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Commission Action:	

STAFF REPORT: REGULAR CALENDAR

APPLICATION NO.: 1-06-012

APPLICANTS: JEANNETTE GAVIN & JOHN ROTTER

PROJECT LOCATION: On the west side of Patricks Point Drive, approximately two miles north of Trinidad, at 1948 Patricks Point Drive, Humboldt County (APN 517-261-002)

PROJECT DESCRIPTION: Construct an approximately 2,600-square-foot single-family residence with a detached 800-square-foot garage, a 1,250-square-foot gravel driveway and parking area, an on-site spring and septic system, and a 3,000-gallon water storage tank.

GENERAL PLAN DESIGNATION (UNCERTIFIED): Rural Residential (RR), one dwelling per two acres.

**ZONING DESIGNATION
(UNCERTIFIED):**

Rural Residential Agriculture, 2-acre minimum lot size, with Archaeological Resource Area, Design Review, and Offshore Rocks/Rocky Intertidal Area combining zones (RA-2/A,D,O)

LOCAL APPROVALS RECEIVED:

Humboldt County Special Permit

OTHER APPROVALS REQUIRED:

None

SUBSTANTIVE FILE DOCUMENTS:

Humboldt County Local Coastal Program;
Humboldt County Special Permit No.
SP-05-112

SUMMARY OF STAFF RECOMMENDATION:

Staff recommends that the Commission approve with conditions the coastal development permit application for the proposed construction of a 30-foot-high, 2,600-square-foot single-family residence with a detached 800-square-foot garage, a 1,250-square-foot gravel driveway and parking area, an on-site spring and septic system, and a 3,000-gallon water storage tank, located on a bluff top parcel about two miles north of the City of Trinidad on the west side of Patrick's Point Drive, at 1948 Patrick's Point Drive. The project site is located in an area of deferred certification and thus, the standard of review is the Coastal Act.

The applicants are proposing that the residential development be served by an on-site spring and sewage disposal system. Test wells and soils evaluations have been conducted to evaluate the suitability of the site for a sewage septic system and to evaluate the suitability of the existing on-site spring for residential use. These studies indicate that the soils are adequate to accommodate the proposed on-site septic system and that the spring produces sufficient volume to serve the proposed development. The applicants have provided evidence from the Humboldt County Division of Environmental Health (DEH) that the on-site spring and proposed septic system meet DEH requirements are adequate to serve the proposed residential development.

The principle issues raised by the proposed project are geologic hazards, water quality, visual compatibility, and potential archaeological resources. Staff believes that with the attachment of seven special conditions, the proposed project would be consistent with the Coastal Act.

The subject property encompasses an uplifted marine terrace situated approximately 200 feet above the ocean. The coastal bluffs are subject to bluff retreat, which poses a hazard to development of the subject parcel. The applicants submitted a geotechnical

investigation prepared for the site that concluded that a 70-foot bluff setback, as proposed, is reasonable to protect the development for its economic lifespan. The Commission's staff geologist, Dr. Mark Johnsson, reviewed the geologic report and concurred with its conclusions.

To ensure that the proposed development is constructed consistent with the recommended bluff setback as proposed, staff recommends Special Condition No. 1, which requires that the final construction plans for the residence adhere to the design recommendations specified in the geotechnical report. Special Condition No. 2 would prohibit construction of future seawalls or shoreline protective devices, and require the landowner to remove any authorized development if it is deemed by a government agency as too dangerous to occupy. Special Condition No. 3 would impose an assumption of risk, waiver of liability, and indemnity agreement to provide acknowledgement of the hazardous nature of the geologic conditions inherent at the site, to assume the risks of developing the property, and to require a waiver of any claim of damage or liability.

The subject site does not provide significant views to or along the ocean from Patrick's Point Drive, as views are largely obstructed by the dense forest vegetation on the property. The site is not visible from Patrick's Point State Park, located approximately 1-1/2 miles north, or from any other public vantage points. The applicants have proposed to utilize natural building materials and dark earthtone colors for the development that would blend with the dark green and brown tones of the densely vegetated parcel and thus, the development would be visually compatible with the character of the surrounding area. Staff recommends Special Condition No. 4 which would impose restrictions on the exterior building materials, colors, and lighting elements to ensure that the exterior appearance of the development is visually compatible with the character of the project's surroundings.

To ensure that Best Management Practices (BMPs) are implemented to control the erosion of exposed soils and minimize sedimentation of coastal waters during construction, staff recommends Special Condition No. 5 requiring the implementation of BMPs to control erosion and sedimentation during and following construction.

Although no known archaeological resources have been discovered at the site and ground disturbing activities associated with the project would be minimal, due to the cultural significance of the area, there is a potential that construction of the proposed project would result in the discovery of sensitive cultural resources. Therefore, to ensure protection of any cultural resources that may be discovered at the site during construction of the proposed project, staff recommends Special Condition No. 6, which requires that if an area of cultural deposits is discovered during the course of the project, all construction must cease and a qualified cultural resource specialist must analyze the significance of the find. To recommence construction following discovery of cultural deposits the applicant is required to submit a supplementary archaeological plan for the review and approval of the Executive Director to determine whether the changes are de minimis in nature and scope, or whether an amendment to this permit is required.

Lastly, Special Condition No. 7 would require the applicant to record a deed restriction imposing the special conditions of the permit amendment as covenants, conditions and restrictions on the use and enjoyment of the property.

As conditioned, staff recommends that the Commission find that the project is consistent with the Chapter 3 policies of the Coastal Act.

The Motion to adopt the Staff Recommendation of Approval with Conditions is found on page 4 below.

STAFF NOTES:

1. Standard of Review

The proposed project is located in the Trinidad area of Humboldt County. Humboldt County has a certified LCP, but the subject property is located within an area of deferred certification. Therefore, the standard of review that the Commission must apply to the project is the Coastal Act.

I. MOTION, STAFF RECOMMENDATION AND RESOLUTION:

The staff recommends that the Commission adopt the following resolution:

Motion:

I move that the Commission approve Coastal Development Permit No. 1-06-012 pursuant to the staff recommendation.

STAFF RECOMMENDATION OF APPROVAL:

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

RESOLUTION TO APPROVE THE PERMIT:

The Commission hereby approves a coastal development permit for the proposed development and adopts the findings set forth below on grounds that the development as conditioned will be in conformity with the policies of Chapter 3 of the Coastal Act. Approval of the permit complies with the California Environmental Quality Act because feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment.

II. STANDARD CONDITIONS: See Attachment A.

III. SPECIAL CONDITIONS:

1. Conformance of the Design and Construction Plans to the Geotechnical Investigation Report

A. All final design and construction plans, including bluff setback, foundations, grading, and drainage plans, shall be consistent with the recommendations contained in the Geotechnical Investigation report dated May 2006 prepared by SHN Consulting Engineers & Geologists, Inc. **PRIOR TO ISSUANCE OF COASTAL DEVELOPMENT PERMIT NO. 1-06-012**, the applicant shall submit, for the Executive Director's review and approval, evidence that a licensed professional (Certified Engineering Geologist or Geotechnical Engineer) 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 final 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 legally required.

2. No Future Bluff or Shoreline Protective Device

A. By acceptance of this Permit, the applicant/landowners agree, on behalf of themselves 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. 1-06-012 including, but not limited to, the residence, detached garage, septic system, water tank, and driveway, 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 applicants hereby waive, on behalf of themselves and all successors and assigns, any rights to construct such devices that may exist under Public Resources Code Section 30235.

- B. By acceptance of this Permit, the applicant/landowners further agree, on behalf of themselves and all successors and assigns, that the landowner shall remove the development authorized by this Permit, including, but not limited to, the residence, detached garage, septic system, water tank, and driveway, if any government agency has ordered that the improvements are not to be used 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.
- C. 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. The report shall be submitted to the Executive Director and the appropriate local government official. If the geotechnical report concludes that the residence or any portion of the residence is unsafe for occupancy, the permittee shall, within 90 days of submitting the report, apply for a coastal development permit amendment to remedy the hazard which shall include removal of the threatened portion of the structure.

3. Assumption of Risk, Waiver of Liability and Indemnity

By acceptance of this permit, the applicant/landowners acknowledge and agree: (i) that the site may be subject to hazards from coastal erosion hazards, such as waves, storm waves, and flooding; or 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.

4. Design Restrictions

- A. All exterior siding and roofing of the proposed structure shall be composed of the colors proposed in the application or darker earth tone colors only. The current owner or any future owner shall not repaint or stain the house or other approved structures with products that will lighten the color of the house or other approved structures without an amendment to this permit. In addition, all exterior materials, including roofs and windows, shall be non-reflective to minimize glare; and
- B. All exterior lights, including any lights attached to the outside of the buildings, shall be the minimum necessary for the safe ingress and egress of the structures, and shall be low-wattage, non-reflective, shielded, and have a directional cast downward such that no light will shine beyond the boundaries of the subject parcel.

5. Best Management Practices and Construction Responsibilities

The permittee shall comply with the following construction-related requirements:

- (a) Any and all excess excavated material resulting from construction activities shall be removed and disposed of at a disposal site outside the coastal zone or placed within the coastal zone pursuant to a valid coastal development permit;
- (b) Straw bales, coir rolls, or silt fencing structures shall be installed prior to and maintained throughout the construction period to contain runoff from construction areas, trap entrained sediment and other pollutants, and prevent discharge of sediment and pollutants into the drainage swale running along the southern edge of the property;
- (c) On-site vegetation shall be maintained to the maximum extent possible during construction activities;
- (d) Any disturbed areas shall be replanted or seeded with native vegetation obtained from local genetic stocks immediately following project completion. If documentation is provided to the Executive Director that demonstrates that native vegetation from local genetic stock is not available, native vegetation obtained from genetic stock outside the local area may be used. No plant species listed as problematic and/or invasive by the California Native Plant Society, the California Invasive Plant Council, or as

may be identified from time to time by the State of California, shall be employed or allowed to naturalize or persist on the site. No plant species listed as a 'noxious weed' by the governments of the State of California or the United States shall be utilized within the property; and

- (e) All on-site stockpiles of construction debris shall be covered and contained at all times to prevent polluted water runoff.

6. Area of Archaeological Significance

- A. If an area of cultural deposits is discovered during the course of the project, all construction shall cease and shall not recommence except as provided in subsection (c) hereof; and a qualified cultural resource specialist shall analyze the significance of the find.
- B. A permittee seeking to recommence construction following discovery of the cultural deposits shall submit a supplementary archaeological plan for the review and approval of the Executive Director. In order to protect archaeological resources, any further development may only be undertaken consistent with the provisions of the supplementary archaeological plan.
 - (i) If the Executive Director approves the Supplementary Archaeological Plan and determines that the Supplementary Archaeological Plan's recommended changes to the proposed development or mitigation measures are de minimis in nature and scope, construction may recommence after this determination is made by the Executive Director.
 - (ii) If the Executive Director approves the Supplementary Archaeological Plan but determines that the changes therein are not de minimis, construction may not recommence until after an amendment to this permit is approved by the Commission.

7. Deed Restriction

PRIOR TO ISSUANCE OF COASTAL DEVELOPMENT PERMIT NO. 1-06-012, the applicant shall submit to the Executive Director for review and approval documentation demonstrating that the applicant has executed and recorded against the parcel(s) governed by this permit a deed restriction, in a form and content acceptable to the Executive Director: (1) indicating that, pursuant to this permit, the California Coastal Commission has authorized development on the subject property, subject to terms and conditions that restrict the use and enjoyment of that property; and (2) imposing the Special Conditions of this permit as covenants, conditions and restrictions on the use and enjoyment of the Property. The deed restriction shall include a legal description of the entire parcel or parcels governed by this permit. The deed restriction shall also indicate that, in the event of an extinguishment or termination of the deed restriction for any

reason, the terms and conditions of this permit shall continue to restrict the use and enjoyment of the subject property so long as either this permit or the development it authorizes, or any part, modification, or amendment thereof, remains in existence on or with respect to the subject property.

III. FINDINGS AND DECLARATIONS:

The Commission hereby finds and declares:

1. Site Description

The subject site is an approximately 8-acre bluff top property located between the City of Trinidad and Patrick's Point State Park, about two miles north of the City. The property is located on the west side of Patrick's Point Drive, approximately 1,000 feet south of the intersection of Seawood Drive and Patrick's Point Drive, at 1948 Patrick's Point Drive (APN 517-261-02).

The subject site occupies a generally westward-sloping, forested, coastal bluff top. The coastline along the site is characterized by offshore rocks and narrow sand beaches backed by high rocky bluffs. The area on the property at the top of the bluff is part of an uplifted marine terrace. Slopes at the site are gentle on the bluff top (5-15%) to moderately steep (up to about 75%) on the bluff face. The site is currently undeveloped. A drainage gully is present along the southern property line.

The subject property is designated in the Humboldt County General Plan as Rural Residential, 2-acre minimum lot size, with overlay combining zones regarding archaeological resources, design review, and the protection of offshore rocks, and intertidal areas. The property is surrounded by Patrick's Point Drive to the east, residential parcels to the north and south, and the Pacific Ocean to the west. The surrounding residential development ranges from smaller older homes of modest stature to large, newer homes.

The subject property is densely vegetated with both native and non-native species. Native vegetation at the site is comprised of Grand fir, Douglas fir, cascara, red alder, salmonberry, elderberry, salal, sword fern, and red flowering currant. Non-native, exotic species include pampas grass, ivy, and scotch broom. No environmentally sensitive habitat areas have been identified at the site.

The property lies within an area designated as "Coastal Scenic" under the County's uncertified portion of the LCP. Views to the ocean through the property from most of Patrick's Point Drive are obscured by dense vegetation and mature trees.

2. Local Coastal Program Background

In October of 1982, the Commission certified in part the Trinidad Area Land Use Plan of Humboldt County's Local Coastal Program. However, the Commission denied certification of the plan for privately owned lands, other than lands owned by the Humboldt North Coast Land Trust, located west of Scenic Drive, Stagecoach Road, and Patrick's Point Drive (where they are the first public roads paralleling the sea), and along the route of the 6th Avenue Trail in the Westhaven area. In denying certification for this area, the Commission suggested that the plan's policies regarding the protection of the public's right of access where acquired through use (i.e. potential prescriptive rights) be modified to conform to the natural resource, hazard, and public access policies of the Coastal Act. The County did not accept the suggested modification and the geographic area became an "area of deferred certification" or ADC. Consequently, the authority for granting coastal development permits within the ADC is still retained by the Commission.

3. Project Description

The proposed project consists of the construction of a 30-foot-high, 2,600-square-foot single-family residence with a detached 800-square-foot garage, a 1,250-square-foot gravel driveway and parking area, an on-site septic system, and a 3,000-gallon water storage tank. The proposed residence would be located near the southeast corner of the subject property, approximately 75 feet north of the southern property line, 105 feet west of the centerline of Patricks Point Drive, and approximately 100 feet east of the bluff edge. The applicants have proposed craftsman style architecture with natural building materials and earthtone colors for the development. The development would be served by an on-site spring. Ten trees ranging in size from 12"-18" dbh are proposed to be removed from the building site. All vegetation within the bluff setback and adjacent to Patrick's Point Drive would remain undisturbed.

4. New Development

Coastal Act Section 30250 (a) states in part:

(a) New residential, commercial, or industrial development, except as otherwise provided in this division, shall be located within, contiguous with, or in close proximity to, existing developed areas able to accommodate it or, where such areas are not able to accommodate it, in other areas with adequate public services and where it will not have significant adverse effects, either individually or cumulatively, on coastal resources.

Section 30250(a) of the Coastal Act states that new development shall be located in 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 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 applicants are proposing that the residential development be served by an on-site spring and sewage disposal system. Test wells and soil evaluations have been conducted to evaluate the suitability of the site for a sewage septic system and to evaluate the suitability of the existing on-site spring for residential use. These studies indicate that the soils are adequate to accommodate on-site septic systems and that the spring produces sufficient volume to serve the proposed development.

According to production testing of the on-site spring conducted by Pacific Watershed Associates (PWA), the spring emerges from a fractured bedrock source that daylights close to the break-in-slope near the southern property line. According to dry season water production testing results prepared by PWA dated August 1, 2006, the spring produced an average captured flow of 0.95 gallons per minute, or 1,368 gallons per day. Currently, the minimum flow accepted by the Humboldt County Division of Environmental Health (DEH) is 0.28 gallons per minute, or 400 gallons per day, provided there is 1,500 gallons of storage capacity. A memo from DEH dated September 22, 2006 indicates that DEH has reviewed the spring production data prepared by PWA and has confirmed that the on-site spring meets the requirements of DEH and is adequate to serve the proposed residential development. (See Exhibit No. 5).

Additionally, PWA prepared an on-site sewage treatment evaluation involving percolation testing and subsurface investigations. In a memo from DEH dated November 7, 2006, DEH indicates that the applicant has completed soils testing in accordance with criteria set forth in the North Coast Regional Water Quality Control Board Basin Plan and has presented an on-site sewage disposal system design that meets DEH requirements for approval of the proposed residential development. (See Exhibit No. 6).

As discussed below, the proposed development has been conditioned to include mitigation measures, which will minimize all significant adverse environmental impacts. Therefore, the Commission finds that the proposed development is consistent with Section 30250(a) of the Coastal Act to the extent that the development will be located in an area able to accommodate it, as (1) the proposed single-family residence will be located in an area planned and zoned for rural residential development, (2) the applicant has submitted evidence that on-site water and sewage disposal systems will be adequate to serve the development; and (3) the project would not contribute to adverse cumulative impacts on geologic stability, water quality, scenic values, or other coastal resources.

5. Geologic Stability

Coastal Act Policies:

Section 30235 states:

Revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls, and other such construction that alters natural shoreline processes shall be permitted when required to serve

coastal-dependent uses or to protect existing structures or public beaches in danger from erosion and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply. Existing marine structures causing water stagnation contributing to pollution problems and fishkills should be phased out or upgraded where feasible.

Section 30253 states in applicable part:

New development shall:

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

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

The subject property encompasses an uplifted marine terrace situated approximately 200 feet above the ocean. The coastal bluffs are subject to bluff retreat, which poses a hazard to development of the subject parcel.

In previous actions on coastal development permits, the Commission has interpreted Section 30253 of the Coastal Act to require that coastal development be sited a sufficient distance landward of coastal bluffs that it will neither be endangered by erosion nor lead to the construction of protective coastal armoring during the assumed economic life of the development. The Commission has generally assumed the economic life of a new house to be 75 to 100 years. A setback adequate to protect development over the economic life of a development must account both for the expected bluff retreat during that time period and the existing slope stability. Long-term bluff retreat is measured by examining historic data including vertical aerial photographs and any surveys conducted that identified the bluff edge. Slope stability is a measure of the resistance of a slope to land sliding, and is assessed by a quantitative slope stability analysis. In such an analysis, the forces resisting a potential landslide are first determined. These are essentially the strength of the rocks or soils making up the bluff. Next, the forces driving a potential landslide are determined. These forces are the weight of the rocks as projected along a potential slide surface. The resisting forces are divided by the driving forces to determine the "factor of safety." The process involves determining a setback from the bluff edge where a factor of safety of 1.5 is achieved. The quantitative slope stability analysis needs to be prepared by a licensed geotechnical professional familiar with the process.

The applicants commissioned SHN Consulting Engineers & Geologists, Inc. to perform a geotechnical investigation of the site (SHN). The site investigation is documented in the

geotechnical report entitled, "Geologic Hazard Evaluation Focusing on Bluff Stability, APN 517-261-02, 1948 Patrick's Point Drive, Trinidad, California." Excerpts of the report are included in Exhibit No. 7. The scope of the geotechnical investigation included a review of pertinent maps and literature, field reconnaissance of the site, development of a profile of the bluff face at the site, quantitative analysis of slope stability, and interpretation of regional historic bluff retreat rates.

The report indicates that the project site is located at the seaward edge of a gently southward-sloping, late Pleistocene marine terrace surface. The terrace surface is wider to the south of the subject parcel, and narrows toward the northern end. The terrace is not present to the north of the lot, presumably having been removed by past erosion and mass wasting. Buildable portions of the parcel are on the terrace surface, which is vegetated with conifer trees and relatively dense ground cover. A drainage swale is present at the southern property line. The swale receives natural drainage, as well as runoff from culverts delivering runoff from the nearby residential subdivision east of Patrick's Point Drive. The ditch ends at the bluff crest along the southern property line, where it discharges to a naturally occurring, 2 to 3-foot-deep gully that has formed just below a spring.

The project site is not located within an Alquist-Priolo Earthquake Fault Zone per the State's criteria. The nearest known active fault to the site is the Trinidad fault, one of the faults making up the Mad River Fault zone. Published mapping suggests that the mapped trace of the Trinidad fault projects offshore west of the site, an estimated 3,000-4,000 feet away.

The bluff face along the coast below the terrace surface is a dynamic geomorphic feature subject to periodic mass wasting and retreat. The bluff face is an irregular slope with gradients between about 50% to 70%. The conifer forest, present on the terrace surface, is absent from the bluff face, which implies it is not sufficiently stable to support trees. The bluff face is heavily vegetated with brush and low shrubs.

The applicants' geologist conducted reconnaissance of the bluff face by making short transects across the slope directly below the lot and along the northern and southern edges of the property. In general, the bluff face at the subject parcel is a broad amphitheater forming above a small cove between two minor spur ridges that extend to the beach. An abundance of sandstone exposures in the bluff face suggest slope mechanics at the site are controlled by the presence of rock in the slope. According to the geologic report and aerial photographs, the amphitheater appears to represent a landslide-related landform most likely formed through repeated shallow-to-moderate-depth slides and slumps focused on the cove between the two resistant spur ridges.

The geologic report further indicates that there is only minor evidence of recent land sliding along the bluff crest across the parcel at the outboard edge of the terrace surface where small, 1-foot potential scarps were observed at the bluff crest near the northern end of the lot. Subtle steps in the terrace surface near the southern end of the lot are

indeterminate geomorphic features that may represent erosion of terrace cover sediments leading to the drainage gully or scarps associated with incipient mass wasting. There is active earthflow deformation at the toe of the bluff face where support is periodically undermined by ocean wave erosion. The beach below the bluff is a narrow rocky strip with no significant beach sand accumulation. The surf zone below the site is very rocky, and numerous large rock blocks appear to dissipate much of the wave energy before it strikes the narrow beach and the base of the bluff.

In its evaluation of the site, SHN reviewed a historical account of bluff retreat (Tuttle, 1981), which was based on review of aerial photographs dating back to 1942. Coastline transects were developed to determine the amount of coastal retreat. Several transects were developed along Patrick's Point Drive between Scotty Point and White Rock, including transects within a few hundred feet on either side of the subject lot. These transects do not indicate any bluff retreat between 1942 and 1974. Comparison of these transects with current coastal conditions at the site indicate an absence of retreat between 1974 and the present. As such, SHN concluded that the coastal bluff at the site has been stable at its current location for at least 63 years.

The geologic report concludes that the bluff face is a potentially unstable geologic feature; a moderately steep slope composed of moderate to low strength materials that are subject to erosion by ocean waves. The most significant geologic hazard to the proposed building area is bluff top retreat due to slope failures on the bluff face. Debris sliding and rotational slumping appear to be the most common slope failure process in the site vicinity. Earthflows are less common, although they were observed locally near the bluff toe.

SHN previously completed a qualitative bluff setback evaluation for this property in July 2005. Based on site conditions, that evaluation concluded that a 70-foot setback was reasonable for the site. The computer modeling conducted for the current applicants resulted in a setback on the order of 35 feet. Including a buffer to account for the uncertainty in the modeling and historic retreat rate analyses (about 10 feet), the suggested protocol indicates a total setback of about 45 feet. However, SHN concludes that based on their experience and the past failure of a portion of the bluff to the north, the 70-foot setback as derived in their original report shall still be applied at the site.

SHN further recommends that site development be designed to minimize topographic impacts and to uniformly dissipate runoff. Actively eroding areas and areas disturbed during construction or site grading should be revegetated prior to the beginning of the rainy season. SHN also recommends that all drainage be routed toward the existing drainage swale located along the southern property line and that the access driveway be surfaced with gravel as proposed.

Coastal Commission staff geologist, Dr. Mark Johnsson, has visited the site, reviewed the SHN report, and conferred with the applicants' geologist. Dr. Johnsson has indicated that he believes that the recommended setbacks are reasonable based on the analysis that was

prepared and concurs that the applicants' geologist's recommended setback is appropriate.

To ensure that the proposed residence is developed consistent with the recommended bluff setback as proposed, the Commission attaches Special Condition No. 1, which requires that the final construction plans for the residence adhere to the design recommendations specified in the geotechnical report, and that development is constructed consistent with these recommendations. The condition requires all final design and construction plans for the development be consistent with the recommendations contained in the geotechnical report dated May 2006 prepared by SHN Consulting Engineers and Geologists, Inc.

Notwithstanding the relative degree of insulation of the proposed project improvements in their proposed locations from geologic hazards, the applicants are proposing to construct development that would be located on a high uplifted marine terrace bluff top that is actively eroding. Consequently, the development would be located in an area of high geologic hazard. However, new development can only be found consistent with Sections 30235 and 30253 of the Coastal Act if the risks to life and property from the geologic hazards are minimized and if a protective device will not be needed in the future. The applicants have submitted information from a registered engineering geologist which states that if new development is set back at least 70 feet from the bluff edge, the development will be safe from erosion and will not require any devices to protect the development during its useful economic life.

Although a comprehensive geotechnical evaluation is a necessary and useful tool that the Commission relies on to determine if proposed development is permissible at all on any given bluff top 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 bluff top 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 bluff top 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 a new house on a vacant bluff top 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 Arnold project at 3820 Vista Blanca in San Clemente (Orange County). Coastal development permit (Permit # 5-88-177) for a bluff top 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 bluff top setback. An emergency coastal development permit (Permit #5-93-254-G) was later issued to authorize bluff top protective works.

The Commission emphasizes 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.

The SHN geologic report states that their conclusions and recommendations presented in the report are professional opinions derived in accordance with current standards of professional practice. The report includes further limitations stating, “...*Because the coastal region of Humboldt County is one of dynamic geologic processes, future geologic hazards may not be accurately portrayed by existing conditions. Therefore, risks from geologic hazards cannot be precisely determined when developing this site.*” This language in the report itself is indicative of the underlying uncertainties of this and any geotechnical evaluation and supports the notion that no guarantees can be made regarding the safety of the proposed development with respect to bluff retreat.

Geologic hazards are episodic, and bluffs that may seem stable now may not be so in the future. Therefore, the Commission finds that the subject lot is an inherently hazardous piece of property, that the bluffs are clearly eroding, and that the proposed new development will be subject to geologic hazard and could potentially someday require a bluff or shoreline protective device, inconsistent with Section 30235 of the Coastal Act. The Commission finds that the proposed development could not be approved as being consistent with Section 30235 of the Coastal Act if projected bluff retreat would affect the proposed development and necessitate construction of a seawall to protect it.

Based upon the geologic report prepared by the applicants’ geologist and the evaluation of the project by the Commission’s staff geologist, the Commission finds that the risks of

geologic hazard are minimized if development is set back at least 70 feet from the bluff edge. However, given that the risk cannot be eliminated and the geologic report cannot assure that shoreline protection will never be needed to protect the residence, the Commission finds that the proposed development is consistent with the Coastal Act only if it is conditioned to provide that shoreline protection will not be constructed. Thus, the Commission further finds that due to the inherently hazardous nature of this lot, the fact that no geology report can conclude with any degree of certainty that a geologic hazard does not exist, the fact that the approved development and its maintenance may cause future problems that were not anticipated, and because new development shall not engender the need for shoreline protective devices, it is necessary to attach Special Condition No. 2 to ensure that no future shoreline protective device will be constructed.

Special Condition No. 2 prohibits the construction of shoreline protective devices on the parcel, requires that the landowner provide a geotechnical investigation and remove the proposed improvements associated with the residential development if bluff retreat reaches the point where this development is threatened, and requires that the landowners accept sole responsibility for the removal of any structural debris resulting from landslides, slope failures, or erosion of the site. These requirements are necessary for compliance with Coastal Act Section 30253, 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 Coastal Act Section 30253 of the Coastal Act if projected bluff retreat would affect the proposed development and necessitate construction of a seawall to protect it.

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, Special Condition No. 2 also 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 residential improvements should the bluff retreat reach the point where a government agency has ordered that these facilities not be used.

Special Condition No. 3 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 applicants must assume the risks. In this way, the applicants are notified that the Commission is not liable for damage as a result of approving the permit

for development. The condition also requires the applicants 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, Special Condition No. 7 requires the applicants to record a deed restriction to impose the special conditions of the permit as covenants, conditions and restrictions on the use and enjoyment of the property. This special condition is required, in part, to ensure that the development is consistent with the Coastal Act and to 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 protective device could be constructed to protect the approved development and will ensure that future owners of the property will be informed of 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 Coastal Act regarding geologic hazards, including Coastal Act Sections 30235 and 30253, since the development as conditioned (1) will not contribute significantly to the creation of any geologic hazards, (2) will not have adverse impacts on the stability of the coastal bluff or on erosion, and (3) will not require the construction of shoreline protective works. Only as conditioned is the proposed development consistent with the Coastal Act.

6. Visual Resource Protection

Section 30251 of the Coastal Act states that the scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance, and requires in applicable part that permitted development 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 restore and enhance where feasible the quality of visually degraded areas, and to be visually compatible with the character of surrounding areas.

The subject property is located on a bluff top site overlooking the Pacific Ocean. Some limited blue water views are afforded through the property from Patrick's Point Drive, but for the most part, views to or along the ocean are obstructed by the dense forest vegetation on the property. The site is not visible from Patrick's Point State Park located approximately 1-1/2 miles north of the site, or from any other public vantage points other than from the open ocean. Views to the ocean through the property from most of Patrick's Point Drive are obscured by dense vegetation and mature trees.

The property lies within an area designated as "Coastal Scenic" under the County's uncertified portion of the LCP and within an area designed with the Design Review (D) combining zone. As required by the County design review provisions, the applicants obtained a special permit from the County (SP-05-112) for the proposed development.

The proposed project includes the construction of a 30-foot-high, 2,600-square-foot single-family residence with a detached 800-square-foot garage, a 1,250-square-foot gravel driveway and parking area, an on-site spring and septic system, and a 3,000-gallon water storage tank. Ten trees ranging in size from 12"-18" dbh would be removed from the building site.

The proposed residence would be sited on the most level portion of the parcel and only minimal grading would be required, thereby eliminating the need for any significant landform alteration. The residence is sited approximately 100 feet west of Patrick's Point Drive and slightly down slope from the road where it would be only minimally visible from the road through the intervening vegetation.

The applicants have proposed craftsman style architecture with natural building materials and earthtone colors for the development. The residence and garage are proposed to be sided with western red cedar rough sawn shakes with a weathered finish and green trim. The roof is proposed to be composed of composition shingles with a sea foam green hue. The proposed colors and materials would blend with the dark green and brown tones of the densely vegetated parcel. In addition, the County approved a special permit for design review for the proposed development, finding that the development would be visually compatible with the character of the surrounding area.

The Commission finds that if the applicant or future owner(s) choose to change the materials or colors of the residence to brighter, non-earth tone colors or materials, the development may no longer be visually compatible with the character of the surrounding area and may become increasingly visible from public vantage points. To ensure that the exterior building materials and colors used in the construction of the development as proposed are compatible with natural-appearing earth tone colors that blend with their surroundings as proposed, the Commission attaches Special Condition No. 4(A), which requires that all exterior siding and visible exterior components be made of natural-appearing materials of dark earth tone colors only. Additionally, Special Condition No. 4(B) requires that non-reflective building materials be used in the construction of the proposed residence to minimize glare and requires that exterior lights be shielded and positioned in a manner that will not allow glare beyond the limits of the parcel. As conditioned, the project is consistent with Coastal Act Section 30251 requiring new development to be visually compatible with the character of surrounding areas.

In addition, Special Condition No. 7 requires that the applicants record a deed restriction detailing the specific development authorized under the permit, identifying all applicable special conditions attached to the permit, and providing notice to future owners of the terms and limitations placed on the use of the property, including the restrictions on colors, use of non-reflective materials, and lighting. The condition will ensure that any future buyers of the property are made aware of the development restrictions on the site because the deed restriction will run with the land in perpetuity.

Therefore, the Commission finds that the proposed development, as conditioned, is consistent with Section 30251 of the Coastal Act, as the project has been sited and designed to minimize visual impacts of the proposed development, will not result in significant landform alteration, and will be visually compatible with the character of the surrounding area.

7. Protection of Water Quality

Coastal Act Policy

Section 30231 of the Coastal Act states as follows:

The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

Discussion

Storm water runoff from new residential development can adversely affect the biological productivity of coastal waters by degrading water quality. Recognizing this potential impact, Section 30231 requires the protection of coastal waters to ensure that biological productivity is maintained and to protect public health and water quality. New development must not adversely affect these values and should help to restore them when possible.

The subject parcel includes intertidal areas, coastal bluffs and gently sloping portions of an uplifted coastal terrace planned and zoned for low-density rural residential development. As the parcel proposed for residential development does not currently contain any developed impervious surfaces, the majority of stormwater at the site infiltrates prior to leaving the site as surface runoff. However, the increase in impervious surface area from the proposed development would decrease the infiltrative function and capacity of the existing permeable land on site. The reduction of permeable surface area would lead to an increase in the volume and velocity of stormwater runoff that can be expected to leave the site.

As discussed above, the subject parcel is located on a coastal terrace that slopes gently to the south. Therefore, runoff originating from the development site generally drains toward the existing drainage swale on the southern edge of the property. The swale receives natural drainage, as well as runoff from culverts delivering runoff from the

nearby residential subdivision east of Patrick's Point Drive. The drainage swale ends at the bluff crest along the southern property line, where it discharges to a naturally occurring, 2 to 3-foot-deep gully that has formed just below the on-site spring. Sediment and other pollutants entrained in runoff from the development that reaches the drainage swale and the ocean would contribute to degradation of the quality of marine waters and any intervening sensitive habitat. Other than removing ten trees from within the building site, the applicants propose to leave the majority of the site in its natural, vegetated condition which would continue to allow for infiltration of site runoff, thereby greatly reducing the potential that runoff from the completed development would affect ocean waters. The ground under the forested area is thick with leaf litter and forest-debris mulch. This thick layer of forest duff and the understory and ground cover vegetation would act as an infiltration system, trapping water that runs off from impervious surfaces of the completed development before it leaves the property.

Therefore, sedimentation impacts from runoff would be of greatest concern during construction. Construction of the proposed development would expose soil to erosion and entrainment in runoff, particularly during the rainy season. To ensure that best management practices (BMPs) are implemented to control the erosion of exposed soils and minimize sedimentation of coastal waters during construction, the Commission attaches Special Condition No. 5. This condition requires the implementation of Best Management Practices (BMPs) to control erosion and sedimentation during and following construction. These required BMPs include (a) disposing of any excess excavated material resulting from construction activities at a disposal site outside the coastal zone or within the coastal zone pursuant to a valid coastal development permit; (b) installing straw bales, coir rolls, or silt fencing structures to contain runoff from construction areas from entering the drainage swale located along the southern edge of the property; (c) maintaining on-site vegetation to the maximum extent possible during construction activities; (d) replanting any disturbed areas with native vegetation following project completion; and (e) covering and containing all on-site stockpiles of construction debris at all times to prevent polluted water runoff.

The Commission thus finds that as conditioned, the proposed development is consistent with Section 30231 of the Coastal Act because existing water quality and biological productivity will be protected and maintained from impairing waste discharges.

8. Archaeological and Cultural Resources

Coastal Act Section 30244 provides protection of archaeological and paleontological resources and requires reasonable mitigation where development would adversely impact such resources.

Although the subject property is located in an uncertified area, the site is designated with an Archaeological Resources combining zone, noting the potential presence of sensitive cultural resources at the site. The Yuroks, a Native American tribe, are known to have settled along the Humboldt County coast within the general vicinity of the subject

property. The Yurok tribe had settlements extending north from Little River State Beach several miles to the south of the project site, to areas within Del Norte County, including over 50 named villages clustered along the Klamath River and coastal lagoons and creeks, including 17 villages on the coast.

No known archaeological resources have been discovered at the site and ground disturbing activities of the proposed development would be limited to shallow grading work in limited areas for residential and driveway construction. Thus, the potential for the development to adversely affect archaeological or paleontological resources is very low. However, as Yurok settlements are known to exist in the general area, there is a potential for adverse impacts to coastal resources.

Therefore, to ensure protection of any cultural resources that may be discovered at the site during construction of the proposed project, the Commission attaches Special Condition No. 6, which requires that if an area of cultural deposits is discovered during the course of the project, all construction must cease and a qualified cultural resource specialist must analyze the significance of the find. To recommence construction following discovery of cultural deposits the applicant is required to submit a supplementary archaeological plan for the review and approval of the Executive Director to determine whether the changes are de minimis in nature and scope, or whether an amendment to this permit is required.

Therefore, the Commission finds that the proposed project, as conditioned, is consistent with Section Coastal Act Section 30244, as the development will not adversely impact archaeological resources.

9. California Environmental Quality Act (CEQA)

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

The Commission incorporates its findings on conformity with Coastal Act policies at this point as if set forth in full. These findings address and respond to all public comments regarding potential significant adverse environmental effects of the project that were received prior to preparation of the staff report. As discussed herein, in the findings addressing the consistency of the proposed project with the Coastal Act, the proposed project has been conditioned to be found consistent with the Coastal Act. Mitigation measures which will minimize all adverse environmental impacts have been made requirements of project approval. 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.

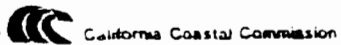
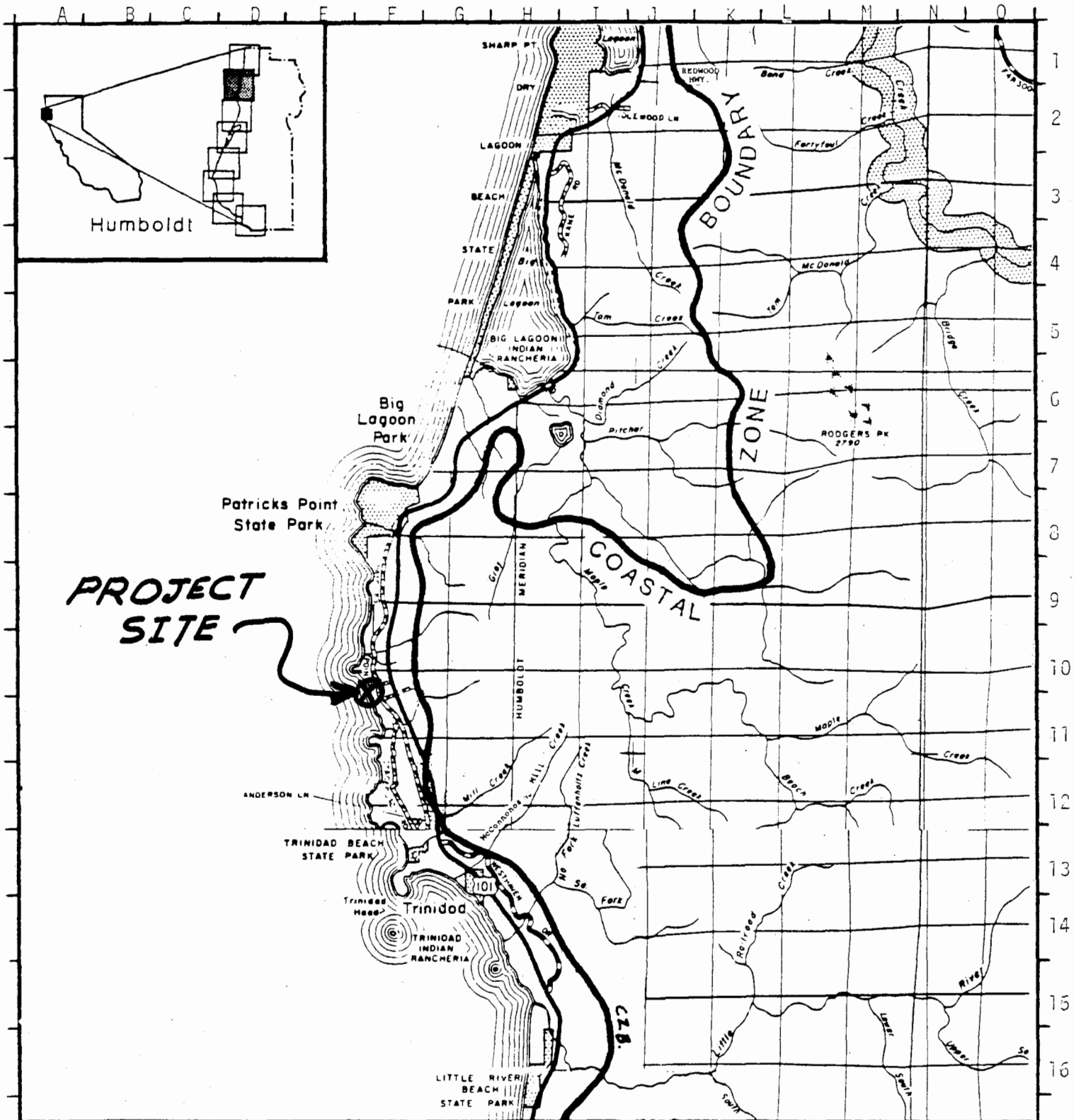
EXHIBITS:

1. Regional Location Map
2. Vicinity Map
3. Proposed Site Plan
4. Proposed Elevations
5. DEH spring approval
6. DEH septic system approval
7. Geologic Report (excerpts)

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.



LOC

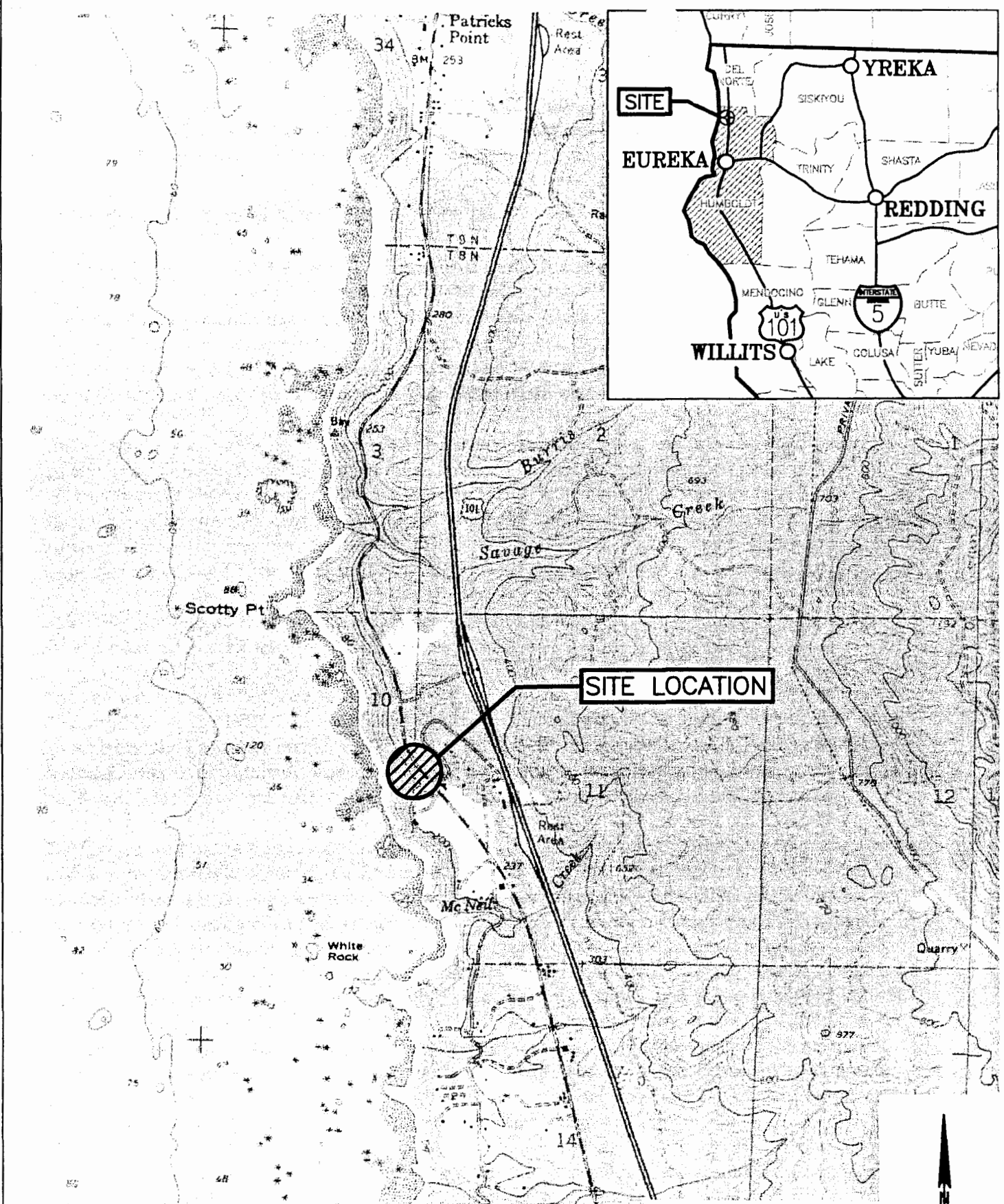
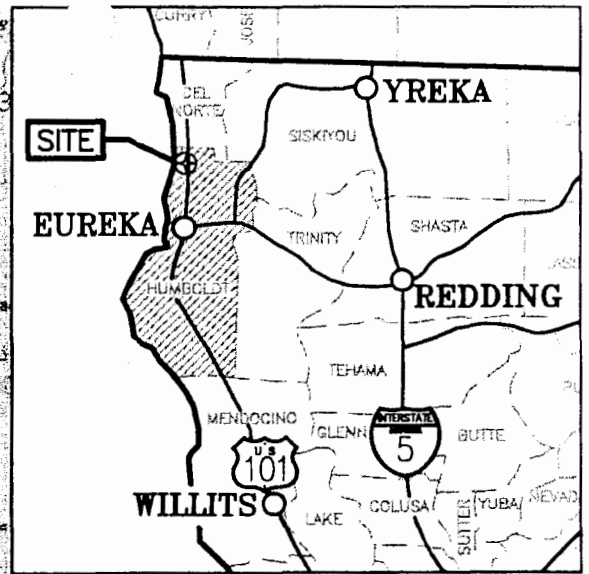
County of Humboldt

EXHIBIT NO. 1
APPLICATION NO.
1-06-012

ROTTER / GAVIN
REGIONAL LOCATION



Sheet 2 of 8




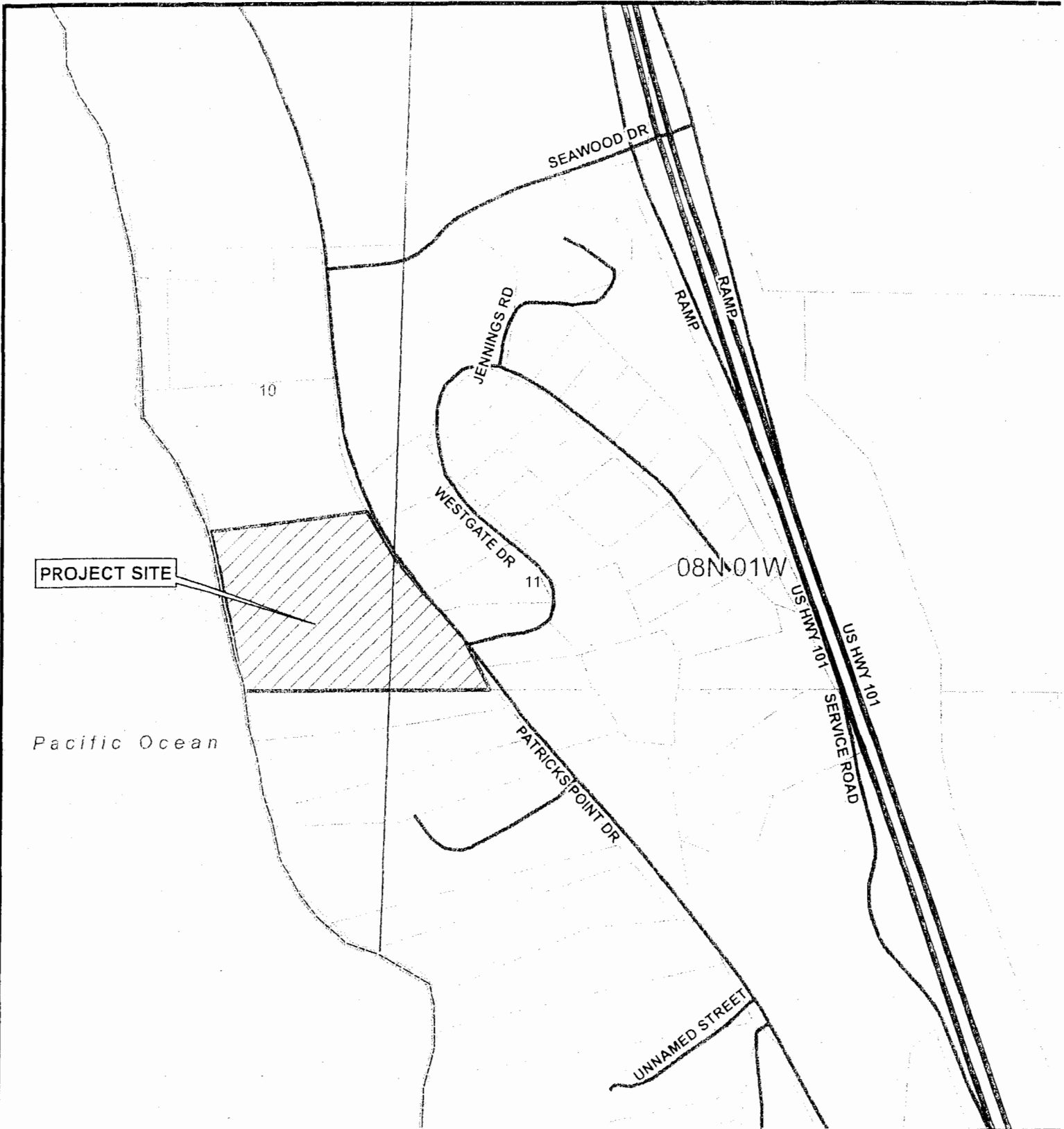
SOURCE: TRINIDAD AND CRANNELL
 USGS 7.5 MINUTE
 QUADRANGLES



John Rotter and Jen Gavin
 1948 Patrick's Point Drive
 Trinidad, California
 May, 2006 006050-LOCA

EXHIBIT NO. 2
 APPLICATION NO.
 1-06-012
 ROTTER / GAVIN
 VICINITY MAP (1 of 2)


 =2000'±
 ure 1

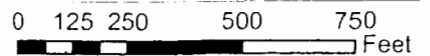


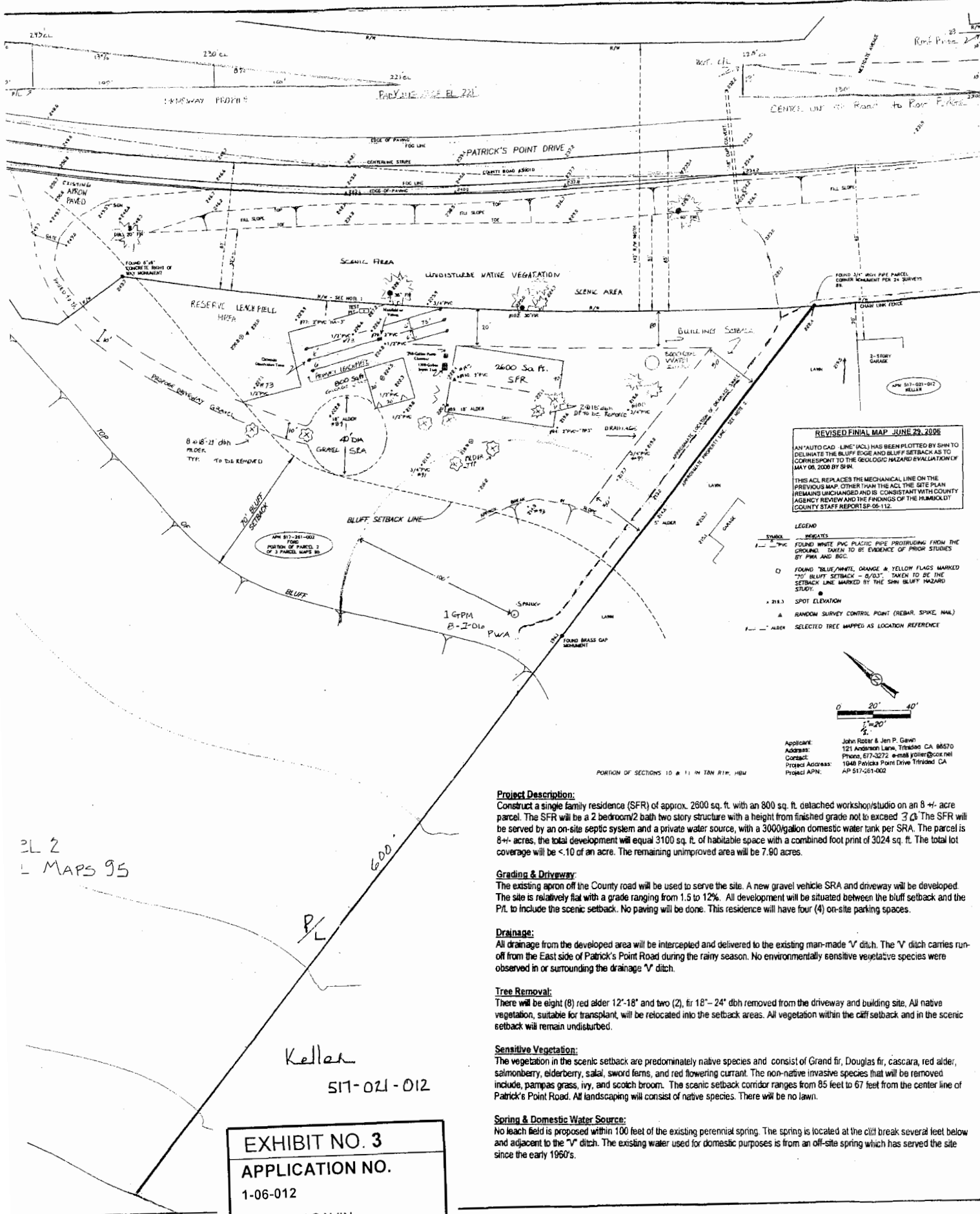
Legend

Project Site = 

LOCATION MAP

202
 APN: 517-261-02
 T8N R1W S10 & 11



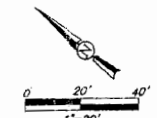


REVISED FINAL MAP JUNE 29, 2008

AN "AUTO CAD LINE" HAS BEEN PLOTTED BY SHN TO DELINEATE THE BLUFF EDGE AND BLUFF SETBACK AS TO CORRESPOND TO THE GEOLOGIC HAZARD EVALUATION OF MAY 08, 2008 BY SHN.

THIS ACL REPLACES THE MECHANICAL LINE ON THE PREVIOUS MAP. OTHER THAN THE ACL THE SITE PLAN REMAINS UNCHANGED AND IS CONSISTENT WITH COUNTY AGENCY REVIEW AND THE FINDINGS OF THE HUMBOLDT COUNTY STAFF REPORT SP-06-112.

- LEGEND**
- PWA INDICATES FOUND WHITE PVC PLASTIC PIPE PROTRUDING FROM THE GROUND TAKEN TO BE EVIDENCE OF PRIOR STUDIES BY PWA AND BGC.
 - FOUND BLUE/WHITE, ORANGE & YELLOW FLAGS MARKED "70" BLUFF SETBACK - 8/03" TAKEN TO BE THE SETBACK LINE MARKED BY THE SHN BLUFF HAZARD STUDY.
 - 21.3 SPOT ELEVATION
 - ▲ RANDOM SURVEY CONTROL POINT (REBAR, SPIKE, NAIL)
 - ALDER SELECTED TREE MAPPED AS LOCATION REFERENCE



Applicant: John Rotter & Jen P. Gavin
 Address: 121 Anderson Lane, Tridand, CA 96570
 Contact: Phone: 517-3272 e-mail: jrotter@cox.net
 Project Address: 1048 Pavlicks Point Drive Trinidad, CA
 Project APN: AP 517-021-002

Project Description:
 Construct a single family residence (SFR) of approx. 2600 sq. ft. with an 800 sq. ft. detached workshop/studio on an 8 +/- acre parcel. The SFR will be a 2 bedroom/2 bath two story structure with a height from finished grade not to exceed 3'. The SFR will be served by an on-site septic system and a private water source, with a 3000 gallon domestic water tank per SRA. The parcel is 8 +/- acres, the total development will equal 3100 sq. ft. of habitable space with a combined foot print of 3024 sq. ft. The total lot coverage will be <.10 of an acre. The remaining unimproved area will be 7.90 acres.

Grading & Driveway:
 The existing apron off the County road will be used to serve the site. A new gravel vehicle SRA and driveway will be developed. The site is relatively flat with a grade ranging from 1.5 to 12%. All development will be situated between the bluff setback and the P/L to include the scenic setback. No paving will be done. This residence will have four (4) on-site parking spaces.

Drainage:
 All drainage from the developed area will be intercepted and delivered to the existing man-made "V" ditch. The "V" ditch carries runoff from the East side of Patrick's Point Road during the rainy season. No environmentally sensitive vegetative species were observed in or surrounding the drainage "V" ditch.

Tree Removal:
 There will be eight (8) red alder 12'-18" and two (2), fir 18"-24" dbh removed from the driveway and building site. All native vegetation, suitable for transplant, will be relocated into the setback areas. All vegetation within the cliff setback and in the scenic setback will remain undisturbed.

Sensitive Vegetation:
 The vegetation in the scenic setback are predominately native species and consist of Grand fir, Douglas fir, cascara, red alder, salmonberry, elderberry, salal, sword ferns, and red flowering currant. The non-native invasive species that will be removed include, pampas grass, ivy, and scotch broom. The scenic setback corridor ranges from 85 feet to 67 feet from the center line of Patrick's Point Road. All landscaping will consist of native species. There will be no lawn.

Spring & Domestic Water Source:
 No leach field is proposed within 100 feet of the existing perennial spring. The spring is located at the cliff break several feet below and adjacent to the "V" ditch. The existing water used for domestic purposes is from an off-site spring which has served the site since the early 1960's.

2L 2
L MAPS 95

EXHIBIT NO. 3
APPLICATION NO.
 1-06-012
 ROTTER / GAVIN
 PROPOSED SITE PLAN

Keller
517-021-012

SHN CONSULTING ENGINEERS & GEOLGISTS, INC.
 10300 HWY 99, SUITE 100, TRINIDAD, CA 94570
 (530) 833-1111
 GARY AND APRIL FORD
 PATRICK'S POINT DRIVE
 TRINIDAD, CALIFORNIA
 SITE MAP
 SHEET 1 OF 1
 DATE 6/08
 PROJ. NO. 006050

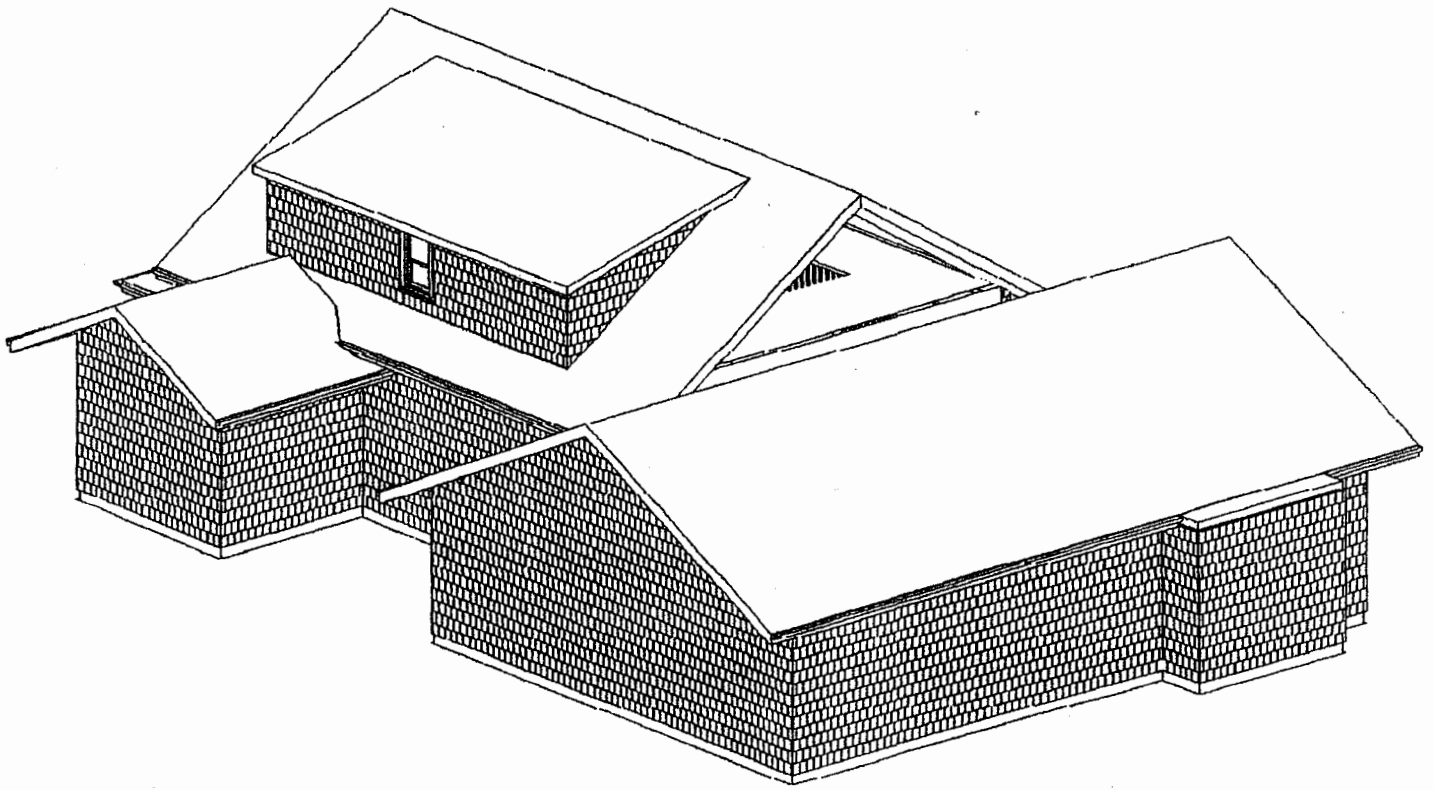
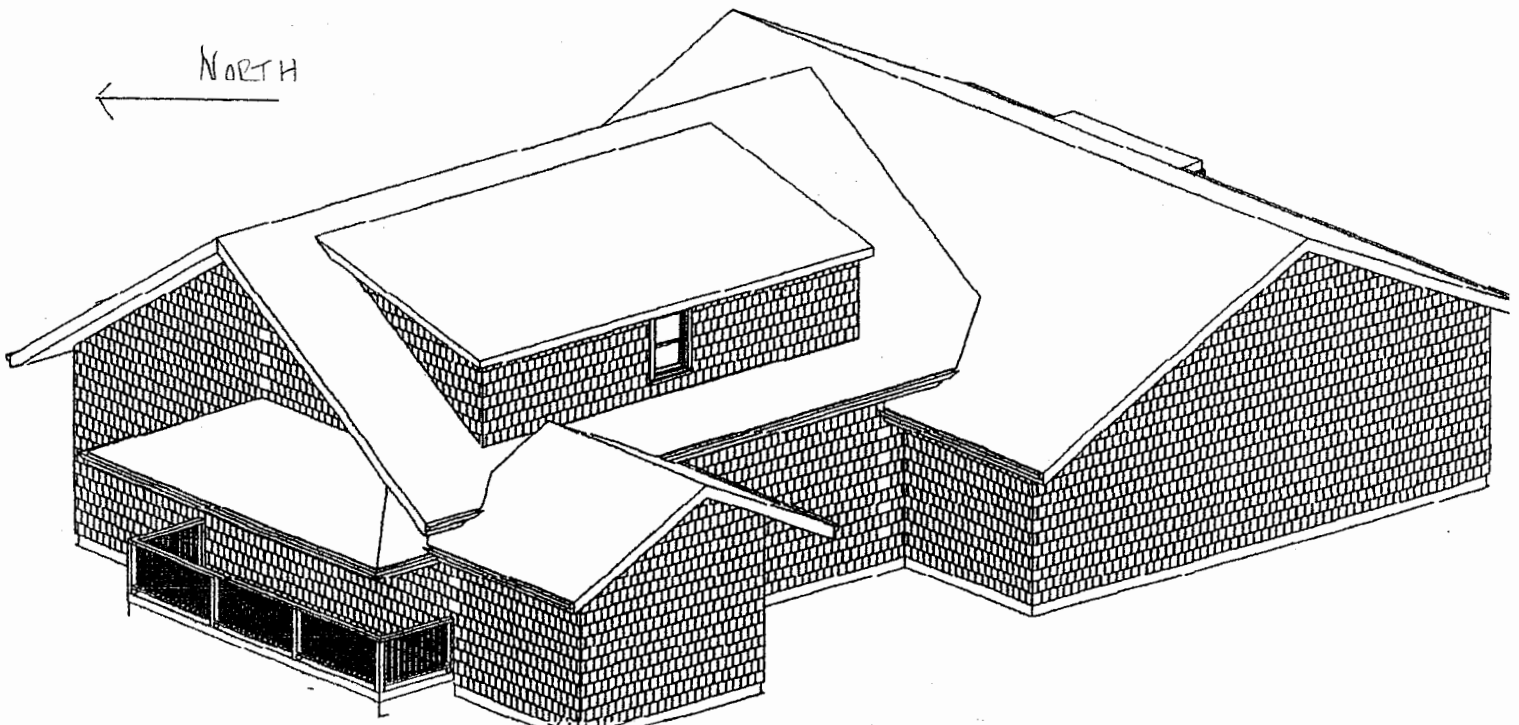
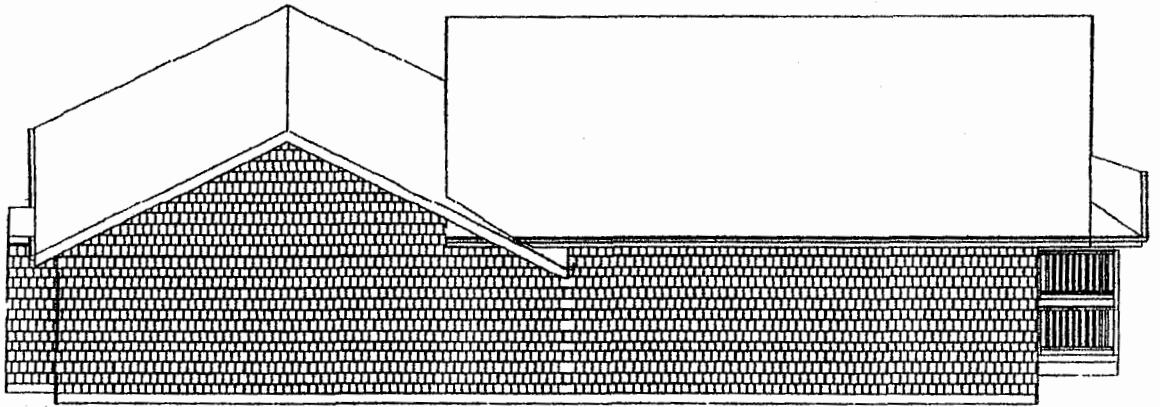


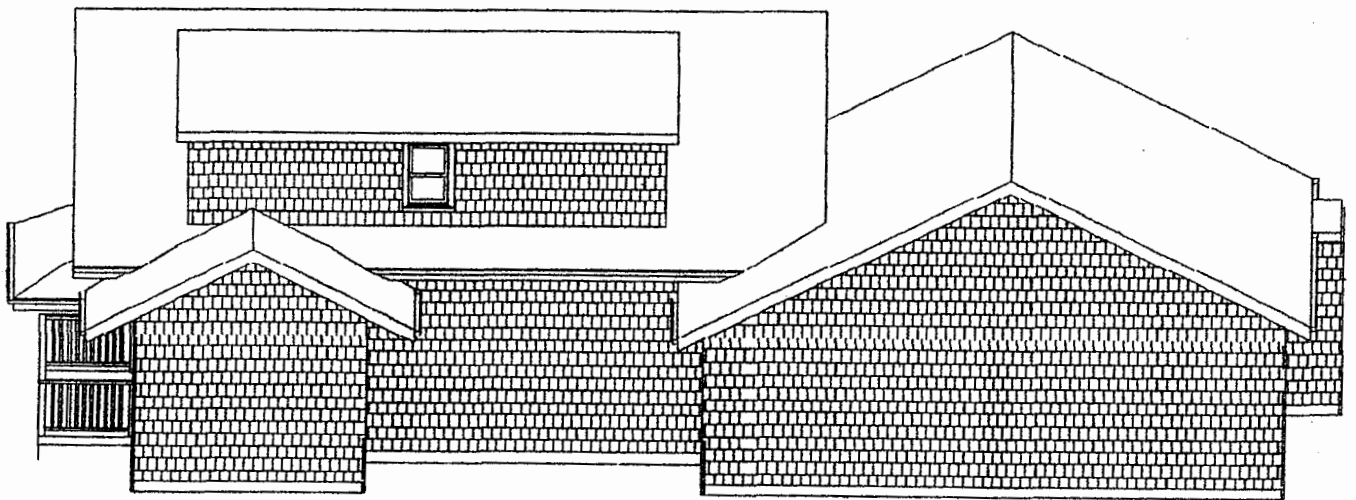
EXHIBIT NO. 4
APPLICATION NO.
1-06-012
ROTTER / GAVIN
PROPOSED ELEVATIONS
(1 of 2)





NORTH EAST

2600 SQ Feet



SOUTH WEST

2012



Humboldt County Department of Health and Human Services
DIVISION OF ENVIRONMENTAL HEALTH

100 H Street - Suite 100 - Eureka, CA 95501
Voice: 707-445-6215 - Fax: 707-441-5699 - Toll Free: 800-963-9241
envhealth@co.humboldt.ca.us

Memorandum

RECEIVED

AUG 21 2006

CALIFORNIA
COASTAL COMMISSION

To: Tiffany Tauber, Coastal Planner
From: David Spinosa, Senior Environmental Health Specialist
Date: August 14, 2006
Subject: Rotter Special Permit SP-05-112 & Calif. Coastal Comm. Coastal Development Permit; A.P. # 517-261-002

The applicant has submitted "Dry-Weather" water supply testing completed by Pacific Watershed Associates (August 1, 2006) meeting minimum requirements for Division of Environmental Health approval of the proposed single family residence under the aforementioned permits.

EXHIBIT NO. 5
APPLICATION NO.
1-06-012
ROTTER / GAVIN
DEH WATER APPROVAL



Humboldt County Department of Health and Human Services
DIVISION OF ENVIRONMENTAL HEALTH

100 H Street - Suite 100 - Eureka, CA 95501
Voice: 707-445-6215 - Fax: 707-441-5699 - Toll Free: 800-963-9241
envhealth@co.humboldt.ca.us

RECEIVED

NOV 07 2006

CALIFORNIA
COASTAL COMMISSION

Memorandum

To: Tiffany Tauber, Coastal Planner, North Coast District
CC: County of Humboldt Planning Division
From: David Spinosa, ^{DS} Senior Environmental Health Specialist
Date: November 7, 2006
Subject: Rotter Calif. Coastal Commission-Coastal Development Permit-
A.P.# 517-261-002 **Onsite Sewage Disposal**

The applicant has completed soils testing in accordance with criteria set forth in the North Coast Regional Water Quality Control Board Basin Plan and has presented an onsite sewage disposal system design meeting Division of Environmental Health requirements for approval of single family residence construction on the aforementioned parcel.

EXHIBIT NO. 6
APPLICATION NO.
1-06-012
ROTTER / GAVIN
DEH SEPTIC APPROVAL

Reference: 006050

Geologic Hazard Evaluation Focusing on Bluff Stability

APN 517-261-02
1948 Patrick's Point Drive
Trinidad, California

Prepared for:

John Rotter and Jenna Gavin
121 Anderson Lane
Trinidad, CA 95570

Prepared by:



Consulting Engineers & Geologists, Inc.
812 W. Wabash Ave.
Eureka, CA 95501-2138
707-441-8855

May 2006

QA/QC: _____

EXHIBIT NO. 7
APPLICATION NO. 1-06-012
ROTTER / GAVIN
GEOLOGIC REPORT (EXCERPTS) (1 of 11)

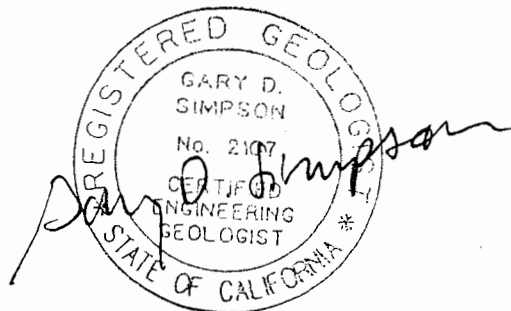


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Abbreviations and Acronyms

APN	Assessors' Parcel Number
ASCE	American Society of Civil Engineers
BGC	Busch Geotechnical Consultants
NR	No Reference
PWA	Pacific Watershed Associates
SHN	SHN Consulting Engineers & Geologists, Inc.
USGS	U.S. Geological Survey

2011

Introduction

This report presents the results of a focused geologic evaluation of a parcel on Patrick's Point Drive in Trinidad, California, conducted by SHN Consulting Engineers & Geologists, Inc. (SHN). It is our understanding that you are in the process of purchasing this parcel (Assessor's Parcel Number [APN] 517-261-02) (Figure 1), with the intention of building a single-family residence. The parcel is located about 2 miles north of Trinidad, along the border between Sections 10 and 11, T. 8 N., R. 1 W., of the Trinidad 7.5-foot U.S. Geological Survey (USGS) quadrangle.

The purpose of this study is to identify the buildable portions of the parcel that are associated with sufficiently low geologic hazards to allow residential development, including a leachfield system. This investigation was conducted in response to a written request from California Coastal Commission staff (Johnsson, 2006) for supplemental information regarding a qualitatively derived bluff setback previously recommended by SHN (SHN, 2005). This is a focused investigation, and specifically does not include geotechnical information regarding soils engineering or erosion and drainage issues. Additional geotechnical work will be required to obtain a County building permit, but that work would be premature at this time, and is not included herein. Our work scope for this investigation included review of pertinent maps and literature, field reconnaissance of the site, development of a profile of the bluff face at the site, quantitative analysis of slope stability (computer modeling), interpretation of regional historic bluff retreat rates, and preparation of this report. Site plans are being prepared. Available plans of the parcel do not include an accurate representation of the bluff location, and are not included herein. ✓

The principal geologic hazard at the site is associated with coastal bluff retreat. Our work scope included review of a previous geotechnical report for the site (Busch Geotechnical Consultants [BGC], 1987), interpretation of aerial photographs, review of pertinent geologic literature and maps, and preparation of this report. We understand that a leachfield feasibility study was recently completed by Pacific Watershed Associates (PWA), but we have not reviewed that work. In addition, we have not conducted subsurface investigations of the site. Test pits were excavated by both BGC and PWA during their evaluation of leachfield feasibility and soils engineering conditions, and some of those logs have been reviewed.

In this report, suitable building sites are those areas subject to sufficiently low slope failure hazard to allow development of a residential structure and a standard leachfield system for on-site sewage disposal that will neither contribute or be subject to substantial geologic instability during the design life (defined as 75 years by the California Coastal Commission) of the residence. There are no guarantees of stability in the dynamic coastal environment, however, and development in these areas must be undertaken with this understanding in mind.

Development plans are still in the planning stages at the time of completion of this reporting. We are aware the proposed development includes plans for a two-story, single family residence (about 2,300 square foot), with a detached shop/studio (about 800 square foot) in the southern part of the parcel, although the exact footprints of these structures is dependent upon the results of this study. We understand that a driveway planned to access the building area from the north will be a gravel surface and will require little or no grading. Site drainage is to be routed toward the existing rock-

lined drainage ditch along the southern property line. Only minimal vegetation removal will occur at the site to accommodate construction; no tree removal is proposed within the bluff setback zone however. There will be no lawn.

Topographic and Geologic Setting

The project site occupies a generally westward-sloping, forested, coastal bluff-top. The bluff top at the site is a remnant of a marine terrace. The site is bordered on the western side by the Pacific Ocean and an associated narrow beach strip and coastal bluff. Slopes at the site are gentle on the bluff top (5–15%) to moderately steep (up to about 75%) on the bluff face. The site is undeveloped, and only minimal grading is apparent on the parcel. A drainage gully is present along the southern property line, the upper portion of which has been improved as a rock-lined drainage ditch.

The marine terrace at the site is a late Pleistocene age feature eroded into the regional bedrock during a previous high sea level stand. The terrace remnant at the site is correlated with the "Patrick's Point Terrace," which is inferred to be about 64,000 years old (Carver and Burke, 1992). Marine terraces typically consist of erosional benches (abrasion platforms), which are subsequently buried by near-shore marine deposits (terrace cover sediments). Terrace cover sediments at the site were described in the early BGC reports as silty and clayey sands with a basal lag deposit of gravels, cobbles, and boulders directly over the erosional bedrock surface. The terrace cover sediments are thin at the northern end of the subject parcel, but are up to about 14 feet thick toward the southern end of the site.

Bedrock at the site is the Cretaceous to Jurassic age Central belt of the Franciscan Complex (McLaughlin et al., 2000). The Franciscan Complex is a regional bedrock unit composed of three broad belts: the Eastern, Central, and Coastal. These belts represent "terrane," discrete fault-bounded masses of highly deformed oceanic crust that have been welded to the western margin of the North American plate during the subduction process over the past 140 million years.

The Central belt of the Franciscan Complex consists of a tectonic *mélange* composed of rock blocks within a penetratively sheared, metamorphosed argillite matrix. Rock blocks within the *mélange* consist of coherent sandstone masses and folded sequences of shale, as well as exotic blocks composed of glaucophane schist, eclogite, and other high-pressure metamorphic assemblages. Individual rock blocks can range in size from very small, gravel-sized fragments to very large, mountain-scale blocks. This bedrock unit is commonly described as a *mélange* due to its block-in-matrix textural character, its assemblage of disassociated rock types, and its pervasively sheared character. *Mélange* is characterized by its extreme variability; therefore, it is very difficult to define subsurface bedrock conditions across a site. Subsurface investigations cannot be extrapolated beyond an area sampled because conditions may change drastically over distances of just a few feet. Of note, we observed a relatively large amount of exposed rock in the bluff face, suggesting an absence of significant quantities of low strength argillaceous matrix.

Slope failures in *mélange* terrain include earthflows that deform the low-strength *mélange* matrix, and rotational slides, slumps, and debris slides that occur in rockier settings. Earthflow movement is complex and commonly involves relatively slow, plastic deformation or flow of cohesive (clay-rich) materials. The displaced mass in an earthflow is typically strongly internally deformed,

particularly along the flow margins. In material with a block-in-matrix texture such as the Franciscan mélange, earthflows tend to occur within the sheared, clay-rich matrix. The matrix flows downslope around the large, relatively stable rock blocks. The blocks may remain on the hillside in relatively stable positions, depending on their depth of penetration relative to the depth of sliding. Deep-seated rotational slumps are less common in mélange due to the cohesive nature of the sheared matrix. Slumps are most common along coastal bluffs where wave action can remove toe support in rocky slopes and gravitational forces can overcome the resisting forces of the materials within the bluff face. One such slump occurred on a parcel just to the north of the subject lot, which destroyed an existing structure (see discussion below).

Seismic and Structural Setting

The north coast of California is one of the most seismically active regions in the continental United States. The area is located near the Mendocino triple junction, the intersection of three crustal plates. The site lies near the southern edge of the portion of the North American plate that is overriding the subducting Gorda plate. More than 60 earthquakes have produced discernible damage in the region since the mid-1800s. Historic seismic and paleoseismic studies in the area suggest there are 6 distinct sources of damaging earthquakes in the region (Dengler et al, 1992):

1. **The Gorda Plate:** this relatively small plate remnant is breaking up as it approaches the subduction zone. Frequent earthquakes are generated along left-lateral faults within the plate itself. The plate is subducting in a northeasterly direction.
2. **The Mendocino Fault:** this high-angle, east-west trending fault represents the plate boundary between the Gorda and Pacific plates. It generates predominantly right-lateral strike-slip earthquakes.
3. **The Mendocino Triple Junction:** infrequent moderate magnitude earthquakes occur in the complex triple junction region. These events are generally shallow, onshore events in the magnitude 5-6 range.
4. **The northern end of the San Andreas Fault:** earthquakes on this fault are extremely rare, but can be very large. This right-lateral transform fault separates the North American and Pacific plates; it passes through Point Delgada before terminating at Mendocino triple junction.
5. **Faults within the North American Plate (including the Mad River and Little Salmon faults zones):** along the leading edge of the North American plate, where it overrides the Gorda plate, oblique compression is manifested along a broad, northwest-trending fold-and-thrust belt. Individual faults within the belt may produce earthquakes in excess of magnitude 7.
6. **The Cascadia Subduction Zone:** the most significant potential seismic source in the region. A great subduction event, rupturing from Cape Mendocino to British Columbia, may be up to magnitude 9.5. Recurrence interval estimated at 300-500 years. The last subduction event occurred approximately 300 years ago.

The project site is not located within an Alquist-Priolo Earthquake Fault Zone per the State's criteria. The nearest known active fault to the site is the Trinidad fault, one of the faults making up the Mad River fault zone. Published mapping suggests that the mapped trace of the Trinidad fault projects offshore west of the site, an estimated 3,000-4,000 feet away. Based on the amount of

displacement of Falor formation sediments across the fault, the estimated Quaternary slip rate for the Trinidad fault is 1.9 millimeters per year (Carver and Burke, 1992). Recurrence intervals or event timing is not known for the Trinidad fault. Paleoseismic studies of other faults in the Mad River fault zone (Mad River and McKinleyville faults) have resulted in recurrence estimates on the order of 3,000–4,000 years.

Site Description

The project site is located at the seaward edge of a gently southward-sloping, late Pleistocene marine terrace surface. The terrace surface is wider to the south of the subject parcel, and narrows toward the northern end; the terrace is not present to the north of the lot, presumably having been removed by past erosion and mass wasting. Buildable portions of the parcel are on the terrace surface. The terrace surface is forested with conifer and relatively dense ground cover vegetation. A drainage swale is present at the southern property line. The swale receives natural drainage, as well as runoff from culverts delivering from the nearby residential subdivision east of Patrick's Point Drive. The swale was armored with rock by the current owner and neighbor to mitigate the erosion potential posed by the addition of residential runoff. The rock-lined ditch ends at the bluff crest along the southern property line, where it discharges to a naturally occurring, 2- to 3-foot deep gully that has formed just below a spring.

The bluff face along the coast below the terrace surface is a dynamic geomorphic feature subject to periodic mass wasting and retreat. The bluff face is an irregular slope with gradients between about 50% to 70%. The conifer forest, present on the terrace surface, is absent from the bluff face, which implies it is not sufficiently stable to support trees. The bluff face is heavily vegetated with brush and low shrubs.

We conducted reconnaissance of the bluff face by making short transects across the slope directly below the lot and along primitive trails at the northern and southern edges of the property. In general, the bluff face at the subject parcel is a broad amphitheater forming above a small cove between two minor spur ridges that extend to the beach. An abundance of sandstone exposures in the bluff face suggest slope mechanics at the site are controlled by the presence of rock in the slope (rather than low-strength mélange matrix). From above, and in aerial photographs, the amphitheater appears to represent a landslide-related landform. It most likely formed through repeated shallow- to moderate-depth debris slides and slumps focused on the cove between the two resistant spur ridges.

There is only minor evidence of recent landsliding along the bluff crest across the parcel (at the outboard edge of the terrace surface); small, 1-foot potential scarps were observed at the bluff crest near the northern end of the lot. Subtle steps in the terrace surface near the southern end of the lot are indeterminate geomorphic features that may represent erosion of terrace cover sediments leading to the drainage gully or scarps associated with incipient mass wasting. There is active earthflow deformation at the toe of the bluff face (lower approximately 50 feet), where support is periodically undermined by ocean wave erosion (similar features were identified in the BGC reports). The beach below the bluff is a narrow rocky strip with no significant beach sand accumulation. The surf zone below the site is very rocky, and numerous large rock blocks appear to dissipate much of the wave energy before it strikes the narrow beach and the base of the bluff.

Interpretation of aerial photographs supports the analysis that the bluff face at the site is subject to landslide deformation (we note that the subject parcel is visible in an online aerial photograph at www.californiacoastline.org; refer to frame 7581). The bluff face to the south of the site is steeper, and appears to be controlled by the presence of large rock masses. At the subject site, however, the bluff face is less steep and forms the broad, moderate-gradient amphitheater described above.

The upper bluff face appears to respond to the removal of material from the slope toe by ocean waves. As sufficient material is eroded at the slope base, subsequent earthflows and shallow rotational slumps move progressively up the bluff face until finally resulting in retreat (erosion) of the seaward edge of the marine terrace surface. This process appears to be occurring very slowly at the subject site. Bluff retreat of this type is cyclic in nature; the seaward edge of the marine terrace may remain stationary for several decades as failures occur lower on the bluff face. However, once a sufficient number of failures occur at the slope toe, and a sufficient amount of toe support is removed by ocean waves, a failure may progress up the bluff face, ultimately reaching the crest of the bluff and resulting in erosion (retreat) of the terrace surface.

Based on the failure of the bluff face just to the north of the site, which reached a residential structure on the terrace surface, there is a clear risk of future bluff retreat on the subject parcel. The damaged structure north of the site appears to have been constructed at the edge of the bluff, which then failed in an earthflow that appears to extend to the beach (see the online photo described above; the failed structure is visible near the left edge of frame 7581, especially when the photo is enlarged). Eyewitness accounts of this event provided by the previous broker (now deceased) suggest that the failure was exacerbated by concentrated residential runoff and an ill-placed culvert. Using the photographs we have viewed, it is not possible to accurately determine the amount of bluff retreat that occurred during the failure that damaged the residence; our best estimate is that no more than about 50 feet of the terrace surface slid down the bluff face. The structure appears to have been located on a small peninsula that was susceptible to retreat.

Calculation of Suitable Bluff Setback

In order to ensure that a residential structure placed at the site is located an adequate distance from the bluff edge, we calculated a building setback following the methods outlined in *Establishing Development Setbacks From Coastal Bluffs* by M.J. Johnsson (2005). This method incorporates two independent calculations, a quantitative slope stability analysis and determination of historic bluff retreat rates; the results of these two analyses are summed to derive the bluff setback. The quantitative slope modeling is intended to determine what portion of the bluff top is "stable" at any one point in time. The historic bluff retreat rate is intended to provide an estimate of long-term retreat through the economic lifespan of the structure (defined by the Coastal Commission as 75 years). As such, the analysis is intended to ensure that the proposed structure is located in a "stable" setting at the end of the 75-year period.

Quantitative Slope Stability Analysis

Slope stability modeling, or "quantitative slope stability analysis" is intended to test various failure geometries relative to the geologic parameters that are input to the computer based on site conditions. Use of the computer to run these models allows rapid analysis of a large number of

possible failure surfaces, and determination of relative factors of safety. "Factors of safety" are numerical values derived from a comparison of slope driving and resisting forces. Forces that "drive" landslides include the weight of rocks, the effects of groundwater, and outside dynamic forces (usually earthquakes). Forces that "resist" landslides include the strength of the earth materials. A factor of safety of 1.0 implies that the driving and resisting forces are equal, and that the slope is subject to failure. Industry-standard suggests that a factor of safety of 1.5 is desirable for new development. The methodology described by Johnsson (2005) suggests using factors of safety of 1.5 under static (non-seismic) conditions, and 1.1 under dynamic (seismic) conditions.

The modeling program "Slide 5.0, version 5.019" (Rocscience Inc., 2005) was used to determine the factors of safety. The stability program runs a two-dimensional limit equilibrium stability analysis. Seismic conditions were modeled using a pseudostatic horizontal "k" factor of 0.15 multiplied by the acceleration of gravity, as suggested by Johnsson (2005).

An important part of the bluff stability modeling is generation of an accurate slope profile (or profiles). At the project site, we developed a single profile of the bluff face to evaluate for stability. The profile was developed directly below the proposed building area, and extends through the area perceived as representing the least stable portion of the bluff face. The single profile was deemed sufficient to model the stability across the site because of consistent morphology across the slope and the relatively small developable area on the parcel (the parcel has about 400 feet of bluff exposure, perhaps 250 feet of which fronts the building area). It should be noted that even the one profile was difficult to achieve because of the limited access on the bluff face. Due to the presence of very heavy vegetation on the bluff, which limits both mobility and visibility, we derived profiles using a combination of tools, including a laser range finder, compass, clinometer, and measuring tape.

Four separate earth materials are identified at the site for inclusion in the slope stability model. Granular, moderately consolidated marine terrace sediments are present in a 12- to 14-foot thick veneer on the bluff top (based on on-site backhoe test pits cited in the leachfield feasibility reports). The bluff face is covered with an estimated 10-foot thick veneer of weathered rock (colluvium), which is associated with lower strength values than the in situ Franciscan Complex bedrock (mélange) that underlies the entire area. Finally, a single bedrock block is exposed along the profile; this feature is visible across most of the bluff face below the building area and was observed during our slope transects.

Site-specific subsurface investigations were not conducted at the site; therefore, material strength parameters were not derived from site samples. Rather, we used data from a nearby site for which we are concurrently completing stability analyses. The nearby site is very similar geologically, especially in the rocky character of the Franciscan Complex materials. Specifically, both sites are characterized by the abundance of rocky material and the absence of sheared argillaceous matrix (and associated earthflow deformation). Because of the extreme variability within the Franciscan Complex, it is essential to use strength values that fit the materials observed at a particular site. Values for the bedrock block in the profile were taken from direct shear tests for similar rock material at a nearby site. The marine terrace deposits were modeled as having the moderate cohesive strength and generally high frictional properties typical of those encountered at other sites underlain by Patrick's Point or equivalent aged terraces.

Circular failure models, using Bishop Simplified and Spencer methods, were employed to calculate factors of safety for the bluff face. For other bluff stability analyses in the region, we have also used Janbu methods to model earthflows on the bluff face. However, due to the observed mode of mass wasting at the project site (which does not include earthflow deformation), we have not included that analysis here. For circular failure searches, the results are shown in the form of the most critical hypothetical failure under static conditions (safety factor of 1.5), the most critical hypothetical failure under seismic conditions (safety factor of 1.1).

Groundwater is likely to be found in the lower part of the more permeable marine terrace deposits, perched on top of the generally low permeability, undisturbed Franciscan Complex bedrock (based on regional observations and on-site leachfield testing). The spring identified near the southern property boundary appears to be emanating from near the marine terrace/Franciscan contact. Full groundwater saturation is not likely to be found in the underlying, undisturbed mélange materials, except along fractured and/or weathered zones. For example, we understand that wells drilled in mélange materials generally produce more dry holes, or very limited production wells, than high production wells. The presence of numerous seeps and springs near the bluff toe suggests the piezometric surface intersects the lower bluff face; therefore, a seaward-sloping surface intersecting near the base of the bluff is included in the models.

For Section A-A' (see attached modeling printouts), the circular failure plane analyses result in failures that encroach between 20 feet (dynamic conditions, factor of safety 1.1) and 35 feet (static, factor of safety 1.5) onto the bluff surface. The model produces what appear to be localized wedge-type failures at the bluff top, which is consistent with the geomorphic condition observed at the site. We used both the Bishop Simplified and Spencer methods; the attached figures show the results of the Spencer method, which produces more conservative results.

Review of Historical Bluff Retreat Rates

We reviewed a historical account of coastal bluff retreat in northern Humboldt County (Tuttle, 1981), which was based on review of aerial photographs dating back to 1942. Coastline transects were developed to determine the amount of coastal retreat. Several transects were developed along Patrick's Point Drive between Scotty Point and White Rock, including transects within a few hundred feet on either side of the subject lot. These transects do not indicate any bluff retreat between 1942 and 1974. Comparison of these transects with current coastal conditions at the site indicate an absence of retreat between 1974 and the present. As such, we conclude that the coastal bluff at the site has been stable at its current location for at least 63 years.

Total Recommended Bluff Setback

As described above, SHN previously completed a qualitative bluff setback evaluation for this property. That evaluation, based on site conditions and our experience in the region, concluded that a 70-foot setback was reasonable for this site. The modeling exercise described above results in a setback on the order of 35 feet. Including a "buffer" to account for the uncertainty in the modeling and historic retreat rate analyses (about 10 feet, according to the guidelines in Johnsson, 2005), the suggested protocol indicates a total setback of about 45 feet. From our experience and the

performance of the bluff to the north, this does not appear to provide an adequate bluff setback. Therefore, we conclude that the original 70-foot bluff setback derived in our initial report (SHN, 2005) still be applied at the site.

Conclusions and Recommendations

1. It is our opinion that residential development is feasible on the subject parcel such that it will not be subject or contribute to substantial geologic hazards if our recommendations are implemented. Buildable ground is present on the marine terrace remnant, a suitable distance from the bluff edge. An appropriate setback from the bluff edge is described below.
2. The bluff face is a potentially unstable geologic feature; a moderately steep slope composed of moderate to low strength materials that are subject to erosion by ocean waves. The most significant geologic hazard to the proposed building area is bluff top retreat due to slope failures on the bluff face. Debris sliding and rotational slumping appear to be the most common slope failure process in the site vicinity; earthflows are less common; although, they were observed locally near the bluff toe.
5. Coastal bluff retreat in the project vicinity occurs incrementally (episodically), most likely in response to great earthquakes on the Cascadia Subduction Zone and other nearby sources. Therefore, it is difficult to accurately define a useful annual rate of retreat; the period between retreat events appears to be greater than the economic lifespan of the proposed development.
6. Bluff setback amounts were calculated per the methodology described by Johnsson (2005). That is, the setback is the sum of the factor of safety analysis and the historic retreat rate applied over the economic lifespan of the structure (defined here as 75 years). That analysis derived a lesser setback (about 45 feet) than our previous qualitative evaluation, and we conclude that the initial 70-foot setback should be applied at the site.
7. Based on review of the previous BGC reports, it appears that on-site sewage disposal is feasible. We have not, to date, reviewed the recent update by PWA. We do not, however, recommend placement of the leachfield on the terrace surface seaward of the eventual building site. Additional soil moisture derived from the leachfield may decrease overall bluff stability, and the rate of bluff retreat may increase. This may necessitate pumping of effluent upgradient to a leachfield north of the residence.
8. Construction of impervious surfaces associated with the proposed development (for example, driveways, rooftops, and so forth) will change natural runoff conditions. Increased, concentrated runoff could result in accelerated erosion. Site development should be designed to minimize topographic impacts and to uniformly dissipate runoff. Actively eroding areas, and areas disturbed during construction or site grading, should be revegetated prior to the beginning of the rainy season. We endorse the applicant's concept of routing drainage toward the existing rock-lined ditch along the southern property line. The proposal to establish a gravel surface drive is also commendable, and will reduce the impact of the access.

9. It is acceptable for a portion of the gravel driveway to encroach into the bluff setback, especially if it allows moving the leachfield farther north away from the residence. The free-draining gravel drive should have a negligible affect on the stability of the bluff.
10. We recommend that the bluff face not be subjected to ground disruption or vegetation removal. However, minor limbing of larger trees or shrubs is not expected to compromise bluff stability.
11. Site grading should be kept to a minimum. Grading activities that result in fill being placed on the bluff face may initiate slope failure processes. We recommend that fill generated during foundation grading be hauled off site, not placed over the bluff edge, as previously discussed.
12. The project site is likely to be subject to the effects of moderate or large earthquakes during its life span, and conceivably, may be subject to the effects of a very large earthquake. Strong ground shaking and seismically induced slope failures are the primary seismic hazards that may impact the site. Because numerous sources are present that may generate damaging earthquakes, we recommend that structures for residential use be of wood-frame construction, built to withstand strong seismic shaking. The potential for surface fault rupture on the project site is considered to be negligible. The minimum standard for construction of the residence should be in accordance with the latest edition of the Uniform Building Code for conventional residences.

Closure and Limitations

The data and conclusions we have presented are based on interpretations of aerial photographs, topographic maps, surficial features, and natural soil exposures. Existing site conditions have evolved according to the geologic processes of the past. It is conceivable that these processes may change or accelerate in an unpredictable manner in the future. Because the coastal region of Humboldt County is one of dynamic geologic processes, future geologic hazards may not be accurately portrayed by existing conditions. Therefore, risks from geologic hazards cannot be precisely determined when developing this site.

Our recommendations are offered on the assumption that design and construction of the improvements will conform to their intent. We are available to review construction plans, if an evaluation of conformance to recommendations is desired.

If there is a substantial lapse of time between the submission of this report and the start of work at the site, or if conditions change due to natural causes or construction operations at or adjacent to the site, we urge that our report be reviewed to determine the applicability of the conclusions and recommendations. This report is applicable only for the project site studied.

The conclusions and recommendations presented in this report are professional opinions derived in accordance with current standards of professional practice. No warranty is expressed or implied.