Staff Report to the Zoning Administrator

Application Number: 07-0676

Applicant: Robin Brownfield
Owner: Greg & Juliet Prussia
APN: 105-151-08

Agenda Date: November 21, 2008
Agenda Item #: 4
Time: After 10:00 a.m.

Project Description: Proposal to construct a 1,162 square foot 1-story single-family residence with 572 square foot shop, a 484 square foot garage and 1,162 square feet of exterior deck space. Requires a Variance to reduce the required 40-foot front yard setback to approximately 10 feet, a Residential Development Permit, a Preliminary Grading Permit, an Archeological Resources survey and a Geologic Report Review.

Location: 463 Flume Road, Aptos Hills

Supervisoral District: 2nd District (District Supervisor: Ellen Pirie)

Permits Required: Variance and Residential Development Permit
Technical Reviews: Geologic, Soils, Archeological

Staff Recommendation:

- Certification that the proposal is exempt from further Environmental Review under the California Environmental Quality Act.
- Approval of Application 07-0676, based on the attached findings and conditions.

Exhibit

A. Project plans
B. Findings
C. Conditions
D. Categorical Exemption (CEQA determination)
E. Location map
F. Assessor's parcel map
G. Zoning map
H. Geologic Investigation by Zinn Geology dated 11/7/07
I. Geo-technical and Geologic Review letter w/ attached Declaration of Geologic Hazards by Joe Hanna, dated 11/30/07

Parcel Information

Parcel Size:	6.3 acres
Existing Land Use - Parcel:	Vacant- one existing storage shed
Existing Land Use - Surrounding:	Residential
Project Access:	From Flume Road off Valencia Road
Planning Area:	Aptos Hills

Land Use Designation:	RM (Mountain Residential)	
Zone District:	RA (Residential Agriculture)	
Coastal Zone:	__ Inside	_x_ Outside
Appealable to Calif. Coastal Comm.	__ Yes	_x_ No

Environmental Information

Geologic Hazards:	potential landslide/ seismic concerns described in Zinn Geology report dated 11/7/07
Soils:	Sandy loam
Fire Hazard:	Not a mapped constraint
Slopes:	>30% outside of proposed geologic building envelope
Env. Sen. Habitat:	Not mapped/no physical evidence on site
Grading:	191 cy fill
Tree Removal:	No trees proposed to be removed
Scenic:	Not a mapped resource
Drainage:	Existing drainage adequate; no change in drainage patterns as a result of the proposed project per RI Engineering, Inc. report dated 6/19/08
Archeology:	Mapped as potential resource area; Phase I survey on 8/25/08 found no evidence of resources

Services Information

Urban/Rural Services Line:	__ Inside	_x_ Outside
Water Supply:	Private well	
Sewage Disposal:	Private sewer	
Fire District:	County Fire	
Drainage District:	Zone 5 Drainage District	

History

The parcel is currently undeveloped, except for a very old 1,125 square foot storage shed on the easternmost of two areas mapped by the applicant's geo-technical consultants as geologically suitable areas for building. Building Permit #s 0059144C and 00143657 were issued on 4/19/06 for the demolition of two storage shed/ lean-to structures and to remove travel trailers and multiple abandoned vehicles in order to rectify a red tag.

Project Setting

The subject property contains very steep alluvial slope areas and erosion-prone terraces above Valencia Creek. Project engineers have mapped two relatively narrow geologic envelope areas on the project site, one of which is developed with an existing old storage shed of approximately 1125 square feet. Because of the nearby steep slopes and the potential for severe erosion and landslides, grading plans for the proposed new residence will include engineered erosion control measures to reduce the potential for accelerated erosion or landslide activity. Geo-technical and geologic reports have been reviewed and accepted by the County geologist.

The Flume Road neighborhood is rural in nature, with lightly-developed large parcels. Because of the abundance of steep slopes and erosive areas, there are other nearby properties where structures have been located within the front setback or road right-of-way areas.

Zoning & General Plan Consistency
The subject property is a 6.3-acre lot, located in the RA (Residential Agriculture) zone district, a designation that allows residential uses. The proposed new residence is a principal permitted use within the zone district, and the project is consistent with the site's (RM) Mountain Residential General Plan designation. If a Variance to the required 40-foot front yard setback is granted, all site standards for the RA zone district will be met.

SITE DEVELOPMENT STANDARDS TABLE

	RA Zone Standards	Proposed Residence
Front yard setback:	40 feet	Approximately 10 feet
Rear yard setback	20 feet	>140 feet
Side yard setbacks:	20 feet / 20 feet	>300 feet
Lot Coverage:	10 % maximum	1.7%
Building Height:	28 feet maximum	26 feet

Analysis
The subject parcel is highly constrained by steep slopes and geologically unstable land. Zinn Geology, the applicant's consultants, mapped the areas of the parcel that would be considered most suitable for structural and septic development (see last sheet of Exhibit A, Zinn Geology Site Plan, February 2008)). If the required 40-foot front setback is overlayed upon the areas of the subject parcel deemed suitable for development, only a very narrow home could be built in either of the two separate areas of the parcel mapped by Zinn Geology. Approval of a Variance to the required 40-foot front setback would allow a residence of reasonable size and scale to be constructed, consistent with other residences in the project vicinity. The proposed new residence would be approximately 20 feet from the traveled right-of-way at its closest point. County Geologist Joseph Hanna will require that a Declaration of Geologic Hazards be recorded by the property owners.

Because the subject parcel is mapped as a potential archeological resource area, a Phase I site survey was conducted by the Santa Cruz Archeological Society/ Cabrillo College on August 25, 2008, and no evidence of cultural resources was found.

Environmental Review
Environmental review of the proposed project per the requirements of the California Environmental Quality Act (CEQA) has resulted in the determination that the proposed project is exempt per CEQA Section 15303 (Class 3- New Construction).

Conclusion
As proposed and conditioned, and with a Variance to the required front setback granted, the project is consistent with all applicable codes and policies of the Zoning Ordinance and General Plan/LCP. Please see Exhibit "B" ("Findings") for a complete listing of findings and evidence related to the above discussion.

Staff Recommendation

- Certification that the proposal is exempt from further Environmental Review under the California Environmental Quality Act.

- **APPROVAL** of Application Number **07-0676,** based on the attached findings and conditions.

Supplementary reports and information referred to in this report are on file and available for viewing at the Santa Cruz County Planning Department, and are hereby made a part of the administrative record for the proposed project.

The County Code and General Plan, as well as hearing agendas and additional information are available online at: www.co.santa-cruz.ca.us

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Santa Cruz CA 95060
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Variance Findings

1. That because of special circumstances applicable to the property, including size, shape topography, location and surrounding existing structures, the strict application of the zoning ordinance deprives such property of privileges enjoyed by other property in the vicinity and under identical zoning classification.

This finding can be made, in that the buildable areas of the parcel are greatly constrained by steep slopes and areas prone to landslides and rapid erosion. Project geologists have mapped "geologically suitable areas" for residential and septic development on the project site, and beyond the required 40-foot front setback, the mapped buildable areas are narrow (approximately 10-20 feet wide). Thus the strict application of a 40-foot front setback requirement would deprive the owners of the ability to easily construct a residence of a size that is comparable to other residences in the vicinity under RA (Residential Agriculture) zoning. The proposed new residence would be approximately 20 feet from the traveled right-of-way at its closest point.

2. That the granting of such variance will be in harmony with the general intent and purpose of zoning objectives and will not be materially detrimental to public health, safety or welfare or injurious to property or improvements in the vicinity.

This finding can be made, in that the residential development that would result from the granting of such a variance to the required front setback poses no threat to public health, safety or welfare and will not be detrimental to other properties or improvements in the vicinity. Flume Road is a lightly-traveled rural road, and many existing residences in the vicinity are also within the front setback area with no detriment to health and safety or the aesthetics of the neighborhood. The proposed new residence would be approximately 20 feet from the traveled right-of-way at its closest point.

3. That the granting of such a variance will not constitute a grant of special privileges inconsistent with the limitations upon other properties in the vicinity and zone in which such is situated.

This finding can be made, as many properties in the vicinity have similar geologic constraints, and there are a number of other residences and structures on Flume Road that are built within the front setback areas. Further, the proposed residence is of a size and scale that is consistent with development on other parcels in the project vicinity.

EXHIBIT B

Development Permit Findings

2. That the proposed location of the project and the conditions under which it would be operated or maintained will not be detrimental to the health, safety, or welfare of persons residing or working in the neighborhood or the general public, and will not result in inefficient or wasteful use of energy, and will not be materially injurious to properties or improvements in the vicinity.

This finding can be made, in that the project is located in an area designated for residential uses and, if built within the designated geologic envelope, is not encumbered by physical constraints to development. Construction will comply with prevailing building technology, the California Building Code, and the County Building ordinance to insure the optimum in safety and the conservation of energy and resources. The proposed new single-family residence will not deprive adjacent properties or the neighborhood of light, air, or open space, in that the siting of the structure will ensure continued access to light, air, and open space in the lightly-developed rural neighborhood.

3. That the proposed location of the project and the conditions under which it would be operated or maintained will be consistent with all pertinent County ordinances and the purpose of the zone district in which the site is located.

This finding can be made, in that—after approval of a Variance to allow the reduction of the required 40-foot front yard setback— the proposed location of the single-family residence and the conditions under which it would be operated or maintained will be consistent with all pertinent County ordinances and the purpose of the RA (Residential Agriculture) zone district in that the primary use of the property will be one residence that meets all current site standards (except for the front setback) for the zone district. The determination to allow a reduced front setback will be consistent with County ordinance Section 13.10.230 standards for the granting of a Variance.

4. That the proposed use is consistent with all elements of the County General Plan and with any specific plan which has been adopted for the area.

This finding can be made, in that the proposed residential use is consistent with the use and density requirements specified for the Mountain Residential (RM) land use designation in the County General Plan.

The proposed new residence will not adversely impact the light, solar opportunities, air, and/or open space available to other structures or properties, and meets all current site and development standards for the zone district as specified in Policy 8.1.3 (Residential Site and Development Standards Ordinance), in that the Residential will not adversely shade adjacent properties, and will meet current setbacks for the zone district that ensure access to light, air, and open space in the neighborhood.

The proposed new single-family residence will not be improperly proportioned to the parcel size or the character of the neighborhood as specified in General Plan Policy 8.6.1 (Maintaining a Relationship Between Structure and Parcel Sizes), in that —after approval of a Variance to allow the reduction of the required 40-foot front yard setback— the proposed residence will comply with all other site standards for the RA zone district (including setbacks, lot coverage, floor area ratio, height, and number of stories) and will result in a structure consistent with a design that could be approved

on any similarly sized lot in the vicinity.

A specific plan has not been adopted for this portion of the County.

5. That the proposed use will not overload utilities and will not generate more than the acceptable level of traffic on the streets in the vicinity.

This finding can be made, in that the proposed new single-family residence is to be constructed on an existing undeveloped lot. The expected level of traffic generated by the proposed project is anticipated to be only 1 peak trip per day (1 peak trip per dwelling unit), and such an increase will not adversely impact existing roads and intersections in the surrounding area.

6. That the proposed project will complement and harmonize with the existing and proposed land uses in the vicinity and will be compatible with the physical design aspects, land use intensities, and dwelling unit densities of the neighborhood.

This finding can be made, in that the proposed structure is located in a rural neighborhood containing a variety of architectural styles, and the proposed new residence is consistent with the land use intensity and density of the neighborhood.

7. The proposed development project is consistent with the Design Standards and Guidelines (sections 13.11.070 through 13.11.076), and any other applicable requirements of this chapter.

This finding can be made, in that the proposed Residential will be of an appropriate scale and type of design that will not detract from the aesthetic qualities of the surrounding properties and will not reduce or visually impact available open space in the surrounding area.

Conditions of Approval

Exhibit A: Project plans, 10 sheets, by Brownfield & Associates (11/07, revised 2/08 and 7/30/08), RI Engineering (6/08), Bridgette Land Surveying (5/10/06) and Zinn Geology (2/11/08).

I. This permit authorizes the construction of a new 1,162 square foot 1-story single-family residence with 572 square foot shop, a 484 square foot garage and 1,162 square feet of exterior deck space. This approval does not confer legal status on any existing structure(s) or existing use(s) on the subject property that are not specifically authorized by this permit.

II. All development, including the residence, driveway, septic system and decks must be located within the Geologic Building Envelope designated by Zinn Geology on their site plan.

III. Prior to exercising any rights granted by this permit including, without limitation, any construction or site disturbance, the applicant/owner shall:

A. Sign, date, and return to the Planning Department one copy of the approval to indicate acceptance and agreement with the conditions thereof.

B. Obtain a Building Permit from the Santa Cruz County Building Official.

1. Any outstanding balance due to the Planning Department must be paid prior to making a Building Permit application. Applications for Building Permits will not be accepted or processed while there is an outstanding balance due.

C. Obtain a Grading Permit from the Santa Cruz County Building Official.

D. Obtain an Encroachment Permit from the Department of PublicWorks for all off-site work performed in the County road right-of-way.

IV. Prior to issuance of a Building Permit the applicant/owner shall:

A. Submit proof that these conditions have been recorded in the official records of the County of Santa Cruz (Office of the County Recorder).

B. Submit final architectural plans for review and approval by the Planning Department. The final plans shall be in substantial compliance with the plans marked Exhibit "A" on file with the Planning Department. Any changes from the approved Exhibit "A" for this development permit on the plans submitted for the Building Permit must be clearly called out and labeled by standard architectural methods to indicate such changes. Any changes that are not properly called out and labeled will not be authorized by any Building Permit that is issued for the proposed development. The final plans shall include the following additional information:

1. One elevation shall indicate materials and colors. The applicant shall

supply a color and material board in 8 ½" x 11" format for Planning Department review and approval

2. Grading, drainage, and erosion control plans by a Civil Engineer.

3. Details showing compliance with fire department requirements, including all requirements of the Urban Wildland Intermix Code, if applicable.

C. Submit four copies of the approved Discretionary Permit with the Conditions of Approval attached. The Conditions of Approval shall be recorded prior to submittal.

D. Project shall comply with all requirements set forth in the November 30, 2007 technical report acceptance letter from Joseph Hanna, County Geologist.

E. Meet all requirements of and pay Zone 5 drainage fees to the County Department of Public Works, Drainage. Drainage fees will be assessed on the net increase in impervious area.

F. Obtain an Environmental Health Clearance for this project from the County Department of Environmental Health Services.

G. Meet all requirements and pay any applicable plan check fee of the County Fire Protection District.

H. Submit 3 copies of a soils report prepared and stamped by a licensed Geotechnical Engineer.

I. Pay the current fees for Parks and Child Care mitigation for 2 bedrooms. Currently, these fees are, respectively, $578 and $109 per bedroom.

J. Pay the current fees for Roadside and Transportation improvements for a new single-family residence. Currently, these fees are, respectively, $2,540 and $2,540 per single-family dwelling.

K. Provide required off-street parking for 3 cars. Parking spaces must be 8.5 feet wide by 18 feet long and must be located entirely outside vehicular rights-of way. Parking must be clearly designated on the plot plan.

L. Submit a written statement signed by an authorized representative of the school district in which the project is located confirming payment in full of all applicable developer fees and other requirements lawfully imposed by the school district.

M. A Notice of Geologic Hazards shall be recorded prior to building permit issuance.

N. Building plans shall reference the geo-technical engineering and engineering geology reports and shall include a statement that the project shall conform to the

reports' recommendations.

O. The project must comply with all recommendations of the approved geo-technical engineering and engineering geology reports, and all construction must be located within the development/ building envelope designated in the geology report.

P. Include a map prepared by the geologist or geo-technical engineer showing the location of previously completed excavations and/ or fills either on the geo-technical site map or geologic map.

Q. All development, including the septic system, must be set back 10 feet from either side of the proposed new drainage culvert shown on plan set sheet C-1 by R. I. Engineering. The project geotechnical engineer and project geologist shall approve the drainage plan.

R. Drainage must be taken from the crest of the slope in a pipe and released in a non-erosive manner at the toe of the slope. The project geotechnical engineer and project geologist shall approve the drainage plan.

S. The geo-technical engineer must inspect and test all fill material placed on site. The relative compaction test locations must be noted on a copy of the approved grading plans, and all related test data must be included in a table with a reference number that correlates the table data to the test location indicated on the grading plan. This testing shall include the backfill for any retaining walls.

T. Plan review letters shall be required from the geologist and geotechnical engineer prior to building permit issuance. These letters shall refer to the final revised plans and state that the project conforms to the recommendations in the reports.

U. During construction, excavation of all cuts and drilling of all pier holes shall be observed by a representative of Zinn Geology.

V. The location of the level spreader for site drainage and the rip rap dissipator for roadway drainage shall be observed and approved by a representative from Haro, Kasunich and Associates.

W. The existing 18-inch storm drain shall be removed and the trench shall be backfilled and recompacted. This shall be shown on the building permit plans prior to permit issuance.

X. Applicant shall obtain a sewage disposal permit for the new development. The applicant must have an approved water supply prior to the approval of the sewage disposal permit.

V. All construction shall be performed according to the approved plans for the Building Permit. Prior to final building inspection, the applicant/owner must meet the following conditions:

A. All site improvements shown on the final approved Building Permit plans shall be installed.

B. All inspections required by the building permit shall be completed to the satisfaction of the County Building Official.

C. Pursuant to Sections 16.40.040 and 16.42.100 of the County Code, if at any time during site preparation, excavation, or other ground disturbance associated with this development, any artifact or other evidence of an historic archaeological resource or a Native American cultural site is discovered, the responsible persons shall immediately cease and desist from all further site excavation and notify the Sheriff-Coroner if the discovery contains human remains, or the Planning Director if the discovery contains no human remains. The procedures established in Sections 16.40.040 and 16.42.100, shall be observed.

VI. Operational Conditions

A. In the event that future County inspections of the subject property disclose noncompliance with any Conditions of this approval or any violation of the County Code, the owner shall pay to the County the full cost of such County inspections, including any follow-up inspections and/or necessary enforcement actions, up to and including permit revocation.

VII. As a condition of this development approval, the holder of this development approval ("Development Approval Holder"), is required to defend, indemnify, and hold harmless the COUNTY, its officers, employees, and agents, from and against any claim (including attorneys' fees), against the COUNTY, it officers, employees, and agents to attack, set aside, void, or annul this development approval of the COUNTY or any subsequent amendment of this development approval which is requested by the Development Approval Holder.

A. COUNTY shall promptly notify the Development Approval Holder of any claim, action, or proceeding against which the COUNTY seeks to be defended, indemnified, or held harmless. COUNTY shall cooperate fully in such defense. If COUNTY fails to notify the Development Approval Holder within sixty (60) days of any such claim, action, or proceeding, or fails to cooperate fully in the defense thereof, the Development Approval Holder shall not thereafter be responsible to defend, indemnify, or hold harmless the COUNTY if such failure to notify or cooperate was significantly prejudicial to the Development Approval Holder.

B. Nothing contained herein shall prohibit the COUNTY from participating in the defense of any claim, action, or proceeding if both of the following occur:

1. COUNTY bears its own attorney's fees and costs; and

2. COUNTY defends the action in good faith.

C. Settlement. The Development Approval Holder shall not be required to pay or perform any settlement unless such Development Approval Holder has approved the settlement. When representing the County, the Development Approval Holder shall not enter into any stipulation or settlement modifying or affecting the interpretation or validity of any of the terms or conditions of the development approval without the prior written consent of the County.

D. Successors Bound. "Development Approval Holder" shall include the applicant and the successor'(s) in interest, transferee(s), and assign(s) of the applicant.

Minor variations to this permit that do not affect the overall concept or density may be approved by the Planning Director at the request of the applicant or staff in accordance with Chapter 18.10 of the County Code.

Please note: This permit expires two years from the effective date listed below unless a building permit (or permits) is obtained for the primary structure described in the development permit (does not include demolition, temporary power pole or other site preparation permits, or accessory structures unless these are the primary subject of the development permit). Failure to exercise the building permit and to complete all of the construction under the building permit, resulting in the expiration of the building permit, will void the development permit, unless there are special circumstances as determined by the Planning Director.

Approval Date: _____

Effective Date: _____

Expiration Date: _____

Don Bussey	Alice Daly
Deputy Zoning Administrator	Project Planner

Appeals: Any property owner, or other person aggrieved, or any other person whose interests are adversely affected by any act or determination of the Zoning Administrator, may appeal the act or determination to the Planning Commission in accordance with chapter 18.10 of the Santa Cruz County Code.

CALIFORNIA ENVIRONMENTAL QUALITY ACT
NOTICE OF EXEMPTION

The Santa Cruz County Planning Department has reviewed the project described below and has determined that it is exempt from the provisions of CEQA as specified in Sections 15061 - 15332 of CEQA for the reason(s) which have been specified in this document.

Application Number: 07-0676
Assessor Parcel Number: 105-151-08
Project Location: Flume Road (no situs)

Project Description: Proposal to construct a new Single-Family Residence that requires a Variance to the required front-yard setback

Person or Agency Proposing Project: Robin Brownfield

Contact Phone Number: 831-724-4994

A. _____ The proposed activity is not a project under CEQA Guidelines Section 15378.
B. _____ The proposed activity is not subject to CEQA as specified under CEQA Guidelines Section 15060 (c).
C. _____ **Ministerial Project** involving only the use of fixed standards or objective measurements without personal judgment.
D. _____ **Statutory Exemption** other than a Ministerial Project (CEQA Guidelines Section 15260 to 15285).

Specify type:

E. __X__ **Categorical Exemption**

Specify type: Section 15303: New Construction or Conversion of Small Structures

F. Reasons why the project is exempt:

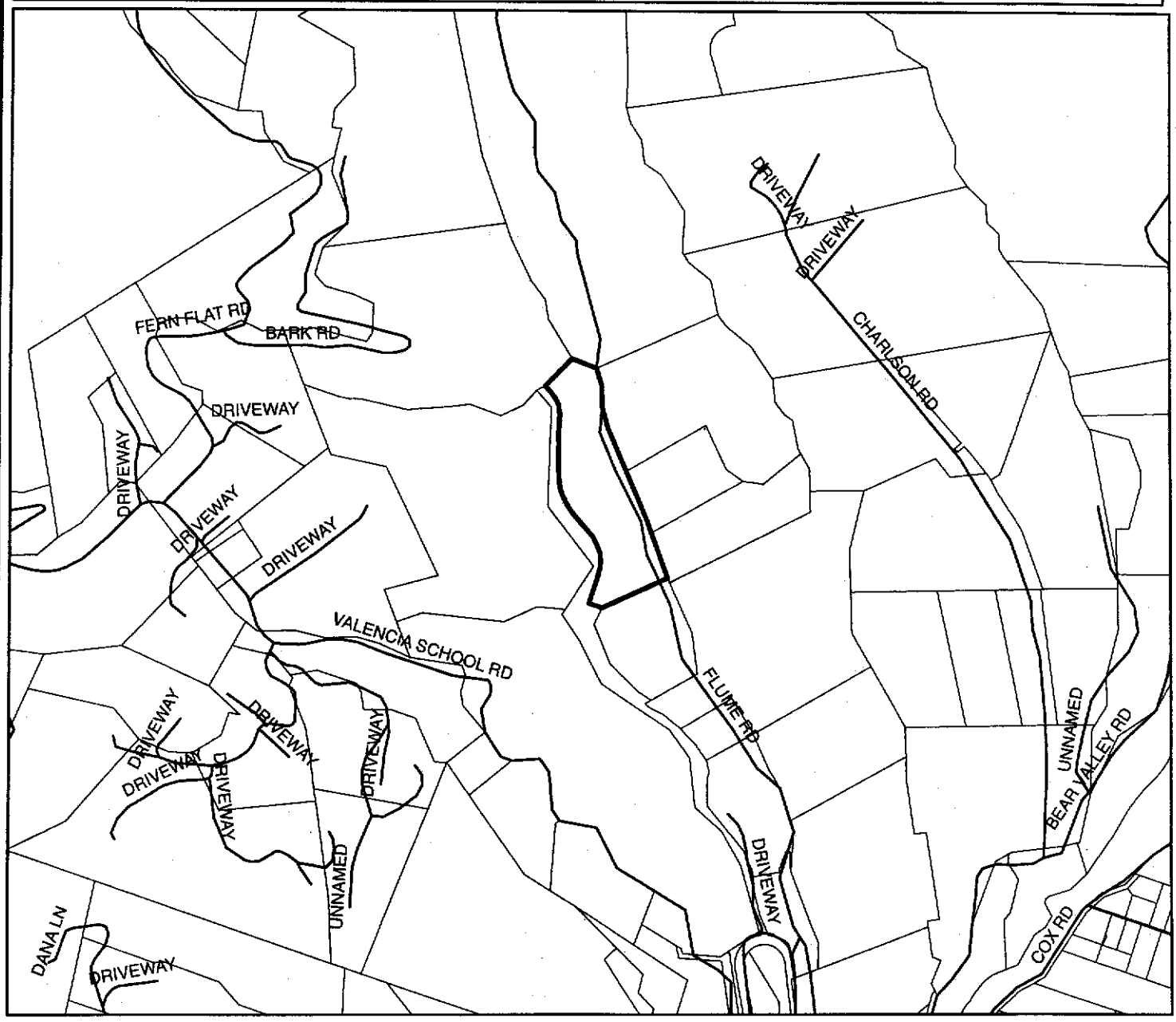
The project is for the construction of one new single-family residence in a residential zone district

In addition, none of the conditions described in Section 15300.2 apply to this project.

_____ Date:_____
Alice Daly, Project Planner

EXHIBIT D

Location Map



0 625 1,250 2,500 3,750 5,000 Feet

LEGEND

APN: 105-151-08

Assessors Parcels

Streets

N

W E

S

Map created by
County of Santa Cruz
Planning Department
November 2007

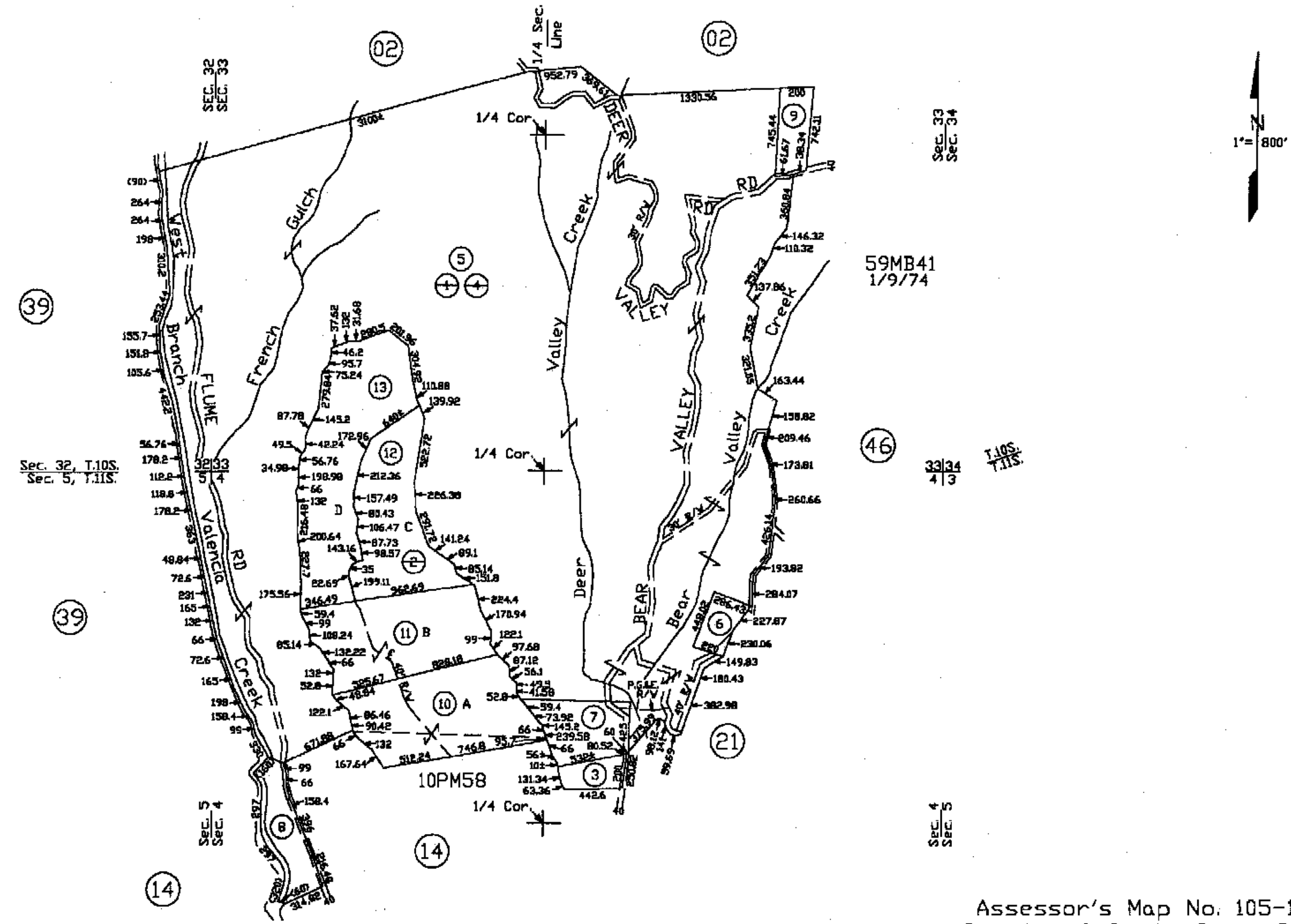
EXHIBIT E

SOQUEL AUGMENTATION RANCHO

POR. SECS. 32 & 33, T.10S., & SECS. 5 & 4, T.11S., R.1E., M.D.B. & M.

Tax Area Code
69-266

105-15



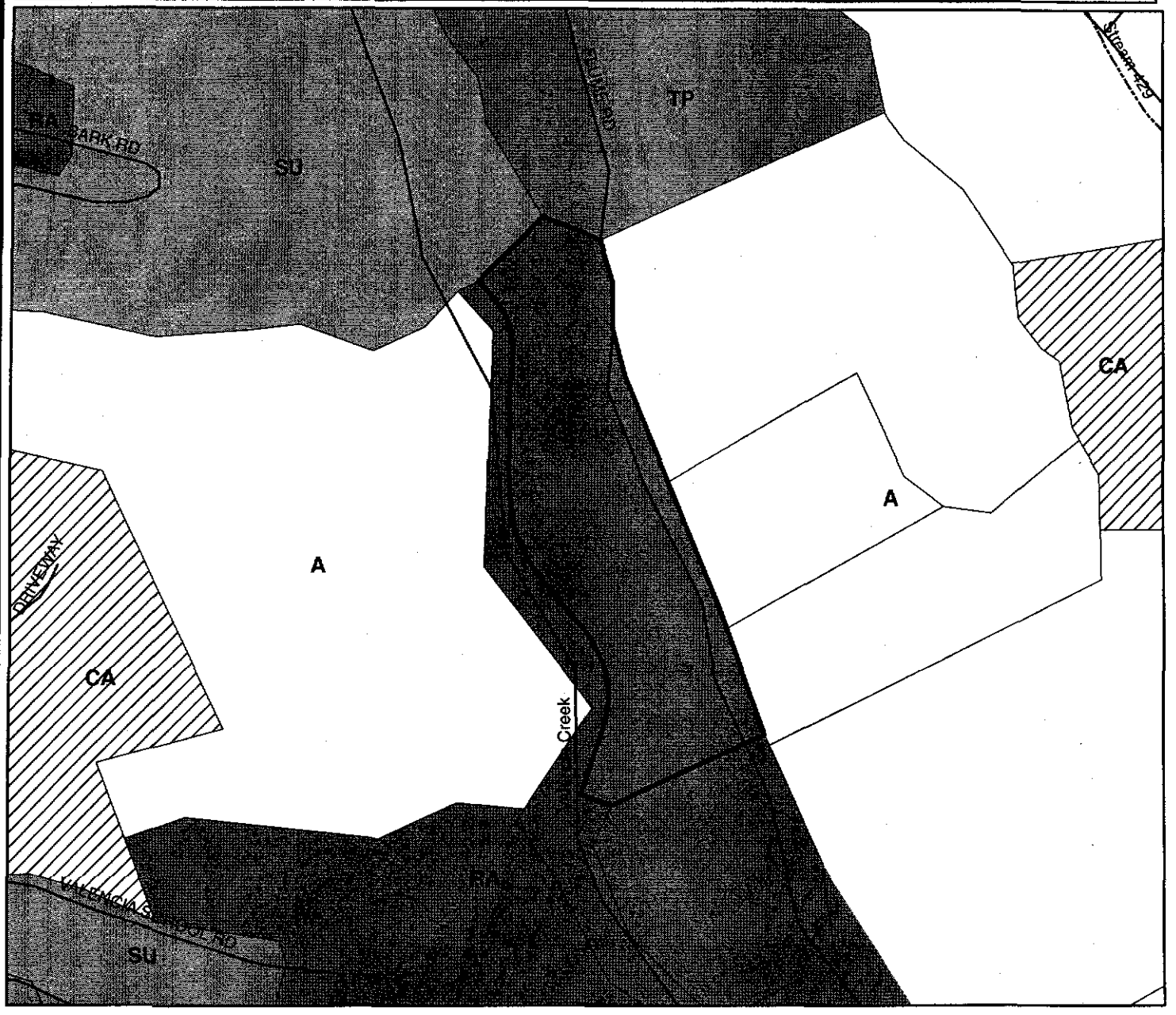
Note - Assessor's Parcel & Block Numbers Shown in Circles.

Assessor's Map No. 105-15
County of Santa Cruz, Calif.
April 1998

Electronically redrawn 4/14/98 KSA
Rev. 3/18/02 mvn (1st name)

EXHIBIT F

Zoning Map



0 260 520 1,040 1,560 2,080 Feet

LEGEND

- APN: 105-151-08
- Assessors Parcels
- Streets

STREAMTYPE

- PERENNIAL
- INTERMITTENT

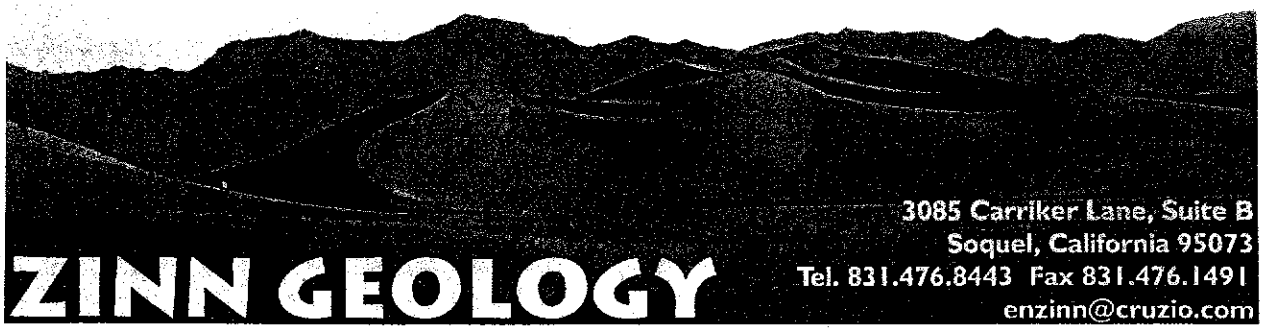
AGRICULTURE

- AGRICULTURE COMMERCIAL
- AGRICULTURE RESIDENTIAL
- SPECIAL USE
- TIMBER PRODUCTION

N W E S

Map created by
County of Santa Cruz
Planning Department
November 2007

EXHIBIT G



ZINN GEOLOGY
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enzinn@cruzio.com

GEOLOGIC INVESTIGATION
Lands of Prussia
Parcel on Flume Road
Aptos, California
County of Santa Cruz APN 105-151-08

Job #2006012-G-SC
7 November 2007

EXHIBIT H

7 November 2007 Job #2006012-G-SC

Greg Prussia
150 Lagunitas Court
Aptos, California 95003-5721

Re: Geologic Investigation
Parcel on Flume Road
Aptos, California
County of Santa Cruz APN 105-151-08

Dear Mr. Prussia:

Our geologic report for the proposed residential development on the property referenced above is attached. This report documents geologic conditions on the subject property germane to the proposed development and addresses potential hazards such as retreat of the top of the steep slope that borders our development envelope through the processes of erosion and shallow landsliding and seismic shaking. Based on the information gathered and analyzed, it is our opinion that the proposed residential development for the subject property is geologically suitable and will be subject to "ordinary risks" (see Appendix B), provided the hazards of erosion, seismic shaking and shallow landsliding are adequately mitigated, and the proposed developments are adequately constructed and maintained. We have drawn a geologically suitable building envelope that encompasses most of the gently sloping area on the upper terrace, set back 10 feet from the top of the steep slope that descends to Valencia Creek. Development within the envelope will be subject to "ordinary" risks (as defined in Appendix B) provided that the geological hazards discussed in the body of this report are adequately mitigated through proper siting and engineering. Appendix B should be reviewed in detail by the property owner or developer, to determine whether an "ordinary risk" as defined in the appendix is acceptable. If this level of risk is unacceptable then the risk should be further mitigated to an acceptable level.

In our opinion, the potential for our development envelope to be impacted by future retreat of the top of the steep slope in the form of shallow landsliding and erosion is low for the lifetime of the residence, corresponding to an ordinary risk. Because we can't absolutely preclude the possibility of future shallow landslides emanating from the slope below the terrace, we are recommending that all residential development be set back at least 10 feet from the top of the slope, and our geological development envelope reflects this setback. This setback should

provide an adequate "buffer" from both future erosion and shallow landslides emanating from the slope below the envelope.

Severe erosion is common in the sandy soils present upon the hills in this region, particularly where the natural drainage is modified by the works of man and not properly controlled. This process may significantly impact the proposed development if any of the proposed drainage controls are not adequately designed and constructed. The project Civil Engineer that develops the grading plans will need to address this issue by providing erosion control measures, such as, energy dissipaters, lined ditches, catch basins, etc. that will reduce the potential of accelerated erosion. Provisions for maintenance will be a requirement in development of this property during and after construction.

The property is located in an area of high seismic activity and will be subject to strong seismic shaking in the future. The controlling seismogenic source for the subject property is the Zayante fault, 1.6 kilometers to the northeast. The design earthquake on this fault should be a M_w 7.0. Although it yields lower seismic shaking values, the expected duration of strong shaking for a M_w 7.9 earthquake on the San Andreas fault is about 38 seconds. Deterministic analysis for the site yields a mean peak ground acceleration of 0.80 g with a corresponding effective peak acceleration of 0.6 g, and a mean peak ground acceleration plus one dispersion of 1.21 g.

We recommend that the residence, driveway and septic system leach fields be located within the development envelope portrayed upon Plate 1. Appurtenant development such as storage structures, fences, hot tubs and landscaping designs, need not be restricted to our development envelope, unless they will elevate the risk to greater than ordinary for habitable structures, access roads or septic systems. Furthermore, the designated building envelopes are issued as the result of a necessarily limited scope of work by our firm. This does not mean that the geological building envelopes cannot be amended in the future, if property owners elect to pursue more rigorous geological investigations or mitigation.

We recommend that the project geotechnical engineer and structural engineer take note of predominant geological process on the slope below our envelopes, and confirm that their proposed foundation scheme is appropriate for this type of geological setting.

The project engineers should review our seismic shaking hazards section and utilize the values most appropriate for their particular analysis, where warranted.

At no time should any concentrated discharge be allowed to spill directly onto the ground adjacent to the proposed developments. Any water landing on paved areas should not be allowed to flow toward the proposed developments. The control of runoff is essential for erosion control and prevention of ponding water against the foundation.

We further recommend that the project design team consider the possibility of collecting surface water in the development area and disposing of it on the lower, active fluvial terrace by Valencia

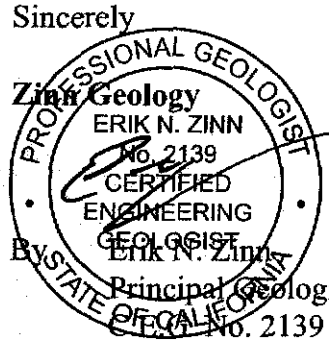
Creek. If the drainage is disposed of in this area, it's disposal will unlikely trigger an elevated potential landslide hazard to the residential development.

We request the privilege of reviewing the following forthcoming documents: geotechnical engineering report (including any supplemental letters), drainage plans, grading plans, foundation plans, civil engineering and architectural plans pertaining to the proposed development. We also recommend that the project civil engineer, structural engineer, architect and wastewater system designer review our report and call us to discuss their preliminary design strategies, prior to finalizing their designs.

All geological observation services must be provided by Zinn Geology during construction of the project. All cuts and pier holes must be observed by Zinn Geology to enable us to form an opinion as to the geological adequacy of the work, the degree of conformance to our report and to provide supplemental recommendations where warranted. Our observation of the pier hole drilling must occur during the drilling of the hole; any pier holes drilled without observation by our firm will be deemed unacceptable. Any cuts or pier holes performed without the direct knowledge and observation of Zinn Geology will render the recommendations of our report invalid.

If you have any questions or comments regarding this report, please contact us at your earliest convenience.

Sincerely



Zinn Geology

By Erik N. Zinn
Principal Geologist
CEG No. 2139

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NOTE: Plates and figures must accompany text of report in order for report to be considered complete.

INTRODUCTION

This report presents the results of our geologic investigation of a currently undeveloped parcel on the Lands of Prussia, County of Santa Cruz APN 105-151-08, a creek side property northeast of the town of Aptos, California (Figure 1). The applicant is applying for a permit to construct a single-family residence above Valencia Creek on a relatively uplifted ancestral creek terrace (Figure 1 and Plate 1). Proposed access to the development on the property will be via short driveways off of Flume Road. Sewage disposal will be presumably handled by the to-be-designed septic system (designed by others) with leach fields located within the geologically suitable building envelopes portrayed upon Plate 1.

The purpose of this investigation was to evaluate the potential geologic hazards relevant to the proposed development on the subject property. The primary focus at the outset of the project was upon the geologic hazards and attendant risks posed by future prospective retreat of the steep slope west of the gently-sloping fossil fluvial terrace. We also identified other potential geological hazards that are ubiquitous to the Santa Cruz region such as erosion and intense seismic shaking for this project.

We were provided with the following documents for this project:

An electronic copy of "SITE EVALUATION RESULTS MAPS FOR SEPTIC SYSTEM FEASIBILITY" by Bio-Sphere Consulting, dated 13 July 2006, Job Number 06013, one sheet, intended publication scale 1"=30'.

A faxed copy of an excerpt from a map (title and date unknown) drawn by Robin Brownfield depicting the footprint of the proposed residence, deck and driveway.

SCOPE OF INVESTIGATION

Work performed during this study included:

1. A review of published and unpublished maps and reports in the vicinity of the property.
2. Examination and interpretation of stereo-pair vertical aerial photographs, to assess the past slope stability of the slopes on the property.
3. Several field meetings on the property, including, the County of Santa Cruz Geologist, Joseph Hanna, the project geotechnical engineer, Chris George of Haro, Kasunich and Associates, the project civil engineer, Jaime Ziegler, the project sanitarian, Andrew Brownstone of Bio-Sphere Consulting and Greg Prussia. We also met with Bill St. Clair of Haro, Kasunich and Associates to discuss our qualitative slope stability analysis.
4. Field mapping of the property.
5. Co-logging of exploratory backhoe test pits with Andrew Brownstone of Bio-Sphere Consulting.

6. Preparation of a geologic site map and geologic cross sections for the proposed home site and surrounding area.
7. Analysis and interpretation of the geologic data and preparation of this report.

REGIONAL GEOLOGIC SETTING

The subject property is located within the central Santa Cruz Mountains. The Santa Cruz Mountains are formed by a series of rugged, linear ridges and valleys following the pronounced northwest to southeast structural grain of central California geology. Underlying most of the Santa Cruz Mountains is a large, elongate prism of granitic and metamorphic basement rocks, known collectively as the Salinian Block. These rocks are separated from contrasting basement rock types to the northeast and southwest by the San Andreas and San Gregorio-Sur Nacimiento strike-slip fault systems, respectively. Overlying the granitic basement rocks is a sequence of dominantly marine sedimentary rocks of Paleocene to Pliocene age and non-marine sediments of Pliocene to Pleistocene age (Figure 2).

Throughout the Cenozoic Era, this portion of California has been dominated by tectonic forces associated with lateral or "transform" motion between the North American and Pacific lithospheric plates, producing long, northwest-trending faults such as the San Andreas and San Gregorio, with horizontal displacements measured in tens to hundreds of miles. Accompanying the northwest direction of the horizontal (strike-slip) movement of the plates have been episodes of compressive stress, reflected by repeated episodes of uplift, deformation, erosion and subsequent redeposition of sedimentary rocks. Near the crest of the Santa Cruz Mountains, this tectonic deformation is most evident in the sedimentary rocks older than the middle Miocene, and consists of steeply dipping folds, overturned bedding, faulting, jointing, and fracturing. Along the coast, the ongoing tectonic activity is most evident in the formation of a series of uplifted marine terraces. The Loma Prieta earthquake of 1989 and its continuing aftershocks are the most recent reminders of the geologic unrest in the region.

REGIONAL SEISMIC SETTING

California's broad system of strike-slip faulting has had a long and complex history. Some of these faults present a seismic hazard to the subject property. The most important of these are the San Andreas and the Zayante (-Vergeles) faults (Figure 2). These faults are either active or considered potentially active (Hall et al., 1974; Cao et al., 2003). Each fault is discussed below. Locations of epicenters associated with the faults are shown in Figure 3. The intensity of seismic shaking that could occur at the subject property in the event of a future earthquake on one of these faults will be discussed in a later section.

San Andreas Fault

The San Andreas fault is active and represents the major seismic hazard in northern California. The main trace of the San Andreas fault trends northwest-southeast and extends over 700 miles

from the Gulf of California through the Coast Ranges to Point Arena, where the fault extends offshore.

Geologic evidence suggests that the San Andreas fault has experienced right-lateral, strike-slip movement throughout the latter portion of Cenozoic time, with cumulative offset of hundreds of miles. Surface rupture during historical earthquakes, fault creep, and historical seismicity confirm that the San Andreas fault and its branches, the Hayward, Calaveras, and San Gregorio faults, are all active today.

Historical earthquakes along the San Andreas fault and its branches have caused significant seismic shaking in the Santa Cruz County area. The two largest historical earthquakes on the San Andreas to affect the area were the moment magnitude (M_w) 7.9 San Francisco earthquake of 18 April 1906 (actually centered near Olema) and the M_w 7.0 Loma Prieta earthquake of 17 October 1989. The San Francisco earthquake caused severe seismic shaking and structural damage to many buildings in the Santa Cruz Mountains. The Loma Prieta earthquake appears to have caused more intense seismic shaking than the 1906 event in localized areas of the Santa Cruz Mountains, even though its regional effects were not as extensive. There were also significant earthquakes in northern California along or near the San Andreas fault in 1838, 1865 and possibly 1890 (Sykes and Nishenko, 1984; Working Group On Northern California Earthquake Probabilities [WGONCEP], 1996).

Geologists have recognized that the San Andreas fault system can be divided into segments with "characteristic" earthquakes of different magnitudes and recurrence intervals (Working Group On California Earthquake Probabilities, 1988 and 1990). A more recent study by the WGONCEP in 1996 has redefined the segments and the characteristic earthquakes for the San Andreas fault system in northern and central California. Two overlapping segments of the San Andreas fault system represent the greatest potential hazard to the subject property. The first segment is defined by the rupture that occurred from the Mendocino triple junction to San Juan Bautista along the San Andreas fault during the great M_w 7.9 earthquake of 1906. The WGONCEP (1996) has hypothesized that this "1906 rupture" segment experiences earthquakes with comparable magnitudes in independent cycles about two centuries long.

The second segment is defined by the rupture zone of the M_w 7.0 Loma Prieta earthquake, despite the fact that the oblique slip and focal depth of this event do not fit the ideals of a typical, right-lateral strike-slip event on the San Andreas fault. Although it is uncertain whether this "Santa Cruz Mountains" segment has a characteristic earthquake independent of great San Andreas fault earthquakes, the WGONCEP (1996) has assumed an "idealized" earthquake of M_w 7.0 with the same right-lateral slip as the 1989 Loma Prieta earthquake, but having an independent segment recurrence interval of 138 years and a multi-segment recurrence interval of 400 years.

The 2002 Working Group On California Earthquake Probabilities [WGOCEP] (2003) segmentation model is largely similar to that adopted by WGONCEP, although they have added far more complexity to the model, and have reduced the forecasted magnitudes for the different

segments. Cao et al. (2003) appears to have largely adopted the earthquake magnitudes issued by the 2002 WGOCEP. The magnitudes for the sundry segments are as follows: Parkfield segment - Mw 6.5, Creeping Segment - Mw 6.2, Santa Cruz Mountains - Mw 7.0, Peninsula segment - Mw 7.1, North Coast North Segment - Mw 7.3, North Coast South Segment - Mw 7.4. The most significant change in modeling the San Andreas Fault Zone by 2002 WGOCEP and Cao et al. (2003) is the elimination of a the penultimate event, the 1906 Mw 7.9 earthquake.

Zayante(-Vergeles) Fault

The Zayante fault lies west of the San Andreas fault and trends about 50 miles northwest from the Watsonville lowlands into the Santa Cruz Mountains. The southern extension of the Zayante fault, known as the Vergeles fault, merges with the San Andreas fault south of San Juan Bautista.

The Zayante fault has a long, well-documented history of vertical movement (Clark and Reitman, 1973), probably accompanied by right-lateral, strike-slip movement (Hall et al., 1974; Ross and Brabb, 1973). Stratigraphic and geomorphic evidence indicates the Zayante fault has undergone late Pleistocene and Holocene movement and is potentially active (Buchanan-Banks et al., 1978; Coppersmith, 1979).

Some historical seismicity may be related to the Zayante fault (Griggs, 1973). For instance, the Zayante fault may have undergone sympathetic fault movement during the 1906 earthquake centered on the San Andreas fault, although this evidence is equivocal (Coppersmith, 1979). Seismic records strongly suggest that a section of the Zayante fault approximately 3 miles long underwent sympathetic movement in the 1989 earthquake. The earthquake hypocenters tentatively correlated to the Zayante fault occurred at a depth of 5 miles; no instances of surface rupture on the fault have been reported.

In summary, the Zayante fault should be considered potentially active. The WGONCEP (1996) considers it capable of generating a magnitude 6.8 earthquake with an effective recurrence interval of 10,000 years. Alternatively, Cao et al. (2003) considers this fault capable of generating a maximum earthquake of Mw 7.0, with no stated recurrence interval.

SITE GEOLOGIC SETTING

The Geologic Map (Plate 1) and Geologic Cross Sections (Plate 2) depict relevant site-specific topographic and geologic information for the property. See also the Local Geologic Map (Figure 4) for information of a more general nature.

Topography

The property and proposed home sites encompass a relatively-uplifted ancestral fluvial terrace and the erosionally-modified former bluff above Valencia Creek (Figure 1 and Plate 1), with all of the area designated as geologically feasible to build upon sitting upon the gently-sloping

ground of the ancestral fluvial terrace. Near the western edge of our building envelope, the slope descends steeply down an to an active fluvial terrace along Valencia Creek (see Plates 1 and 2). A short steep creek-bank slope then subsequently descends westward from the active terrace into the active channel of Valencia Creek.

Drainage

Natural surface drainage across the property occurs by overland sheet flow toward the west, eventually flowing over the outboard edge of the ancestral creek terrace and down the slope onto the active fluvial terrace and directly into Valencia Creek.

Surface drainage along Flume Road, east of the property is collected by an array of ditches that line the road. It appears that a portion of this drainage is collected in an existing culvert that daylights in the slope below the upper portion of the property, near the northern end of the property (see Plate 1). Bio-Sphere Consulting encountered this culvert during their subsurface exploration program, and we have located their test pit as well as the outfall of the pipe on our map. There is also one area where the surface drainage along Flume Road ponds along the outboard edge of the road, which is noteworthy because it appears to be triggering accelerated erosion of the slope below the road (and above the dirt road on the subject property) in the form of sporadic very shallow slump-style landslides.

Some of the rainfall on the property probably infiltrates the ground and enters the groundwater regime. We did not observe seeps, springs or any other surface manifestations of high groundwater levels on the property during our investigation in the summer of 2006. Haro, Kasunich and Associates did not encounter free water within the fluvial terrace deposits in their small diameter borings advanced on 30 June 2006, although the stratigraphic column of soils were variably moist, ranging from dry to wet, indicating that groundwater may perch atop less transmissive layers during the rainy season.

Earth Materials

McLaughlin et al. (2001) shows the subject property as being underlain by Tertiary age Purisima Formation (Figure 4). His mapping in the region surrounding the property shows bedding as striking roughly 5 degrees or less to the southwest. His work is partially consistent with our field reconnaissance observations and logging of back hoe test pits and small-diameter exploratory borings.

The underlying Purisima Formation bedrock on the property is predominantly by fine- to medium-grained sand, containing varying percentages of silt and clay in the matrix, as well as interbeds of silt and clay. We have divided the underlying bedrock into three sub-units to the depths explored for the purposes of this investigation: a fine- to medium-grained, micaceous clean sand, overlain by a northward-thinning bed of fine- to medium-grained sand to clayey sand containing interbeds of silt and clay, which in turn is capped by fine-grained sand with silt and

clay (see Plate 2 for graphical depiction of the sub-units). We did not observe any reliable evidence of bedding or discontinuities such as joints or fractures in local road cut exposures or test pits, so we cannot confirm the validity of the structure of the bedrock depicted to the east of the property by McLaughlin et al. (2001). Since the body of Purisima Formation bedrock stretching southwest of the Zayante Fault to the coastline is uniformly gently tilted to the southwest, it seems reasonable to assume that the bedrock underlying the property is very gently tilted to the southwest.

A blanket of colluvium buttresses the slope on the northern end of the property (see cross section A-A' on Plate 2), due to the distance of the toe of the slope from Valencia Creek. South of cross section A-A' and further downstream, the colluvium has been removed by Valencia Creek, due to the fact that the active fluvial terrace abuts the slope (see cross section B-B' on Plate 2) in this area.

Alluvium may underlie the active fluvial terrace that abuts Valencia Creek, but we were unable to verify the composition or geometry of the alluvium/bedrock contact during our field reconnaissance. It is, however, important to note that this is not germane to the geological hazards and attendant risks for the proposed developments at this stage of our investigation.

Although it is not related to the earth materials per se, we noted that the upper portions of subject property abutting Flume Road, lie along the outboard edge of a larger, abandoned, relatively-uplifted fossil fluvial terrace. There do not appear to be any fluvial terrace deposits or alluvial deposits associated with the terrace, so the landform is likely a stranded erosional terrace associated with an ancestral Valencia Creek. The current location and elevation of Valencia Creek, well below the upper portions of the property, is likely graded to the last sea-level low stand that occurred approximately 18,000 years ago. This means that the terrace surface occupying the upper portions of the property, and the slope below the terrace, are at least 18,000 years old. The significance of this synthesis will be elaborated upon in the subsequent sections of the report that deal with landsliding hazards.

GEOLOGIC HAZARDS

The primary potential geologic hazards that we addressed for the proposed remodel are erosion, shallow landsliding and intense seismic shaking. The following sections address these hazards.

Erosion

A process that may impact the proposed development is retreat of the top of the slope at the outboard edge of the terrace, which can be partially attributed to erosion. Erosion will likely contribute to the gradual retreat of the top of the slope over the 50-year design life of the residence.

We attempted to use historical stereopair aerial photographs, dating back to 1948, to assess the long-term retreat of the terrace, but found that the canopy of the hardwood and redwood trees on the property completely obscure the top of the terrace throughout the entire aerial photograph history.

Severe erosion is common in the sandy soils present upon the hills in this region, particularly where the natural drainage is modified by the works of man and not properly controlled. Typically, once the upper surface of the weathered sandy earth materials is breached by a rill or a gully, erosion proceeds at an accelerated rate, and the rills and gullies deepen and migrate headward (upslope). An example of this process is located downslope from the uncontrolled outfall of the culvert that once directed surface drainage from Flume Road (see Plate 1); a large erosional gully has formed downstream from the outfall, and this gully continues to incise and widen. This process may significantly impact the proposed development if any of the proposed drainage controls are not adequately designed and constructed. The project Civil Engineer that develops the grading plans will need to address this issue by providing erosion control measures, such as, energy dissipaters, lined ditches, catch basins, etc. that will reduce the potential of accelerated erosion. Provisions for maintenance will be a requirement in development of this property during and after construction.

Seismic Shaking Hazard

Seismic shaking at the subject site will be intense during the next major earthquake along one of the local fault systems. It is important that our recommendations regarding seismic shaking be considered in the design for the proposed development where applicable.

Deterministic Seismic Shaking Analysis

For the purpose of evaluating deterministic peak ground accelerations for the site, we have considered two seismic sources, the San Andreas and Zayante fault zones. While other faults or fault zones in this region may be active, their potential contributions to deterministic seismic hazards at the site are overshadowed by this fault. Table 1 shows the moment magnitude of the characteristic or maximum earthquake, estimated recurrence interval and the distance from the site for each of this fault system. We took the fault data from "Database of potential sources for earthquakes larger than magnitude 6 in Northern California" (WGONCEP, 1996), Petersen et al. (1996) and Cao et al. (2003). Also shown on Table 1 are calculated on-site accelerations from the listed earthquake derived using several different methods. These accelerations are based on attenuation relationships derived from the analysis of historical earthquakes. Because the historical data can be interpreted in different ways, there are a number of different attenuation relationships available. We have employed a fairly conservative attenuation relationship for rock/shallow soil sites in deriving the acceleration values listed in Table 1.

The "maximum considered earthquake ground motion," as defined by FEMA (1998), is also listed in Table 1. FEMA (1998) and the National Earthquake Hazards Reduction Program

suggest that in regions of high seismicity, such as coastal California, the appropriate design level for ground shaking is the deterministically derived mean peak horizontal ground acceleration multiplied by 1.5. Applying this method to the subject property results in ground shaking parameters roughly equivalent to the deterministically derived mean values plus one dispersion.

Table 1
Faults, Earthquakes and Deterministic Seismic Shaking Data

Fault	Moment Magnitude of Characteristic or Maximum Earthquake (M_w)	Estimated Recurrence Interval (years)	Distance from Site (km)	Estimated Mean Peak Ground Acceleration (g)[1]	Estimated Mean + One Dispersion Ground Acceleration (g)[1]	Maximum Considered Earthquake Ground Motion[2] (g)
Zayante-Vergeles	7.0	10,000	1.6	0.80	1.21	1.20
San Andreas (1906 rupture)	7.9	210	7.6	0.52	0.77	0.79

[1] Sadigh et al., 1997
[2] FEMA, 1998

If the deterministically derived accelerations are used for engineering analysis on the subject property, we recommend utilizing the attenuation relationship developed by Sadigh et al. (1997). It is important to note that predicting seismic shaking intensity is a field that is dominated heavily by theory, with a paucity of near-field station readings in rock and shallow soil settings. It should also be noted that the accelerations listed in Table 1 are only average values. Therefore, we caution that the listed values are approximations, rather than precise predictions. Actual measured "free-field" accelerations may be larger.

Based on the results listed in Table 1, the mean peak ground acceleration expected at the property will be approximately 0.80 g, the maximum earthquake ground motion (mean acceleration plus one dispersion) expected at the subject property will be approximately 1.21 g, based on a M_w 7.0 earthquake (reverse-faulting event) centered on the Zayante fault zone 1.6 kilometers northeast of the site.

Naeim and Anderson (1993) found that "effective peak acceleration" (EPA) is more typically about 75 percent of the peak acceleration. Effective peak acceleration is comparable to "repeatable high ground acceleration" (after Ploessel and Slossen, 1974) and is generally considered to represent the large number of lower amplitude peaks on an accelerogram recording. This suggests that the mean peak horizontal ground acceleration of 0.80 g would generate an EPA of approximately 0.60 g.

The duration of strong shaking is dependent on magnitude. Dobry et al. (1978) have suggested a relationship between magnitude and duration of "significant" or strong shaking expressed by the formula:

Log D = 0.432 M - 1.83 (where D is the duration and M is the magnitude).

On the basis of the above relationship, the duration of strong shaking associated with a magnitude 7.0 earthquake (the characteristic earthquake for the Zayante fault zone) is estimated to be about 16 seconds. In contrast, the duration of strong shaking associated with a magnitude 7.9 earthquake (the characteristic earthquake for the San Andreas fault) is estimated to be about 38 seconds. Considering the recurrence intervals of the San Andreas and Zayante faults, the residence is much more likely to experience the characteristic event on the San Andreas, with lower peak accelerations than the design earthquake on the Zayante but lasting more than two times as long. Bear in mind that the duration of strong seismic shaking may be even more critical as a design parameter than the peak acceleration itself.

Shallow Landsliding Hazards

We did not observe any evidence of landslides being shed off of the slope below the upper terrace, which, as noted in the above Earth Materials section, has to be older than 18,000 years. The fact that there is no fossil evidence of catastrophic, deep-seated landsliding in at least the past 18,000 years is important, leading us to conclude that the potential for this type of failure to occur is low for the 50-year design life of a residence. It does not, however, preclude the possibility that smaller, shallower landslides, such as debris flows have occurred in the past and might occur in the future on the slope below the terrace. Although we did not observe any scars or landslide deposits associated with historical shallow landsliding out of the slope below the terrace on the subject property, we did observe examples of historical shallow landslides out of the slope upstream and downstream of the property. Said landslides were typically less than 10 cubic yards in size and less than five feet deep.

We have discussed the aforementioned findings with Chris George of Haro, Kasunich and Associates and the implications for quantitative slope stability analysis. It is very difficult, in our opinion, to quantitatively model debris flows, particularly under psuedostatic conditions. We are not recommending that a quantitative slope stability analysis be performed by the project geotechnical engineer at this stage of our investigation, because of this conclusion, and the conclusion that the slope appears to be grossly stable with respect to deep-seated landsliding under static and psuedostatic conditions throughout geological time. If, for some reason, a quantitative slope stability analysis is performed, we recommend that we be retained to assist the project geotechnical engineer with the geological aspects of the model.

Because we can't preclude the possibility of future shallow landslides emanating from the slope below the terrace, we are recommending that all residential development be set back at least 10 feet from the top of the slope. We have drawn a geological development envelope that reflects

this setback. This setback should provide an adequate "buffer" from both future erosion and shallow landslides emanating from the slope below the envelope.

It is important to note that geologic investigations for residential development have typically focused upon the hazards and attendant risks posed to habitable structures, access roads and septic systems. The goal of the investigation is to characterize the potential geologic processes that might injure or kill people, cut off vehicular access (such as emergency vehicles) to the residence, or prevent usage of the septic system over the assumed 50-year design life of a residence. Consulting geologists do not typically address other appurtenant development activities such as storage structures, fences, hot tubs and landscaping designs, unless they will elevate the risk to greater than ordinary for habitable structures, access roads or septic systems. Furthermore, the designated building envelopes as part of a standard geological investigation is issued as the result of a necessarily limited scope of work by the geologic consultant. This does not mean that the geological building envelopes cannot be amended in the future, if property owners elect to pursue more rigorous geological investigations or mitigation.

REVIEW OF DEVELOPMENT FOOTPRINT

We were faxed an excerpt of the proposed residence, deck and driveway footprint by the project designer, Robin Brownstone on 2 November 2007. We have taken the liberty of plotting this information upon our geologic site map (see Plate 1). The proposed residence and driveway appear to be entirely within our envelope. The proposed deck projects slightly out of the downslope boundary of our envelope. We therefore recommend that none of the foundational elements of the current proposed configuration of the deck be located outside of our envelope. It is acceptable, in our opinion, to cantilever the deck outside of our envelope, provided that it derive no support whatsoever from the ground outside our envelope. Another alternative to cantilevering the deck would be to reposition the footprint of the deck entirely within the envelope shown on Plate 1.

REVIEW OF SITE EVALUATION RESULTS MAP BY BIO-SPHERE CONSULTING

We have reviewed the "Site Evaluation Results Map" dated 13 July 2006, prepared by Bio-Sphere Consulting. The map depicts the location of the test pits, percolation holes and areas considered to be suitable for the disposal of septic tank effluent. The disposal area envelopes drawn by Bio-Sphere Consulting fall entirely within our envelopes. The reader may note that the northern envelope is currently occupied mostly by the proposed footprint of the residence, deck and driveway.

In our opinion, from a geological perspective, the southern disposal area envelope, located at the extreme southern end of the property is the best option for effluent disposal because it is farther from the top of the steep slope and is located far away from the other proposed residential developments. The residence and driveway would be unaffected by the extremely rare event of leach fields failing in the future if the leach fields are located at the southern end of the property.

EXHIBIT H

CONCLUSIONS

Based on the information gathered and analyzed, it is our opinion that the proposed residential development for the subject property is geologically suitable and will be subject to "ordinary risks" (see Appendix B), provided the hazards of erosion, seismic shaking and shallow landsliding are adequately mitigated, and the proposed developments are adequately constructed and maintained. We have drawn a geologically suitable building envelope that encompasses most of the gently sloping area on the upper terrace, set back 10 feet from the top of the steep slope that descends to Valencia Creek. Development within the envelope will be subject to "ordinary" risks (as defined in Appendix B) provided that the geological hazards discussed in the body of this report are adequately mitigated through proper siting and engineering. Appendix B should be reviewed in detail by the property owner or developer, to determine whether an "ordinary risk" as defined in the appendix is acceptable. If this level of risk is unacceptable then the risk should be further mitigated to an acceptable level.

In our opinion, the potential for our development envelope to be impacted by future retreat of the top of the steep slope in the form of shallow landsliding and erosion is low for the lifetime of the residence, corresponding to an ordinary risk. Because we can't absolutely preclude the possibility of future shallow landslides emanating from the slope below the terrace, we are recommending that all residential development be set back at least 10 feet from the top of the slope, and our geological development envelope reflects this setback. This setback should provide an adequate "buffer" from both future erosion and shallow landslides emanating from the slope below the envelope.

Severe erosion is common in the sandy soils present upon the hills in this region, particularly where the natural drainage is modified by the works of man and not properly controlled. This process may significantly impact the proposed development if any of the proposed drainage controls are not adequately designed and constructed. The project Civil Engineer that develops the grading plans will need to address this issue by providing erosion control measures, such as, energy dissipaters, lined ditches, catch basins, etc. that will reduce the potential of accelerated erosion. Provisions for maintenance will be a requirement in development of this property during and after construction.

The property is located in an area of high seismic activity and will be subject to strong seismic shaking in the future. The controlling seismogenic source for the subject property is the Zayante fault, 1.6 kilometers to the northeast. The design earthquake on this fault should be a M_w 7.0. Although it yields lower seismic shaking values, the expected duration of strong shaking for a M_w 7.9 earthquake on the San Andreas fault is about 38 seconds. Deterministic analysis for the site yields a mean peak ground acceleration of 0.80 g with a corresponding effective peak acceleration of 0.6 g, and a mean peak ground acceleration plus one dispersion of 1.21 g.

RECOMMENDATIONS

1. We recommend that the residence, driveway and septic system leach fields be located within the development envelope portrayed upon Plate 1. Appurtenant development such as storage structures, fences, hot tubs and landscaping designs, need not be restricted to our development envelope, unless they will elevate the risk to greater than ordinary for habitable structures, access roads or septic systems. Furthermore, the designated building envelopes are issued as the result of a necessarily limited scope of work by our firm. This does not mean that the geological building envelopes cannot be amended in the future, if property owners elect to pursue more rigorous geological investigations or mitigation.

2. We recommend that the project geotechnical engineer and structural engineer take note of predominant geological process on the slope below our envelopes, and confirm that their proposed foundation scheme is appropriate for this type of geological setting.

3. The project engineers should review our seismic shaking hazards section and utilize the values most appropriate for their particular analysis, where warranted.

3. At no time should any concentrated discharge be allowed to spill directly onto the ground adjacent to the proposed developments. Any water landing on paved areas should not be allowed to flow toward the proposed developments. The control of runoff is essential for erosion control and prevention of ponding water against the foundation.

We further recommend that the project design team consider the possibility of collecting surface water in the development area and disposing of it on the lower, active fluvial terrace by Valencia Creek. If the drainage is disposed of in this area, it's disposal will unlikely trigger an elevated potential landslide hazard to the residential development.

4. We strongly recommend that home owners implement the simple safety procedures outlined by Peter Yanev in his book, *Peace of Mind in Earthquake Country*. This book contains a wealth of information regarding earthquakes, seismic design, and precautions that the individual home owner can take to reduce the potential for loss of life, injury and property damage.

5. We request the privilege of reviewing the following forthcoming documents: geotechnical engineering report (including any supplemental letters), drainage plans, grading plans, foundation plans, civil engineering and architectural plans pertaining to the proposed development. We also recommend that the project civil engineer, structural engineer, architect and wastewater system designer review our report and call us to discuss their preliminary design strategies, prior to finalizing their designs.

6. All geological observation services must be provided by Zinn Geology during construction of the project. All cuts and pier holes must be observed by Zinn Geology to enable us to form an opinion as to the geological adequacy of the work, the degree of conformance to our report and to

provide supplemental recommendations where warranted. Our observation of the pier hole drilling must occur during the drilling of the hole; any pier holes drilled without observation by our firm will be deemed unacceptable. Any cuts or pier holes performed without the direct knowledge and observation of Zinn Geology will render the recommendations of our report invalid.

INVESTIGATION LIMITATIONS

1. The conclusions and recommendations noted in this report are based on probability and in no way imply the site will not possibly be subjected to ground failure or seismic shaking so intense that structures will be severely damaged or destroyed. The report does suggest that pursuing mitigation measures structures at the subject site, in compliance with the recommendations noted in this report, will result in an "ordinary" risk to the residence as defined in Appendix B.

2. This report is issued with the understanding that it is the duty and responsibility of the owner or his representative or agent to ensure that the recommendations contained in this report are brought to the attention of the architect and engineer for the project, incorporated into the plans and specifications, and that the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

3. If any unexpected variations in soil conditions or if any undesirable conditions are encountered during construction or if the proposed construction will differ from that planned at the present time, Zinn Geology should be notified so that supplemental recommendations can be given.

COUNTY OF SANTA CRUZ

PLANNING DEPARTMENT
701 OCEAN STREET, 4TH FLOOR, SANTA CRUZ, CA 95060
(831) 454-2580 FAX: (831) 454-2131 TDD: (831) 454-2123
TOM BURNS, PLANNING DIRECTOR

November 30, 2007

Gregory Prussia
150 Lagunitas Road
Aptos, CA 95003

Subject: Geotechnical Engineering by Haro, Kasunich and Assocaites, Dated November 15, 2007, Projct Number SC9172; and **Engineering Geology Report** by Zinn Geology dated November 7, 2007, Job Number 2006012-G-SC

Reference: **APN:** **105-151-08**
APPL#: **07-0676**

Dear Applicant:

The purpose of this letter is to inform you that the Planning Department *has accepted* the subject report and the following items shall be required:

1. All construction shall comply with the recommendations of the report, and must be located within the development/building envelope designated within the Geology Report dated November 7, 2007.

2. Final plans shall reference the subject reports and include a statement that the project shall conform to the reports' recommendations.

3. An engineered grading, drainage, and erosion control plan are required for this project. All drainage must be taken from the crest of the slope in a pipe and released in a non-erosion manner at the toe of the slope.

4. Unauthorized grading occurred on this property in the early 1990's and most likely repeatedly over the last half century. Please have either the engineering geologist and/or geotechnical engineering indicate the location of previously completed excavations and fills on either the geotechnical site plan or geologic map. This map must be submitted with the project's plan review letters when they are submitted with the Building Permit.

5. All development, including the septic system, must be set back 10 from either side of the culvert.

6. The project geotechnical engineer, or a similar qualified testing laboratory, must be employed to provide ***constant inspect*** and test all the fill material placed on the site. The relative compaction tests' location must be noted on a copy of the approved grading plans, and all related test data must be included in a table with a reference number that correlates the table data to the test location indicated on the grading plan. This testing includes the backfill to any retaining walls.

(over)

EXHIBIT I

Review of the Geotechnical Engineering by Haro, Kasunich and Assocaites, Dated November 15, 2007, Projct Number SC9172; and **Engineering Geology Report** by Zinn Geology dated November 7, 2007, Job Number 2006012-G-SC

7. The attached notice of geologic hazards must be recorded before the final of the building permit.

Our acceptance of the reports is limited to its technical content. Other project issues such as zoning, fire safety, septic or sewer approval, etc. may require resolution by other agencies.

Please call the undersigned at (831) 454-3175 if we can be of any further assistance.

Sincerely,

Joe Hanna
County Geologist

Cc Zinn Geology
Haro, Kasunich, and Associates

EXHIBIT I

Return recorded form to:
Planning Department
County of Santa Cruz
701 Ocean Street, 4th Floor

Attention: Joe Hanna
County Geologist
831-454-3175

Notice

THIS PAGE ADDED TO PROVIDE ADEQUATE SPACE FOR RECORDING INFORMATION (CALIFORNIA GOVERNMENT CODE §27361.6)

EXHIBIT I

County of Santa Cruz

PLANNING DEPARTMENT

701 OCEAN STREET, 4TH FLOOR, SANTA CRUZ, CA 95060
(831) 454-2580 FAX: (831) 454-2131 TDD: (831) 454-2123
TOM BURNS, PLANNING DIRECTOR

STEPS FOR COMPLETING THE ENCLOSED DECLARATION OF GEOLOGIC HAZARDS

Read the following instructions and carry out all steps. Do not make any alterations to the form, except as allowed by #2 below. FAILURE TO FOLLOW THE INSTRUCTIONS OR ALTERATIONS TO THE FORM WILL RESULT IN A DELAY IN THE ISSUANCE OF YOUR PERMIT.

Read the entire Declaration.

1 Check the information filled in by County staff (ownership, Assessor's Parcel Number, recordation dates, volume and page number and address). IF THERE ARE OMISSIONS, FILL IN THE BLANKS. The information can be found on the recorded deed or in the County Recorder's Office. If you feel there are any other errors, contact Environmental Planning staff for instructions. The form is a formal document and shall not be altered as above. Any unauthorized change(s) will result in an additional delay in processing your permit.

2 Have all owner(s) signatures acknowledged by a notary public. An acknowledgement is a form obtained from the notary verifying that the signatory is the person stated on the Declaration.

3 Take, do not mail, the form and recording fee to:

Office if the County Recorder
County Government Center
701 Ocean Street, Room 230
831) 454-2800

4 Bring or send a copy of the recorded document to:

County of Santa Cruz
Planning Department
701 Ocean Street, 4th Floor
Santa Cruz, Ca. 95060

YOUR PERMIT CANNOT BE APPROVED UNTIL THE ABOVE STEPS ARE COMPLETED. Please call Joe Hanna at 831-454-3175 if you have any questions regarding this form.

(over)

EXHIBIT 1

RECORDED AT REQUEST OF:
County of Santa Cruz

WHEN RECORDED MAIL TO:

Santa Cruz County Planning
701 Ocean St.
Santa Cruz, CA 95060

(Space above this line for Recorder's use only)

Note to County Recorder:

Please return to the staff geologist in the Planning Department when completed.

DECLARATION REGARDING THE ISSUANCE OF A DEVELOPMENT PERMIT IN AN AREA SUBJECT TO GEOLOGIC HAZARDS

DECLARATION REGARDING THE ISSUANCE OF A DEVELOPMENT PERMIT IN AN AREA SUBJECT TO GEOLOGIC HAZARDS

The undersigned _____ (names of property owners) (does) (do) hereby certify to be the owner(s) of the real property located in the County of Santa Cruz, State of California, commonly known as_____ _____ (Street address); legally described in that certain deed recorded in Book _____ on Page _____ of the official records of the Santa Cruz County Recorder on _____ (deed recordation date); Assessor's Parcel Numbers 105-151-08.

And, acknowledge that records and reports, filed with the Santa Cruz County Planning Department, indicates that the above described property is located within an area that is subject to geologic hazards, to wit:

> The subject property is located at the top of a hill slope close to the crest of the hill. A **Geotechnical Engineering** by Haro, Kasunich and Assocaites, Dated November 15, 2007, Projct Number SC9172; and **Engineering Geology Report** by Zinn Geology dated November 7, 2007, Job Number 2006012-G-SC determined a building envelope and standards for the foundations that reduce the ponteintal for site erosion or slope instabilty to damage the proposed structures. This property will also be subject to intense seismic shaking.

In addition, having full understanding of said hazards and the proposed mitigation of these hazards, we elect to pursue development activities in an area subject to geologic hazards and do hereby agree to release the County from any liability and consequences arising from the issuance of the development permit.

This declaration shall run with the land and shall be binding upon the undersigned, any future owners, encumbrancers, their successors, heirs, or assignees. This document should be disclosed to the forgoing individuals. This declaration may not be altered or removed from the

EXHIBIT 1

records of the County Recorder without the prior consent of the Planning Director of the County of Santa Cruz.

OWNER: _____ OWNER: _____
Signature Signature

ALL SIGNATURES ARE TO BE ACKNOWLEDGED BEFORE A NOTARY PUBLIC. IF A CORPORATION, THE CORPORATE FORM OF ACKNOWLEDGEMENT SHALL BE USED.

STATE OF CALIFORNIA, COUNTY OF SANTA CRUZ ss

On _____ before me _____,
personally appeared
_____, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity (ies), and that by his/her/their signature(s) on the instrument the person(s) or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

_____

Notary Public in and for said County and State

EXHIBIT 1