feet per year predicted by the applicants' geologist. The available evidence shows that the river has only migrated as far north as the subject site one time since 1941, indicating that it is unlikely that the river would remain at the base of the

bluff for the 18 years necessary to threaten the residence at the higher retreat rate of 10 feet per year. It should also be noted that there are existing residences further seaward than the proposed development on adjacent lots. If threatened by erosion, these property owners may seek bluff protection that may indirectly benefit the subject site and potentially further the economic lifespan of the residence. To avoid locating the residence directly under the runway approach zone for the Arcata-Eureka Airport and to maximize the amount of open space available under the approach zone, the residence cannot be moved entirely toward the eastern edge of the lot. However, the proposed site plan shows that the residence could be setback approximately 20 additional feet further than the proposed 180-foot setback which would also help extend the economic lifespan and add additional assurance that it would be safe from geologic hazards as discussed further below in Section 4. LCP policies relating to concerns with airport safety hazards limit the amount of area on the lot available to set the residence back even further without encroaching into the easterly portion of the lot that lies in the direct path of runway 2 of the airport.

Although the uncertainty associated with predicting the future patterns of river migration at the base of the subject bluff makes it impossible for the Commission's staff geologist to assure that the residence will be safe from bluff retreat for 75 years, the available evidence does indicate that the project would be safe for a minimum of 20 years if the 200-foot setback is required. As described above, this represents a "worst case scenario"; the Commission's staff geologist states that in all likelihood, the house would remain safe for much longer, perhaps even the full 75 years. Although the LCP policies state that new development should be designed to be safe during the economic lifespan of the development, the policies do not specify how long the lifespan is. While 75 years is often used, 50 years, or other increments of time have also been used in the past. The likelihood that the applicants' house would be safe for a 50-year period is even greater. However, to ensure that the project will minimize risks to life and property, will not create or contribute to geologic hazards, will assure stability and structural integrity, and will not result in the construction of a shoreline protective device, the Commission has attached to the permit several Special Conditions discussed below.

In the event that the bluff retreats to within 10 feet of the approved residence, Special Condition No. 4 (A)(3) ensures that measures would be taken to address the potential threat to the structures and that they be removed and/or relocated as necessary. Special Condition No. 4 (A)(3) requires that if the bluff should retreat to within 10 feet of the residence, a geotechnical investigation report be prepared by a qualified geologist or civil engineer with coastal experience, retained by the applicant, to address the degree of threat to the residence. The geotechnical investigation is required to address whether any portions of the residence are threatened by geologic hazards and to identify all immediate or potential future measures that could stabilize the principal residence without shore or bluff protection, including but not limited to removing or relocating portions of the residence. If the geotechnical report concludes that the residence, or any portion of the residence, is unsafe for occupancy, the applicant is required to obtain a coastal development permit to remove the threatened portion of the structure.

To further minimize risks to life and property from geologic hazards, and further assure stability and structural integrity of the proposed development pursuant to MAP Policy 3.28, the Commission attaches Special Condition No. 1 that requires submittal of revised site plans showing the proposed residence, garage, greenhouse, and lap pool set back as far as possible on the lot. To avoid locating the residence directly under the runway approach zone for the Arcata-Eureka Airport and to maximize the amount of open space available under the approach zone, the residence cannot be moved entirely toward the eastern edge of the lot. However, the proposed site plan shows approximately 20 feet of additional area available to further increase the bluff edge setback without encroaching into the runway approach zone, thereby increasing the assurance of structural stability and integrity. Special Condition No. 1 requires this extra 20 feet of area be used to increase the bluff setback.

The geotechnical report provides recommendations regarding the construction of foundations, slabs, grading and drainage, and retaining walls to accommodate the geologic characteristics and hazards of the site. Special Condition No. 2 requires submittal of final foundation, construction, and site drainage plans that incorporate all recommendations of the initial geotechnical report intended to avoid creating a geologic hazard. Special Condition No. 2 also requires development to proceed consistent with the approved plans.

In accordance with the provisions of Section 13250(b)(6) of Title 14 of the California Code of regulations, the Commission also attaches Special Condition No. 3 which requires recordation of a future development deed restriction. Section 30610(a) of the Coastal Act exempts certain additions to existing single family residential structures from coastal development permit requirements. Thus, once the house has been constructed, certain additions and accessory buildings that the applicant might propose in the future could be exempt from the need for a permit or permit amendment. Depending on its nature, extent, and location, such an addition or accessory structure could contribute to geologic hazards at the site. For example, installing a landscape irrigation system on the property in a manner that leads to saturation of the bluff could increase the potential for landslides or catastrophic bluff failure. Another example would be installing a sizable accessory structure for additional parking, storage, or other uses normally associated with a single family home in a manner that does not provide for the collection, conveyance, and discharge of roof runoff to areas away from the bluff edge. Such runoff to the bluff edge could potentially exacerbate bluff erosion at the subject site.

To avoid such impacts to coastal resources from the development of otherwise exempt additions to existing homes, Section 30610(a) requires the Commission to specify by regulation those classes of development which involve a risk of adverse environmental effects and require that a permit be obtained for such improvements. Pursuant to Section 30610(a) of the Coastal Act, the Commission adopted Section 13250 of Title 14 of the California Code of regulations. Section 13250(b)(6) specifically authorizes the Commission to require a permit for additions to existing single family residences that could involve a risk of adverse environmental effect by indicating in the development permit issued for the original structure that any future improvements would require a development permit. As noted above, certain additions or improvements to the approved structure could involve a risk of creating geologic hazards at the site. Therefore, in

accordance with provisions of Section 13250 (b)(6) of Title 14 of the California Code of Regulations, the Commission attaches Special Condition No. 3 which requires that all future development on the subject parcel that might otherwise be exempt from coastal permit requirements requires an amendment or coastal development permit. This condition will allow future development to be reviewed by the Commission to ensure that future improvements will not be sited or designed in a manner that would result in a geologic hazard. Special Condition No. 3 also requires recordation of a deed restriction to ensure that all future owners of the property are aware of the requirement to obtain a permit for development that would otherwise be exempt. This will reduce the potential for future landowners to make improvements to the residence without first obtaining a permit as required by this condition.

The Commission also attaches Special Condition No. 4, which prohibits the construction of shoreline protective devices on the parcel and requires that the landowner provide a geotechnical investigation and remove the house and its foundation if bluff retreat reaches the point where the structure is threatened, and that the applicant accepts sole responsibility for the removal of any structural debris resulting from landslides, slope failures, or erosion of the site.

The requirements of Special Condition No. 4(A)(1) are consistent with MAP policy 3.28 and Sections A315-16 and A314-32 of the Humboldt County Coastal Zoning Ordinance, which states that new development shall minimize risk to life and property in areas of high geologic, flood, and fire hazard, assure structural integrity and stability, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding areas, nor in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs. The Commission finds that the proposed development could not be approved as being consistent with Zoning Code Sections A315-16 and A314-32 if projected bluff retreat would affect the proposed house and necessitate construction of a seawall to protect it. As discussed above, the geotechnical report does not assure that the development would not require a seawall for protection from bluff retreat during the life of the development. In addition, Coastal Zoning Code Section A314-32 allows for the construction of shoreline protective devices only for the protection of existing development. The construction of a shoreline protective device to protect new residential development is not permitted by the LCP. In addition, as discussed further below, the construction of a protective device to protect new residential development would also conflict with the visual policies of the certified LCP.

A letter was submitted to the Commission by property owners of blufftop parcels to the north and south of the subject site (see Exhibit No. 7). The property owners contend that the revetment Caltrans constructed in 1992 and 1995 at the base of Vista Point just north of the subject site has contributed significantly to the erosion of their properties. The revetment was constructed pursuant to emergency permits granted by the Executive Director in 1992 and 1995. The Commission subsequently denied the follow-up coastal development permit application in September of 1999, largely because the Commission determined it did not have specific information needed to find the project consistent with Coastal Act policies. A new application was submitted by Caltrans in March of 2000, but the application has not yet been filed complete. These adjacent property owners are concerned that Special Condition No. 4 prohibiting the

construction of shoreline protection devices at the subject site would interfere with any future requirement that the Commission might impose in its action on the pending application that Caltrans extend the shoreline protection along the subject bluff as mitigation for the installation of the rock slope protection below Vista Point. The Commission notes that the Caltrans rock slope protection project is a separate item from the single-family residence project. The Commission further notes that the notion that the Commission would require the installation of such a revetment in conjunction with the Caltrans project is speculative at this time. In the event that the Commission should consider rock slope protection a necessity in the future, Special Condition No. 4 would not preclude the Commission from deciding such. Special Condition No. 4 only prevents the owners of the subject property from asserting the right to construct shoreline protective devices in the future should bluff retreat threaten this approved development.

Although a comprehensive geotechnical evaluation is a necessary and useful tool that the Commission relies on to determine if proposed development is appropriate at all on any given blufftop site, the Commission finds that a geotechnical evaluation alone is not a guarantee that a development will be safe from bluff retreat. It has been the experience of the Commission that in some instances, even when a thorough professional geotechnical analysis of a site has concluded that a proposed development will be safe from bluff retreat hazards, unexpected bluff retreat episodes that threaten development during the life of the structure sometimes still do occur. Examples of this situation include:

- The Kavich Home at 176 Roundhouse Creek Road in the Big Lagoon Area north of Trinidad (Humboldt County). In 1989 the Commission approved the construction of a new house on a vacant blufftop parcel (Permit 1-87-230). Based on the geotechnical report prepared for the project it was estimated that bluff retreat would jeopardize the approved structure in about 40 to 50 years. In 1999 the owners applied for a coastal development permit to move the approved house from the blufftop parcel to a landward parcel because the house was threatened by 40 to 60 feet of unexpected bluff retreat that occurred during a 1998 El Nino storm event. The Executive Director issued a waiver of coastal development permit (1-99-066-W) to authorize moving the house in September of 1999.

- The Denver/Canter home at 164/172 Neptune Avenue in Encinitas (San Diego County). In 1984 the Commission approved construction of new house on a vacant blufftop lot (Permit 6-84-461) based on a positive geotechnical report. In 1993, the owners applied for a seawall to protect the home (Permit Application 6-93-135). The Commission denied the request. In 1996 (Permit Application 6-96-138), and again in 1997 (Permit Application 6-97-90) the owners again applied for a seawall to protect the home. The Commission denied the requests. In 1998, the owners again requested a seawall (Permit Application 6-98-39) and submitted a geotechnical report that documented the extent of the threat to the home. The Commission approved the request on November 5, 1998.

- The Bennett home at 265 Pacific Avenue, Solana Beach (San Diego County). In 1995, the Commission approved a request to construct a substantial addition to an existing blufftop home (Permit 6-95-23). The minimum setback for the area is normally 40 feet. However,

the applicants agreed to waive future rights to shore/bluff protection if they were allowed to construct 25 feet from bluff edge based on a favorable geotechnical report. The Commission approved the request on May 11, 1995. In 1998, a substantial bluff failure occurred, and an emergency permit was issued for a seawall. The follow-up regular permit (#6-99-56) was approved by Commission on May 12, 1999. On August 18, 1999, the Commission approved additional seawall and upper bluff work on this and several other properties (Permit #6-99-100).

- The McAllister duplex at 574 Neptune Avenue, Encinitas (San Diego County). In 1988, the Commission approved a request to construct a duplex on a vacant blufftop lot (Permit #6-88-515) based on a favorable geotechnical report. By October 1999, failure of the bluff on the adjoining property to the south had spread to the bluff fronting 574 Neptune. An application is pending for upper bluff protection (Permit #6-99-114-G).

- The Arnold project at 3820 Vista Blanca in San Clemente (Orange County). Coastal development permit (Permit # 5-88-177) for a blufftop project required protection from bluff top erosion, despite geotechnical information submitted with the permit application that suggested no such protection would be required if the project conformed to 25-foot blufftop setback. An emergency coastal development permit (Permit #5-93-254-G) was later issued to authorize blufftop protective works.

The Commission notes that the examples above are not intended to be absolute indicators of bluff erosion on the subject parcel, as coastal geology can vary significantly from location to location. However, these examples do illustrate that site specific geotechnical evaluations cannot always accurately account for the spatial and temporal variability associated with coastal processes and therefore cannot always absolutely predict bluff erosion rates. Collectively, these examples have helped the Commission form its opinion on the vagaries of geotechnical evaluations with regard to predicting bluff erosion rates.

In the Commission's experience, geologists have no way of absolutely predicting if or when bluff erosion on a particular site will take place, and cannot predict if or when a house or property may become endangered. Geologic hazards are episodic, and bluffs that may seem stable now may not be so in the future. The geologist's determination of a "Moderate" risk to the development over the course of 75 years is indicative of the underlying uncertainties of this geotechnical evaluation and supports the notion that no guarantees can be made regarding the safety of the proposed development with respect to bluff retreat. Therefore, the Commission finds that the subject lot is an inherently hazardous piece of property, that the bluff is clearly eroding, and that the proposed new development will be subject to geologic hazard and may someday require a bluff or shoreline protective device, inconsistent with MAP Policy 3.28 and Zoning Code Sections A315-16 and A314-32. Based upon the geologic report, the Commission finds that the risks of geologic hazard are minimized if the residence is set back 200 feet from the bluff edge. However, given that the risk cannot be eliminated and the geologic report does not assure that shoreline protection will never be needed to protect the residence, the Commission finds that the proposed residence is consistent with the certified LCP only if it is conditioned to

provide that shoreline protection will not be constructed. Therefore, the Commission imposes Special Condition No. 4(A)(1).

As noted above, some risks of an unforeseen natural disaster, such as an unexpected landslide, massive slope failure, erosion, etc. could result in destruction or partial destruction of the house or other development approved by the Commission. In addition, the development itself and its maintenance may cause future problems that were not anticipated. When such an event takes place, public funds are often sought for the clean up of structural debris that winds up on the beach or on an adjacent property. As a precaution, in case such an unexpected event occurs on the subject property, the Commission attaches Special Condition No. 4(A)(2), which requires the landowner to accept sole responsibility for the removal of any structural debris resulting from landslides, slope failures, or erosion on the site, and agree to remove the house should the bluff retreat reach the point where a government agency has ordered that the structure not be occupied.

If the rate of bluff retreat should proceed such that the bluff comes within 10 feet of the approved residence, Special Condition No. 4 (A)(3) ensures that measures would be taken to address the potential threat to the structures and that they would be removed and/or relocated as necessary. This condition requires a geotechnical investigation be performed to evaluate the threat to the residence from geologic hazards when the bluff comes within 10 feet of the residence. If it is determined that the any portion of the residence is unsafe for occupancy, the applicant is required to obtain a coastal development permit to remove the threatened portions of the structure.

The Commission finds that Special Condition No. 4 is required to ensure that the proposed development is consistent with the LCP and that recordation of the deed restriction will provide notice of potential hazards of the property and help eliminate false expectations on the part of potential buyers of the property, lending institutions, and insurance agencies that the property is safe for an indefinite period of time and for further development indefinitely into the future, or that a seawall could be constructed to protect the development.

Additionally, the Commission attaches Special Condition No. 5, which requires the landowner to assume the risks of extraordinary erosion and geologic hazards of the property and waive any claim of liability on the part of the Commission. Given that the applicants have chosen to implement the project despite these risks, the applicant must assume the risks. In this way, the applicant is notified that the Commission is not liable for damage as a result of approving the permit for development. The condition also requires the applicant to indemnify the Commission in the event that third parties bring an action against the Commission as a result of the failure of the development to withstand hazards. In addition, the condition ensures that future owners of the property will be informed of the risks, the Commission's immunity from liability, and the indemnity afforded the Commission.

The Commission thus finds that the proposed development, as conditioned, is consistent with the policies of the certified LCP regarding geologic hazards, including MAP Policy 3.28, and Coastal Zoning Code Sections A315-16 and A314-32, as the proposed development, as conditioned, will minimize risks to life and property, will assure geologic stability and not result

in the creation of geologic hazards, and will not result in the construction of protective devices. Furthermore, the Commission will be able to review any future additions to ensure that development will not be located where it might result in the creation of a geologic hazard. As conditioned, the proposed development is consistent with the LCP policies regarding geologic hazards.

4. Airport Safety

As previously mentioned, the subject property lies entirely within the airport approach zone of runway 2 of the Arcata-Eureka Airport in McKinleyville. The Humboldt County LCP includes policies relating to land use development and airport compatibility for areas that fall within the designated Arcata-Eureka Special Study Area.

Certified MAP Policy 3.28(G) applies to the Arcata-Eureka Airport Special Study Area, and it states in applicable part:

> 1. *New development within the Arcata-Eureka Airport approach and transitional zones shall be consistent with the approved off-site development guidelines contained in the adopted County Airport Master Plan. The Airport Land Use Commission will define and formally establish an airport safety zone, adopt specific noise and safety standards, and apply such standards to all new development within these zones.*
>
> 2. *Generally, within the airport approach and transitional zones the plan recommends an overall residential density of 1 unit per 2.5 acres.*
>
> 3. *The clustering of new development or planned unit development technique shall be encouraged for new development in these zones to mitigate health and safety concerns.*

Section A314-50(D)(3) of the certified Humboldt County Coastal Zoning Code (HCC) states:

> *The maximum density in an approach zone is one unit per three acres. A minimum of one (1) dwelling unit per lawfully created lot is permitted, even if this density is exceeded. The special permit process shall be used to retain to the maximum extent feasible the contiguous open space in the approach zone.*
>
> *Exceptions to the maximum density of one unit per three acres within an approach zone may be permitted subject to approval by the Director of the Department of Public Works.*

In 1980, a document entitled "Draft Technical Report, Humboldt County Airport Master Plan" by Hodges & Shutt, Aviation Planning Services, was adopted for use by the County. The document contains background information on airport planning issues, off-airport planning issues, and discussions of airport/land use compatibility policies (noise, airspace, and safety) and

recommended certain airport/land use compatibility policies. When the County adopted the McKinleyville Area Plan (MAP) in 1982, it incorporated the 1980 Airport Master Plan into Section 3.28(G), the Arcata-Eureka Special Study Area.

In addition to the policies included in the MAP, the property is subject to several combining zones of the certified HCC. These "overlay or combining zones" are used where special regulations apply to the property. The purpose of the combining zones is to establish regulations for land use and development in special areas that are identified in the Humboldt County LCP. The property is specifically subject to the AP (Airport Safety Review) combining zone as identified in Section A314-50 of the HCC because the property is located entirely within an airport approach zone. The purpose of the AP zone is to establish regulations to maintain compatibility between land uses and Humboldt County airports and to further minimize risks to life and property under airport approach zones.

In 1993, the County of Humboldt adopted a revision to the Airport Master Plan for all County airports. However, the County did not transmit the 1993 revisions to the Airport Master Plan as an LCP amendment for certification by the Commission. Therefore, the 1993 revisions are not part of the certified LCP and not part of the standard of review for Coastal Development Permit Application No. A-1-HUM-00-001. The document revised and updated the safety compatibility criteria and created different safety zones that addressed the frequency levels of historic accidents in approach areas of airports throughout the state. The objective of the land use safety compatibility criteria is to minimize the risks associated with an off-airport aircraft accident or emergency landing. These 1993 revisions redefine the safety zones and the land use safety compatibility criteria that apply to the subject lot. The revisions designate the easterly portion of the subject lot to be within the "A" - Runway Protection Zone, or within the Building Restriction Line. The revisions designate the westerly portion of the lot to be within the "B1"- Approach/Departure Zone and Adjacent to Runway. The 1993 revised safety zones prohibit residential development to be located within the "A" zone, or the easternmost portion of the subject lot because of the safety hazards associated with its direct orientation with the end of runway 2. (see Exhibit No. 3)

When the County originally approved the subject residence, they referred to the 1993 revised Airport Master Plan policies in the required analysis for issuing a coastal development permit and did not allow any portion of the residence to be located within this zone. In addition, the Humboldt County Director of Public Works issued a memo during County planning staff's review of the project that stated that the structure must be located outside of the "A" Zone of Runway 2 pursuant to the 1993 plan updates adopted by the County. Although the 1993 revised airport policies clearly prohibit residential development within the "A" zone, or the easterly portion of the subject site, the 1993 Plan was never amended into the LCP and is not the standard of review for the review of coastal development permits. Therefore, the Commission must refer to the policies regarding airport safety that *are* part of the certified Humboldt County LCP, and the 1980 Airport Master Plan provisions.

As noted previously, the subject parcel is approximately 700 feet deep from the bluff edge to Letz Avenue. As discussed in the Geologic Hazards findings above, the Commission finds that the possibility of high rates of bluff retreat at the site requires that the approved development be setback at least 200 feet from the bluff edge. LCP policies relating to concerns with airport safety hazards limit the amount of area on the lot available to set the residence back even further without encroaching into the easterly portion of the lot that lies in the direct path of runway 2 of the airport.

MAP Policy 3.28 (G) stated above, requires that new development within the Arcata-Eureka Airport approach zones be consistent with the approved off-site development guidelines contained in the adopted County Airport Master Plan. The certified 1980 Airport Master Plan includes "Airport/Land Use Safety Compatibility Criteria." The proposed development is a single-family residence on approximately 5 acres which is defined in the compatibility criteria as "low-density residential." According to the certified Airport Master Plan, the entire subject site falls within the defined Approach Zone. The condition for low-density residential development within this zone states:

> "The use may be acceptable if the average density does not exceed one dwelling unit per approximately 3 acres (agricultural, rural residential, or similar zoning designation). This criterion assumes that it is possible to adjust building sites within the approach zone so as to maximize the extent of contiguous open space. Where this is not the case, residential use is normally unacceptable."

The "contiguous open space" refers to that area directly below the runway approach zone which coincides with zone "A" of the 1993 plan described above, or the easternmost portion of the subject lot. The airport/land use safety compatibility requirements restrict the ability to locate the residence closer to Letz Road than approximately 200 feet from the bluff edge to further minimize potential bluff retreat concerns discussed in the Geologic Hazard findings above. The Commission finds that to be consistent with MAP Policy 3.28(G) and the 1980 Airport Master Plan incorporated by reference into the certified LCP, this area shall be reserved as contiguous open space. The provisions of Special Condition No. 1 that require relocation of the residence 200 feet from the bluff edge are consistent with the allowable density within the approach zone and maximize the extent of open space as required by MAP Policy 3.28(G).

Section A314-50 (D)(3) of the certified Humboldt County Coastal Zoning Code (HCC) states that the special permit process shall be used to retain to the maximum feasible extent of contiguous open space in the approach zone. However, as discussed above, when the County originally approved the proposed project, the coastal development permit analysis was based on the 1993 revised Airport Master Plan that more clearly prohibits residential development within the influence of the runway approach zone. Thus, the County did not issue a special permit to maximize the open space under the runway approach zone as required by Section A314-50 (D)(3).

To ensure consistency with the special permit requirements of Section A314-50 (D)(3),the Commission attaches Special Condition No. 6 which requires the applicant to obtain a special permit from the County as required by Section A314-50(D)(3) prior to issuance of the coastal development permit. As discussed in the Geologic Hazards finding, Special Condition No. 1 requires the residence at least 200 feet from the bluff edge and as close as possible to the runway protection zone, adjacent to the border of the "A" and "B1" zones (as defined in the 1993 revised Airport Master Plan) without encroaching into the required open space of the "A" zone. Special Condition No. 6 will ensure that the applicant obtains a special permit from the County to retain the maximum amount of open space in the approach zone and allow for the residence to be located directly adjacent to this open space.

5. Visual Resources

MAP Policy 3.42 states that the scenic and visual qualities of Humboldt County coastal areas shall be considered and protected as a resource of public importance, and that 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.

The subject parcel is located on a blufftop site in a large-lot subdivision overlooking the Pacific Ocean. The site is not located within a designated "Highly Scenic Area." The proposed development will not adversely affect views to or along the coast, as intervening vegetation between the approved house and Letz Avenue greatly limits any view of the ocean from Highway 101, Letz Avenue, and the Hammond Trail.

The proposed development includes a 4,000-square-foot, two-story, less than 35-feet-high, single family residence, a 768-square-foot attached garage, a 36-square-foot detached greenhouse and a 180-square-foot lap swimming pool. Although the proposed residence is relatively large compared to other Humboldt County homes, homes in the subdivision that includes the subject parcel range in size from 3,000 to 5,000 square-feet. Thus, the house is in the middle of the range of house sizes for the immediate area. Therefore, the proposed development is compatible with the character of the surrounding area. In addition, the site is relatively flat and the development would require only minimal grading. Therefore, the amount of landform alteration will be minimized consistent with MAP Policy 3.42.

The Commission thus finds that the proposed development, as conditioned, is consistent with MAP Policy 3.42, as the project has been sited and designed to minimize visual impacts, will be visually compatible with the character of surrounding areas, and will not result in significant landform alteration.

6. Public Access

Projects located within the coastal development permit jurisdiction of a local government are subject to the coastal access policies of both the Coastal Act and the LCP. Coastal Act Sections 30210, 30211, and 30212 require the provision of maximum public access opportunities, with limited exceptions. Section 30210 states that maximum access and recreational opportunities shall be provided 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 states that development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation. Section 30212 states that public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where it is inconsistent with public safety, military security needs, or the protection of fragile coastal resources, adequate access exists nearby, or agriculture would be adversely affected.

In its application of these policies, the Commission is limited by the need to show that any denial of a permit application based on these sections, or any decision to grant a permit subject to special conditions requiring public access, is necessary to offset a project's adverse impact on existing or potential public access.

A segment of the Hammond Trail beginning at the north end of Letz Avenue just north of the subject site is currently under construction by Humboldt County. The Hammond Trail provides public access to and along the coast and the proposed development will not impact the trail or public access in any way. There is no evidence of trails on the site and no indication from the public that the site has been used for public access purposes in the past. Furthermore, the proposed development will not significantly increase the demand for public access to the shoreline and will otherwise have no significant impact on existing or potential public access. Therefore, the Commission finds that the proposed project, which does not include provision of public access, is consistent with the public access policies of the Coastal Act and the County's LCP.

7. California Environmental Quality Act:

Section 13096 of the Commission's administrative regulations requires Commission approval of a coastal development permit application to be supported by findings showing that the application, as modified by any conditions of approval, is consistent with any applicable requirement of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(A) of CEQA prohibits a proposed development from being approved if there are feasible alternatives or feasible mitigation measures available, which would substantially lessen any significant adverse effect the proposed development may have on the environment.

The Commission incorporates its findings on conformity with LCP policies at this point as if set forth in full. As discussed herein, in the findings addressing the consistency of the proposed

project with the certified LCP, the proposed project has been conditioned to be found consistent with the Humboldt County LCP and the public access and recreation policies of the Coastal Act. Mitigation measures which will minimize all adverse environmental impacts have been required. As conditioned, there are no feasible alternatives or feasible mitigation measures available, beyond those required, which would substantially lessen any significant adverse impact that the activity may have on the environment. Therefore, the Commission finds that the proposed project can be found to be consistent with the requirements of the Coastal Act to conform to CEQA.

Exhibits

1. Regional Location Map
2. Vicinity Map
3. Site Plan
4. Geotechnical Report, February 4, 2000 (13 pages)
5. Geotechnical Addendum No. 1, June 1, 2000 (3 pages)
6. Geotechnical Addendum No. 2, June 30, 2000 (2 pages)
7. Correspondence

ATTACHMENT A

Standard Conditions:

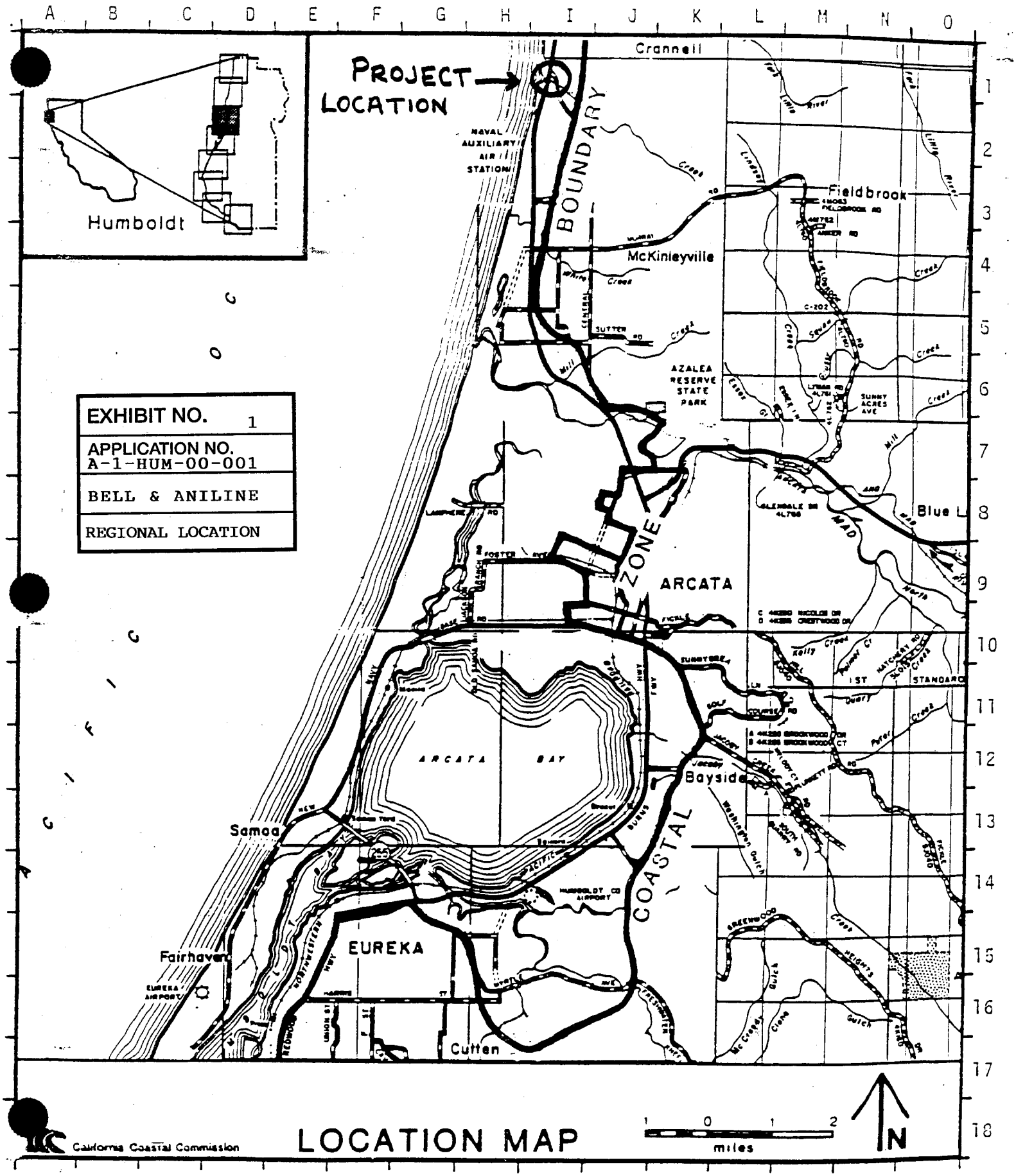
1. Notice of Receipt and Acknowledgment. The permit is not valid and development shall not commence until a copy of the permit, signed by the permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.

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

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

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

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



County of Humboldt

Sheet 3 of 8

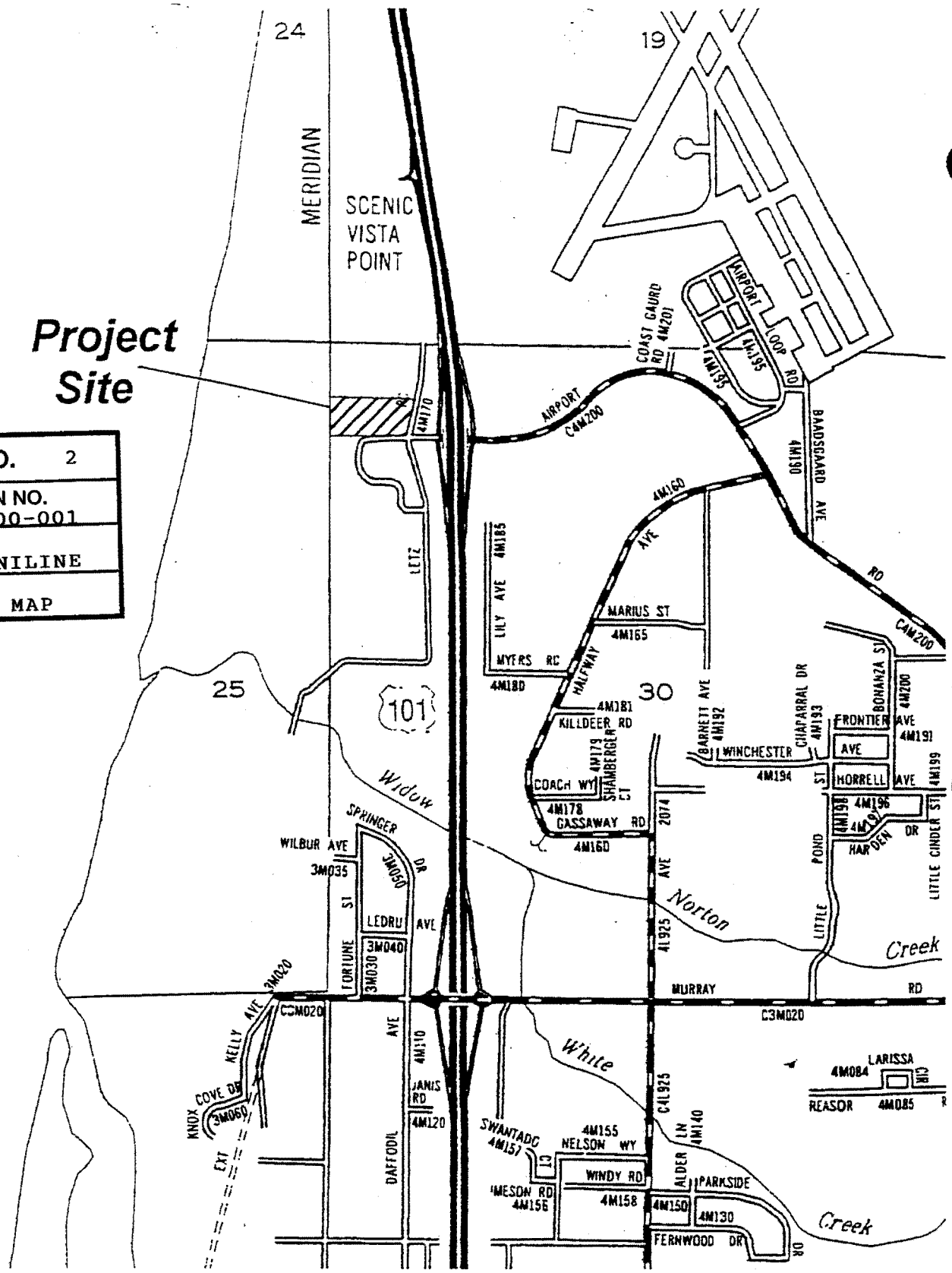


EXHIBIT NO. 2
APPLICATION NO. A-1-HUM-00-001
BELL & ANILINE
VICINITY MAP

Proposed Bell Coastal Development Permit
McKinleyville Area CDP-99-22
APN: 511-061-08
Section 30, T7N R1E, H.B.&M.

LOCATION MAP

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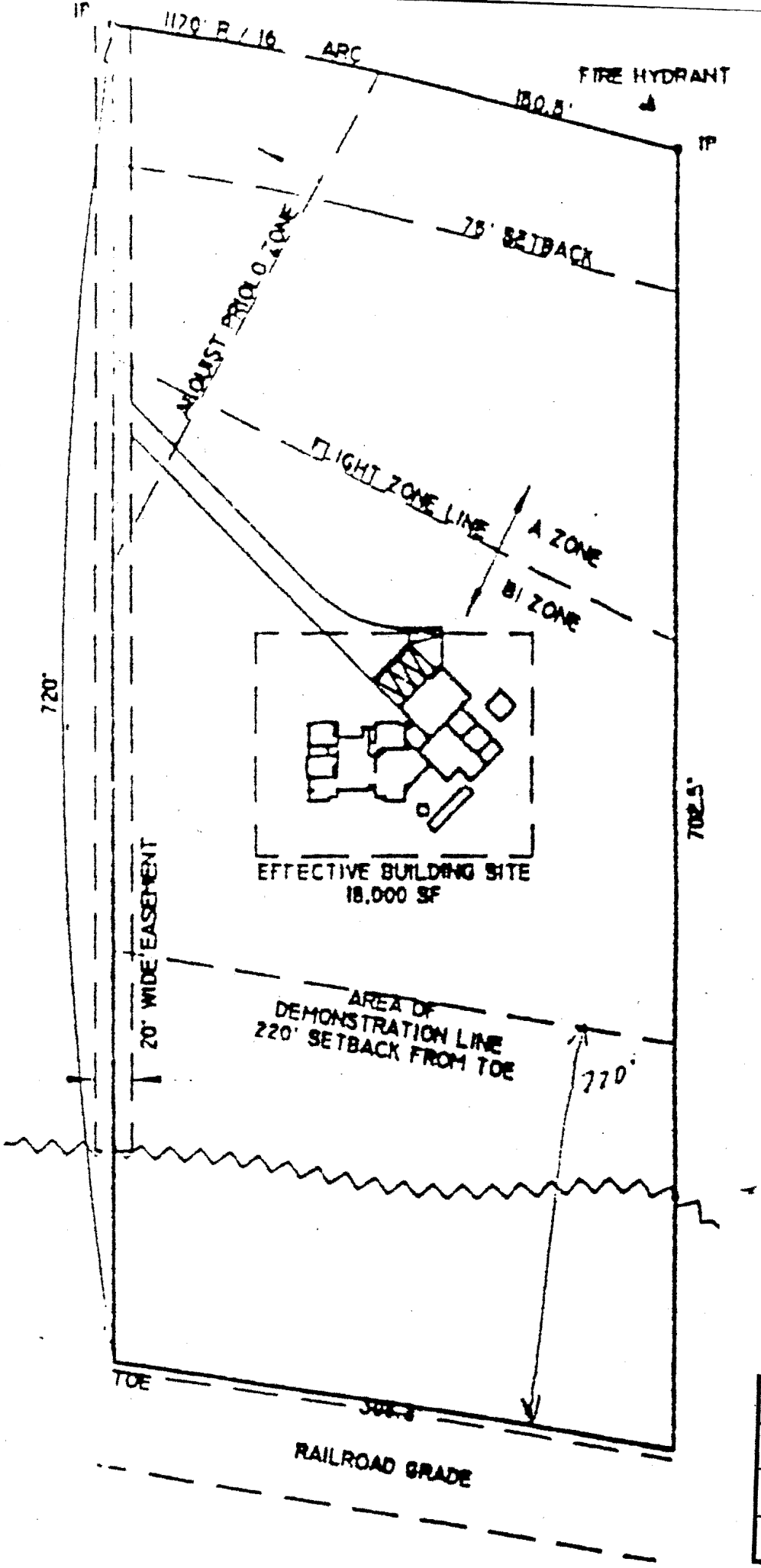

EXHIBIT NO.	3
APPLICATION NO.	A-1-HUM-00-001
BELL & ANILINE	
SITE PLAN	

WB Sweet
CIVIL ENGINEERING SURVEYING GEOLOGY

EXHIBIT NO. 4
APPLICATION NO. A-1-HUM-00-001
BELL & ANILINE
GEOTECHNICAL REPORT

February 4, 2000

Orm Aniline and Kate Bell
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Project No. 99-5075

SUBJECT: Engineering Geologic Report (R2), Letz Road, McKinleyville, APN 511-061-08

INTRODUCTION

This report presents the results of our field and laboratory investigation at a vacant parcel located on the northern end of Letz Lane, McKinleyville, APN 511-061-08. The parcel is a portion of a late Pleistocene marine terrace that fronts the beach and the former mouth of the Mad River. It is just to the south of the area where CalTrans installed rock slope protection to halt the northerly migration of the Mad River that threatened Highway 101 near Clam Beach. We understand that the project is to construct a single-family residence a minimum of 180 feet easterly of the existing bluff edge. The purpose of this report is to summarize our site-specific observations, provide our opinion of the active processes affecting erosion of the bluff, and to provide recommendations for site development/foundation design. A primary focus of our investigation was to address anticipated rate of bluff retreat at the site, and the relative risk to the proposed residence? We used 75 years as the assumed economic lifespan of the residence at this site.

SITE INVESTIGATION

Certified Engineering Geologist Mark Verhey of this office performed fieldwork in January, 2000. Our fieldwork included drilling hand auger holes in the area of the proposed residence, reviewing the area below the site to make observations of hillslope processes, and investigating the material types that comprise the bluff. The entire face of the bluff is absent of vegetation, providing excellent exposure of the material types comprising the bluff. In addition to our fieldwork, we reviewed a series of aerial photographs at the CalTrans office in Eureka, and existing literature plus maps. Figure One shows the location of the site, general topography, the location of a schematic cross section and profile, and our excavation locations. We classified soils using the Unified Soils Classification System (USCS, Appendix II). Appendix I are soil logs. Laboratory results are presented on the soil logs.

DESCRIPTION OF SITE TOPOGRAPHY

The site is located at an elevation of approximately 130 feet above mean sea level. The break in slope at the western edge of the bluff is abrupt. At the base of the bluff is the back beach. At the time of our investigation, there were no dunes between the base of the bluff and the ocean. The overall slope gradient from the edge of bluff to the back beach is 110%. The upper approximately 12 feet of the subject slope is near vertical. In plan view, the edge of the bluff consists of several arcuate shaped indentations. The indentations, in plan view are relatively wide, roughly 50 feet, and extend more than 5 feet into the bluff. The face of the slope is

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absent of vegetation. A relatively large debris fan composed of loose material that has fallen off the face of the bluff is present at the base of the slope.

The topography of the site is relatively level. However, we estimate that the area of the proposed residence is slightly lower (1-2 feet) than the elevation at the edge of bluff. The parcel to the north slopes gently to the south-southwest. The location where the gentle slope on the parcel to the north intersects the relatively flat topography of the subject lot, is a subtle topographic lineament oriented west-northwest. Vegetation on the terrace surface consists of annual grasses and brush.

DESCRIPTION OF SITE SOILS

In the area of the proposed residence, the topsoil thickness is 5.0 - 5.5 feet. This is in contrast to an approximately two-foot thickness of topsoil at the bluff edge. The topsoil consists of soft, black, slightly sandy, slightly clayey silt (USCS ML). It is highly compressible. We collected two tube samples in the lower part of the topsoil to confirm the relatively low density of the topsoil. The average dry density of collected topsoil samples is 77 pounds per cubic foot (pcf). Below the topsoil is dark yellowish brown, medium dense, slightly clayey, silty sand (USCS SM). This is the target bearing material. We collected one tube sample from this unit (Appendix I). It has a dry density of 94 pcf and a moisture content of 21 percent.

The upper approximately 3-4 feet of the yellowish brown subsoil has slight cohesive strength and represents the soil developed into the marine terrace sediments. Underlying this relatively thin, geologically youthful soil profile, is medium dense, yellowish brown sand and slightly silty sand. This material type comprises the majority of the bluff. Within this thick package of slightly silty sand are a couple layers of gravelly sand and sandy gravel (USCS GW and SW). The clasts consist dominantly of well rounded chert. The average clast size is ¼ inch. The maximum size is 1 inch.

At a depth of approximately 12 feet is an approximately 3 foot thick layer of bluish-grey, soft-medium stiff, clayey silt (USCS ML-MH) with abundant shell hash. This unit is not laterally continuous. It progressively increases in thickness to the south and thins to the north.

In general, site soils are well drained. The materials consist dominantly of fine to medium grained sand. The upper four feet of sediment, excluding the topsoil, consists of slightly clayey, silty sand, that may perch water during intense storm events. The bluish grey clayey silt unit with shell hash has a low permeability and will interfere with vertical infiltration of groundwater.

GEOLOGIC SETTING

The site is a late Pleistocene marine terrace, informally called the Savage Creek terrace, with an estimated age of 83,000 years (Carver and Burke, 1992). This estimated age is based upon a soil chronosequence study and relationships between past sea level changes and relative elevations of the terrace sequence in McKinleyville. There are no absolute ages for any of the marine terraces in McKinleyville.

The site is located in the Mad River fault zone (MRfz), an approximately 25 kilometer (km) wide zone of imbricate, northwest trending, northeast dipping thrust faults between Arcata and Big Lagoon (Carver, 1987). The principal faults include the Big Lagoon, Trinidad, McKinleyville, Blue Lake, Mad River, and Fickle Hill faults (Carver and others, 1983). Each of these faults has accrued between 0.7 to 2.2 kilometers of dip slip displacement in the last 700 to 1 million years (Carver, 1987).

The nearest mapped active fault is a trace of the McKinleyville fault, which is a northwest trending, northeast dipping thrust fault. Its main trace is shown on published maps to be located approximately 500 feet north of the site (CDMG, 1983). The estimated late Quaternary slip rate for the McKinleyville fault is 1.0 mm/yr (Carver and Burke, 1992). The McKinleyville fault, as exposed in the bluff between the site and Route 101 Vista Point, consists of many closely spaced, small-displacement fault strands extending across an area over 1000 feet wide. The faults are arranged into two sets, a primary (synthetic) northeast dipping set, and a secondary (antithetic) southwest dipping set. The dips range between 20-50 degrees. The two sets represent a conjugate pair and record nearly horizontal compression. Bedding changes from near horizontal at the site, to steeply dipping adjacent to the Vista Point (exposure is now covered by rock slope protection). This change in dip indicates that folding and rotation of fault-bounded blocks within the fault zone has accommodated much of the displacement.

The sediments exposed in the bluff face are estimated to be late Pleistocene in age (Miller and Morrison, 1988). The depositional environment for the sands is nearshore marine. The layer of clayey silt to silty clay with abundant fossil remains records shallow bay deposition.

Seismic Shaking

There are several seismic sources capable of producing strong ground motion at the site (Dengler et al., 1992). Strong ground shaking from a local source should be anticipated during the project design life. The site is in Seismic Zone Four, as specified in the 1997 Uniform Building code (UBC). At the site, the estimated peak ground acceleration with a ten percent probability of exceedance in 50 years (design value recommended by the UBC) is 0.83g (USGS, 1999). The largest earthquake that could strike the site, is an 8.5 M or larger earthquake generated by rupture along the Cascadia subduction zone (Csz) (Clarke and Carver, 1992). The recurrence interval for Csz events is approximately 300-700 years, with the last Csz event estimated to have occurred approximately 300 years ago (Clarke and Carver, 1992).

Migration of the Mouth of the Mad River and Rock Slope Protection (RSP)

Beginning in approximately 1970, prior to installation of the rock slope protection (RSP), the mouth of the Mad River migrated northward. The cause of the northward migration is poorly understood and involves many variables, some of the which include: a large tidal range; the interaction of ocean waves and the fluvial system; a bluff that is composed almost entirely of sand; ocean waves entering the mouth; the width of the mouth; the formation and erosion of the spit; longshore transport of sand offshore; the river current; the last chance dune sequence (now eroded); the alteration by man of the Mad River watershed, and the active local tectonics.

By the spring of 1991, the Mad River had migrated northward to a point where it placed Highway 101 in jeopardy should the migration continue. In 1992 CalTrans completed construction of an approximately 1,600 foot long rock slope protection structure (revetment) at the then mouth of the Mad River. The structure curves along the then northerly edge of the mouth, and was constructed using quarry rock (4 ton rock). During the winter of 1994-1995, erosion progressed immediately south of the revetment and an additional approximately 1,000 linear feet of rock slope protection was installed south of the existing RSP. This was completed in June, 1995.

The mouth of the Mad River opened to a width of 3,600 feet in the El Nino event of 1982-1983, and 3,300 feet in the El Nino event of 1997-1998. Both of these events were coincident with unusually large waves and prolonged elevated sea levels (Borgeld, 1998). The erosion that occurred from wave attack, wash over, and high river discharge removed much of the sediment that had comprised the river mouth spit into the nearshore circulation system (Borgeld, 1998). Borgeld (1998) notes that following the 1982-1983 El Nino event, it took several years for the spit to reconstruct and that the rate of reconstruction was dependent upon: offshore conditions including wave power and direction, sea levels, river discharge, and sediment supplied. One aerial photograph dated 6/17/98 in the Borgeld (1998) report shows that the spit moved landward roughly 160 feet and showed evidence of washover by waves.

In early March, 1999, the Mad River broke through the dunes in the vicinity of Hiller road, approximately 4 kilometers south of the site. The mouth has remained at this location to the current time.

SLOPE STABILITY

Our interpretation of the stability of the subject slope is based on the steepness of the slope, the material types comprising the slope, our observations and interpretations of the active processes, and our knowledge of the history of the site. CalTrans provided us with access to a series of aerial photographs spanning a time period from 2/7/93 to 8/8/95.

The slope gradient on the face of the bluff is 115 percent. The relief is approximately 100 feet. The material consists dominantly of medium dense, fine to medium grained sand with a low percentage of silt plus clay (generally less than 15%). This relatively clean sand relies almost entirely on strength due to friction between grains. It has low cohesive strength. There is a slightly cohesive cap (approximately 6 foot thick), a few sandy gravel layers, and one approximately 5 foot thick layer of silty clay. At the base of the slope is a debris fan consisting of loose material that has fallen off the slope above. On the northern portion of the site, this debris fan extends nearly half way up the slope. On the southern portion of the site, this debris fan extends approximately ¼ of the way up the slope.

We observed many active failures on the subject slope. Our interpretation is that the entire length of the subject slope can be mapped as an active landslide. Consequently, we interpret the site slope to be unstable. The upper 12 feet of the site slope is near vertical and locally contains overhangs. The steepness of this upper portion of the slope suggests failure by blockfall. The observation that topsoil locally covers the debris fan at the base of the slope indicates that blocks broke upon impact, thereby allowing for topsoil to be transported to the

base of the slope. It also indicates that the slides are recent. At the time of our investigation, there had been little modification of the slide debris and slide scars by weathering and erosion.

During the period from 8/8/95 to the present, we estimate there was approximately 50 feet of bluff edge removed by slope failures. During the period 2/27/93 – 8/8/95, we estimate the amount of bluff retreat was approximately 10 feet at the site. Our estimate of the amount of bluff edge lost is based on our review of aerial photographs, and our site specific observations. The August 1995 photograph shows the house to the south to be roughly 110 feet from the bluff edge. We estimate that it currently is approximately 60 feet from the edge of bluff. The estimate of its existing distance from the edge comes from pacing along the property line. We did not investigate conditions on adjacent properties. Our observations come from being on the subject parcel only.

The debris fan at the base of the slope, and extending up the slope, in our opinion, is critical to the rate of bluff retreat. If this debris fan were to be removed, the rate of bluff retreat will accelerate. The removal of the debris fan could occur either by wave action or the Mad River may return to its previous mouth at Vista Point. During the time of our investigation, we did not observe any clear evidence that the debris fan had been eroded by waves at the toe. However, the high tide line, or debris line, is less than 100 feet from the base of the slope and there is some large woody debris currently against the base of slope. Consequently, under current conditions, it is possible that large storm events coincident with high tides will result in waves reaching the base of the slope.

The risk of the Mad River migrating north to the location of the site cannot be determined precisely. There are many variables affecting this dynamic process. Historically, the photographic coverage suggests the Mad River has migrated northward, with episodic washover and breaching that repositions the inlet further south, at least four times since 1941 (Borgeld, 1999). However, between 1941 and 1970, the mouth of the Mad River was located in an area roughly 1.1 miles wide (Borgeld, 1993). The episodes of northward migration prior to the sequence that began in approximately 1970 did not result in migration as far north as Vista Point. Borgeld (1999) states that the rate of migration will be dependent upon wave power and direction, river flow, tidal currents, and sediment supply, but a longer term trend to migrate northward should be expected to occur once again.

As a final note, the precipitous slope gradient and the dominantly cohesionless material types that comprise the bluff suggest that strong seismic shaking will initiate failure over a large portion of the subject slope.

FAULT RUPTURE

There is a topographic lineament located adjacent to the northerly property line that has a similar orientation to that of the planes of small-scale faults exposed in the bluff face. The small-scale faults in the face of the bluff cut through Pleistocene sediment but do not result in offset greater than a few inches. We did not observe any of the small scale faults resulting in significant offset of the clayey silt layer with shell hash nor the upper late Pleistocene terrace soil. Due to the presence of faults cutting Pleistocene sediment in the bluff face below the site, and the observation of an apparent topographic expression of the faults (lineament), the possibility of fault rupture at the site cannot be excluded.

LIQUEFACTION

Liquefaction refers to the phenomena of seismic generation of large pore-water pressures and consequent severe softening of granular soils. Post liquefaction phenomena include soil deformation, settlement, and ground failure.

Due to the late Pleistocene to Pleistocene age of the materials at the site, and an absence of a high water table, we interpret the liquefaction potential at the site to be LOW.

SUMMARY AND DISCUSSION

In our opinion, the subject slope is unstable. Failures will continue to occur on the subject slope regardless of whether the toe is eroded or not. The rate of bluff retreat will increase if the debris fan is removed. Based on our review of aerial photographs, there has been roughly 50 feet of bluff top lost in the last approximately 5 years. Prior to the that time, the rate of retreat was significantly less. In 1997-1998, the mouth of the Mad River widened to an unusually wide 1,300 feet, allowing for waves to enter the mouth and directly attack the sandy bluff.

In our opinion, the critical variable affecting the rate of bluff retreat is erosion of the toe. The area between the base of slope and the ocean is a relatively flat beach. There currently are no active dunes. If the dunes reestablish, there will be less of a risk of direct attack by waves. After the 1982-1983 El Nino event it took several years for the spit to reconstruct (Borgeld, 1998). Additionally, as the bluff continues to retreat, the distance from the high tide line to the base of slope will increase, thereby decreasing the frequency and risk of attack by waves. If the debris fan can become moderately stable, and vegetation becomes established, the rate of bluff retreat will decrease dramatically. At some distance, waves should no longer be able to reach the base of slope. Whether or not the Mad River will migrate northward to the location of its previous mouth is not possible to assess accurately. However, there is historic precedence for this occurrence and it, therefore, cannot be excluded.

CONCLUSIONS

It is our opinion the site slope is unstable. Landslides will continue to occur on the subject slope. The rate of bluff retreat will be largely related to erosion at the toe, either by direct attack by waves, northward migration of the Mad River, or tidal action. Given the appreciable distance from the existing edge of bluff to the proposed location of the residence, a minimum of 180 feet, it is our opinion that the risk to the proposed residence is Moderate. In our opinion, no further geologic investigation is necessary. We anticipate that over the next 75 years, the rate of bluff retreat at the site will not exceed an average of 2.25 feet/year. However, as discussed earlier, the potential for large episodic events to cause bluff retreat greater than our average annual estimate are possible during the design life of the proposed residence.

RECOMMENDATIONS

Foundations

We recommend that all excavations for foundation elements, including interior and deck footings, extend to the native, yellowish brown subsoil.

Due to the lack of relief at the location of the proposed residence, it is acceptable to use either a two-sack concrete slurry or compacted engineered fill in the base of footing trenches to decrease the thickness of foundation concrete. The compacted fill or slurry should be brought up to a maximum of 12 inches from grade for one-story structures and 18 inches for two story structures.

We recommend that a representative from this office inspect the open footing excavations, and provide a certification letter, prior to placing reinforcing steel, form boards, fill, slurry, or concrete.

We recommend using an allowable foundation pressure of 1500 pounds per square foot (psf). This value may be increased by one third for combined loads, including wind and seismic. This bearing value is for native subsoil. Zero bearing value and zero passive pressure is assigned to topsoil. All other allowable increases should follow the guidelines of Table 18-I-A of the 1997 Uniform Building Code (UBC), Material Type Four.

An engineered, or structural fill, is a well graded, low plasticity material with no clasts in excess of three inches. We recommend using a sandy gravel because it is readily available, and relatively easy to moisture condition and compact. We recommend that all structural fills used to support foundations be compacted to a minimum of 90 percent of its maximum dry density, as determined by ASTM D-1557 (laboratory), and ASTM D-2922 (field). We recommend that compaction testing be performed a minimum of every two vertical feet of compacted fill.

A representative sample of proposed fill materials should be brought to a testing laboratory a minimum of 40 hours prior to its intended use. Please notify the pertinent parties a minimum of 48 hours prior to compaction testing in the field.

We recommend that footing trenches be 18 inches wide if they will be partially backfilled with compacted engineered fill. This is due to the width of the handles of most hand held compaction devices. Although the base plates typically can fit in a 12 inch wide trench, upon applying compaction effort, the handles/bars tend to remove a significant amount of loose material from the sidewalls, thereby increasing the moisture content, and fines content, of the fill, in turn making it difficult to achieve the recommended compaction rate.

Foundation dimensions and design should conform to current UBC criteria at the time of construction. All foundation design and dimensions should, at minimum, meet current UBC Seismic Zone Four criteria.

We do not recommend the construction of a basement.

Slabs

Due to the thickness of topsoil, we do not recommend the use of concrete slab floors for habitable rooms.
We recommend that the garage slab be structurally separate from the perimeter footings.

We recommend that all slabs be underlain by a minimum of 24 inches of structural fill compacted to a minimum of 90 percent of the maximum dry density. We recommend having the fill material tested in the laboratory (ASTM D-1557), and the field (ASTM D-2922) for its relative density.

We recommend that fill be placed in lifts not exceeding eight inches if compacted by a hand held device. Lifts of fill can be one foot thick if compacted by vibratory roller.

We recommend that all slabs be underlain by a moisture barrier with seams overlapped a minimum of 12 inches. A layer of sand can be placed above the moisture barrier to protect its integrity during placement of reinforcing steel and concrete.

We recommend that all slabs be a minimum of four and one half inches thick and incorporate adequate reinforcing steel.

Grading and Drainage

We did not observe any evidence of concentrated surface runoff crossing the top of bluff. Due to the topography of the site, it appears that surface runoff largely flows away from the edge of bluff. We recommend that a positive drainage gradient be maintained around residences.

All drainage facilities should be designed to carry waters to the nearest practical drainage way approved by the building official or other appropriate jurisdiction as a safe place to deposit waters.

We recommend that no cuts or fills be made in excess of three feet thick without first obtaining geotechnical advice. We recommend sloping cuts and fill at 3:1 (horizontal to vertical).

We do not recommend using topsoil as fill for driveways, or to support load bearing structures.

We recommend placement and compaction of fill soils be monitored by a representative from our office and a letter be presented to the owner for certification of the work.

Site soils are highly erodible when exposed during construction. Precautionary measures should be taken to insure that sediment does not become entrained in surface runoff. Exposed areas should be seeded as soon as practical.

Retaining Walls

If footings retain more than four feet of soil, as measured from base of footing to top of stemwall, then we recommend that a Registered Civil Engineer design them as retaining walls.

We recommend using an equivalent fluid pressure of 40 pcf for retaining wall design with a level backslope that is not supporting a structure. If retaining walls with a level backslope are part of the foundation, we recommend using an equivalent fluid pressure of 60 pcf. This assumes that all retaining walls will be designed with an adequate backdrain. Please contact us for additional recommendations if any proposed retaining walls will have an inclined backslope.

We recommend using a passive pressure of 150 psf per foot of depth below the native undisturbed subsoil. We assign a zero passive pressure value for topsoil.

We recommend using a friction coefficient of 0.25 for the interface of the concrete and native subsoil.

CLOSURE

Our conclusions and soil parameters are based upon site conditions at the time of this study. If during construction, conditions are different from those presented in this report, then please contact this office immediately to allow us to review conditions and provide additional recommendations.

Determination of any potential environmental hazard due the possible presence of hazardous and/or toxic wastes was not a part of our investigation.

Recommendations for footing dimensions provided in this report do not preclude the need for structural design of footings and foundations where necessary.

We thank you for this opportunity to be of service. If there are any questions, or if we can be of further assistance, please contact our office. We are available for laboratory materials testing and evaluation, and site construction materials testing.

Very truly yours,

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WB Sweet
CIVIL ENGINEERING SURVEYING GEOLOGY

EXHIBIT NO. 5
APPLICATION NO. ~~A-1-HUM-00-001~~
BELL & ANILINE
GEOLOGY ADDENDUM #1

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CALIFORNIA
COASTAL COMMISSION

June 1, 2000

Kate Bell and Orm Aniline
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Project No. 99-5075

SUBJECT: Response to Coastal Commission's Review of Engineering Geologic Report (R2), Letz Road, McKinleyville, APN 511-061-08

On March 15, 2000, the California Coastal Commission considered an appeal of the County of Humboldt's approval of Coastal Development Permit No. CDP-99-22 for the above referenced project. This is in response to the Coastal Commissions comments regarding the suitability of information provided in our previous 11-18-99 report.

The site is located at 3524 Letz Road in McKinleyville. It is on a Pleistocene marine terrace overlooking the Pacific Ocean at an elevation of approximately 130 feet above mean sea level. There is an abrupt break in slope along the westerly margin of the terrace. Below (westerly) the break in slope is a precipitous bluff face leading down to a back beach. The Mad River formerly occupied this back beach area. The Mad River mouth has subsequently broken through the dune spit south of the site and no longer occupies the area at the toe of this slope. The proposed project is to construct a single-family residence approximately 180-feet from the top of the bluff edge.

We are in receipt of a March 22, 2000 letter from the California Coastal Commission requesting additional information. Below we have restated each specific item and have provided a response:

1) A justification for the estimated bluff retreat rate of 2.25 feet/year.

There are many variables affecting the rate of bluff retreat at this site, including: topographic relief, slope gradient, material types; local seismicity; Mad River migration; accumulation of sand on the current back beach area; establishing vegetation on the debris fan; wave action; tidal fluctuation; wind; and longshore transport of sand offshore. We have previously interpreted the site slope to be unstable. We anticipate that failures will continue to occur. However, as the distance from the base of bluff to the highest water level increases, we anticipate that vegetation will establish on the debris fan and the frequency and magnitude of failures will decrease. Our bluff retreat rate of 2.25 feet/year was determined qualitatively based upon the above variables and a 75-year design life for the proposed residence.

2) Evidence that renewed northward migration of the mouth of the Mad River will not increase this rate of bluff retreat.

Evidence exists showing that the presence of the Mad River channel at the toe of the slope causes erosion and subsequent retreat of the bluff face. The bluff retreat rate of 2.25 feet per year is an estimated average annual rate. As discussed in 1) above, this is a qualitative determination based upon a wide range of variables. These variables include a renewed

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northward migration of the Mad River mouth. Therefore, our determination of bluff retreat rate at this site incorporated the potential for the northward migration of the Mad River mouth.

3) An evaluation of the role of groundwater in slope failures, particularly in conjunction with the relatively impermeable "bluish-gray, soft-medium stiff, clayey silt with abundant shell hash."

At the time of our investigation, we did not encounter groundwater in any of our excavations, we did not observe distinct mottling of site soils, nor did we observe emergent water on the bluff face. The bluish-gray clayey silt unit with abundant shell hash, which is approximately 3 feet thick at the site, does have the ability to perch water. All other site soils are well drained.

Along the bluff face south of the site, there are many areas of emergent groundwater originating from the top of this bluish-gray unit. However, it is not laterally continuous; it progressively increases in thickness south and tapers out north of the site.

It is our interpretation that this bluish-gray unit does alter the topography of the bluff face at the project site. This interpretation is based upon the near vertical face of the upper, approximately 12 feet of bluff. This suggests that water periodically emerges from sands directly overlying the bluish-gray unit, which causes over-steepening of the overlying slope, resulting in eventual failure by blockfall. This type of failure is termed sapping erosion. In locations which sapping erosion is a primary cause of slope failure, a characteristic amphitheater type of depression is observable. In plan view this results in sharp and distinct irregularities of the top of slope.

However, the characteristic amphitheater type depressions typically associated with sapping erosion are not present at the project site. The observation that the top of slope, in plan view, is a relatively straight feature, suggests that the rate of bluff retreat is dominated by erosion at the toe, rather than processes active on the face of the slope.

4) A slope failure analysis based on geotechnical parameters measured from samples obtained at the site, for both static loads and loads imposed during seismic shaking corresponding to the maximum credible earthquake for the site.

We interpret the subject slope to be unstable. Failures will continue to occur on the subject slope. In our opinion, it is not necessary to perform a detailed factor of safety analysis. The presence of active landslides indicates that the existing factor of safety is approximately 1.0.

CONCLUSIONS

We interpret the bluff face at the project site to be unstable. Landslides, erosion and bluff failure will continue to occur. Bluff retreat is based on many dynamic variables existing at the project site. Our estimated average annual rate of retreat is based upon a qualitative analysis of these variables. This does not preclude the possibility of large scale short-term failures resulting from seismic events, renewed northward migration of the Mad River, heavy storms or extreme sea conditions. We anticipate that the likely type of failure during any of these events will be blockfall of the exposed upper portion of the bluff and debris slides of the unconsolidated fan deposit mantling the slope.

In addition, given the appreciable distance from the existing edge of bluff to the proposed location of the residence, a minimum of 180 feet, it is our opinion that the risk to the proposed residence is Moderate over a 75-year design life.

Very truly yours,

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MV/JB (5075 Aninline Add JCB.doc)

WB Sweet

CIVIL ENGINEERING · SURVEYING · GEOLOGY

EXHIBIT NO. 6
APPLICATION NO. A-1-HUM-00-001
BELL & ANILINE
GEOLOGY ADDENDUM #2

June 30, 2000

Kate Bell and Orm Aniline
1711 3rd St
Eureka, CA 95501

Project No. 99-5075

SUBJECT: Addendum Number Two of Engineering Geologic Report (R2), Letz Road, McKinleyville, APN 511-061-08

The purpose of this addendum is to provide a summary of our review of additional aerial photographs spanning a time period from 1941 to 1996, and a review of a previous report in the site vicinity (BGC, 1997). In summary, the aerial photographs reveal that prior to 1993, much of the site slope was covered by vegetation. There were some relatively small, shallow slides in the site vicinity, but nothing of the magnitude experienced subsequent to 1993. During the period 2/27/93 – 8/8/95, we estimate the amount of bluff retreat was approximately 10 feet at the site. During the period from 8/8/95 to present, we estimate there has been approximately 50 feet of bluff retreat at the site.

By the spring of 1991, the Mad River had migrated northward to a point where it placed Highway 101 in jeopardy should the migration continue. In 1992 CalTrans completed construction of an approximately 1,600 foot long rock slope protection structure (revetment) at the then mouth of the Mad River. During the winter of 1994-1995, erosion progressed immediately south of the revetment and an additional approximately 1,000 linear feet of rock slope protection was installed south of the existing RSP. This was completed in June 1995.

The Busch Geotechnical Consultants report (BGC, 1997) provides documentation of two slides on the slope below the Highway 101 Vista Point in the winter of 1996-1997. They concluded that the southernmost slide occurred in the same location as a failure that occurred in the winter of 1963-1964 or 1964-1965, soon after construction of the Vista Point. BGC comments that it is likely the depressions are gully heads related to drain outlets and not to chronic instability of the slope.

In summary, we did not identify any large landslides of the site slope during the time interval 1941-1993. It is possible shallow failures may have occurred during this time period but were obscured by thick vegetation. However, failures of the size that occurred subsequent to 1993 would have been visible.

We interpret the site slope to be unstable. Landslides have occurred on the site slope during the recent past, and we anticipate that landslides will continue to occur on the site slope. Clearly, the site slope is at risk under seismic conditions. However, given the appreciable distance from the existing edge of bluff to the proposed location of the residence, a minimum of 180 feet, it is our opinion that the risk to the proposed residence is Moderate.

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REFERENCES CITED

BGC (Busch Geotechnical Consultants), 1997. Hillslope Instability Along a Portion of the Hammond Coastal Trail, McKinleyville, Humboldt County, California. Unpubl rept for client, 31 pp + apps.

LIST OF AERIAL PHOTOGRAPHS REVIEWED

1941. CVL 6B 17,18
1948. CDF 2-16 61, 62
1954. CVL 13N 95, 96
1958. HU 10 39,40
1962. HCN-2 13B 18, 19, 20
1965. 1-HUM-1 20, 21
1966. HC-66 16B 54, 55
1970. CH-70 16B 56, 57
1974. HC74 16B 53, 54
1988. WAC 88CA 2 47, 48
1996. 96138 1-11 14, 15,

BEFORE THE CALIFORNIA COASTAL COMMISSI

RE: CALTRANS CDP Application No. 1-92-69
CALTRANS Appeal No. A-1-HUM-98-088

REQUEST BY LETZ AVENUE BLUFF-ABUTTING PROPERTY OWNERS

This request is made by Harry Conner, George Owen and John L. White, Letz Avenue bluff-abutting property owners, who have already appeared and given oral testimony and submitted written testimony in the above identified docket items on their own behalf and on behalf of other bluff abutting property owners on Letz Avenue, in the McKinleyville area of Humboldt County.

ACTION SOUGHT BY THE COASTAL COMMISSION

The Commission is requested to instruct staff NOT to propose, either informally to the appelees in Appeal A-1-HUM-00-01 (Letz Avenue bluff property owners Kate Bell and Orm Aniline) or in its staff report in that appeal, any undertaking on the part of the appellees that would be inconsistent with any remediation which the Commission might impose on CALTRANS as a result of the damage to the bluff which occurred after CALTRANS installed in 1995 the 1,000 foot extension to the RSP which it installed in 1992 at the mouth of the Mad River, positioned at that time at Vista Point.

FACTUAL BASIS FOR THIS REQUEST

Staff has proposed orally to appellees Bell and Aniline that to ensure a favorable decision in the appeal they agree to a deed covenant which would preclude them from seeking permission in the future to armor the bluff at the western boundary of their property, to protect the bluff from further erosion. Staff left the appellees with the impression that this covenant was a pre-requisite to their receiving staff recommendation for approval of their building permit.

The Bell-Aniline property is part of the bluff which is the focus of the above-identified CALTRANS application and appeal which has been on the Agenda of the Commission and the subject of a public hearing over a year ago. What the staff has proposed to appellees Bell and Aniline is inconsistent and incompatible with the Commission being able to objectively decide on the appropriate remediation which should be imposed on CALTRANS. Asking owners of one property, as a prerequisite to obtaining Commission approval of its building permit, to undertake never to request permission to install rock on the bluff at the base of their property, effectively precludes the Commission from considering rock installation on the other properties as remediation in the above-identified agenda items.

The proposal by Staff to the appellee is is an improper tactic to decide the CALTRANS RSP application and appeal -- not by a vote by the Commission members – but by manipulating a deed change in a separate appeal. The appellees have agreed to accept a "hold blameless" clause. The Commission doesn't need a deed restriction to exercise its right to deny any specific rock emplacement permit if one were requested in the future. Therefore, the only reason for the Commission not to approve the appellants' building permit promptly is an attempt at the Staff level to pre-empt the Commission's decision-making perogative on a separate issue – the CALTRANS RSP application and appeal.

The Commission is therefore requested to instruct Staff accordingly.

Respectfully submitted,

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Date: June 13, 2000