

July 11, 2008  
Job No. 2595.0

Gamble Family Vineyards  
Attention: Mr. Eric N. Sims  
P.O. Box 128  
Oakville, CA 94562

Report  
Geotechnical Reconnaissance  
Planned New Winery  
APN: 031-100-031  
7554 St. Helena Highway  
Napa, California

This report presents the results of our geotechnical reconnaissance for the subject project. We understand that a new winery is being planned at the northwest portion of the property, in the vicinity of the existing barns and the upslope area. A cut-and-cover structure is being considered as a potential development method. A site plan presented on Plate 1 indicates the generalized limits of the planned development.

The scope of our work, as outlined in our April 28, 2008, agreement included reviewing selected published geologic data, our previous work in the site vicinity, and conducting a surficial reconnaissance of the site. Our scope of work did not include an evaluation of any potential hazardous waste contamination of soil or groundwater at the site.

The purpose of our work has been to provide an opinion regarding the site conditions observed and preliminary geotechnical engineering development considerations. A detailed geotechnical investigation will be necessary to determine the actual conditions and to develop specific recommendations for site development.

On June 11, 2008, our engineering geologist met at the site with Mr. Eric Sims to discuss the planned development and perform a surficial reconnaissance of the site. During our reconnaissance, we observed the topography, the surficial soils, nearby bedrock outcrops,

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and the conditions exposed in several shallow test pits excavated upslope of the existing barns. Distances and slope inclinations were estimated for general reference purposes.

We reviewed our previous work for development of the Cardinale Winery at the adjacent property and the following selected published geotechnical data:

Bauer Associates, March 14, 1997, Report, Geotechnical Investigation, Cardinale Winery, Oakville, California, Job No. 1087.0

Dwyer et al., 1976, Reconnaissance Photo-Interpretation Map of Landslides in 24 Selected 7.5-Minute Quadrangles in Lake, Napa, Solano, and Sonoma Counties: U.S. Geological Survey, Open File Report 76-74, 25 Plates, Scale 1:24,000.

Fox, K. R., et. al., 1973, Preliminary Geology Map of Eastern Sonoma County and Western Napa County, California: U.S. Geological Survey, Miscellaneous Field Studies Map MF-483, BDC-56, Scale 1:62,500.

Hart, E.W., and Bryant, W.A., 1999, Fault-Rupture Hazard Zones in California: California Division of Mines and Geology, Special Publication 42, 38pp.

Wagner, D.L., and Bortugno, E.J., 1982, Geologic Map of the Santa Rosa Quadrangle: California Division of Mines and Geology, Scale 1:250,000.

### SITE CONDITIONS

The property is located about one mile southeast of the Highway 29 and Oakville Cross Road intersection. The northern property line adjoins the Cardinale Winery property. Most of the property is situated on the relatively level valley floor. The northwest corner of the property extends onto an isolated knoll that punctuates the valley floor. A copy of the Napa County GIS, indicating the property, referenced features, and generalized development area is presented on Plate 1.

Slope inclinations on the knoll average about 6:1 (horizontal to vertical). The knoll is generally covered with a moderately dense of native grasses. Bedrock outcrops are frequently exposed on the slopes. Two old barns are located on the valley floor at the

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eastern base of the knoll. We understand that the barns were previously used for dairy cattle. The knoll does not appear to have been previously developed.

The geologic maps reviewed indicate that the site is underlain by volcanic bedrock of the Sonoma Volcanics. Volcanic bedrock is exposed at several locations on the knoll as outcrops and is exposed within the test pits. The bedrock typically consists of hard, strong, and moderately weathered rhyolite and tuff. The exposures indicate that the bedrock is generally closely to moderately fractured. We understand that excavation refusal was encountered within the test pits that were excavated with a 'light-duty' farm tractor. At the valley floor, the bedrock is overlain by alluvium. The alluvial sediments are expected to vary, but often consist of lensing and interfingering units of clays, silt, sands, and gravels. The alluvium is expected to thicken away from the knoll. The estimated limits of the volcanic bedrock and alluvium is presented on Plate 1.

The bedrock on the knoll is typically blanketed with porous (weak) sandy clay surface soils ranging to about a foot thick. We expect that the firm alluvium will be similarly blanketed with weak soils. The depth of weak soils overlying the firm alluvium is unknown, but is expected to be typically on the order of 3 to 5 feet. The depth of weak soils can also be affected by deep ripping associated with previous vineyard development. Some of the surface soils are visually estimated to have a high expansive potential. Highly expansive soils experience volume changes associated with moisture content variations. We did not observe evidence of fill soils based on our surface observations, although localized fills ranging to about 1 or 2 feet deep within the existing barn area could be encountered.

We did not observe any springs or groundwater seepage on the site at the time of our reconnaissance. However, groundwater conditions are expected to vary seasonally and temporarily perched groundwater could rise to within a few feet of the surface during periods of prolonged heavy rainfall.

The published maps do not indicate landsliding at the site. We did not observe evidence of landsliding during our reconnaissance.

Published geologic maps of the area do not show active fault traces at the site. Faults that have experienced surface rupture within about the last 11,000 years are considered 'active'. The property is not within an Alquist-Priolo (AP) Earthquake Fault Zone, which could require a detailed investigation to evaluate the hazard of fault surface rupture in relation to nearby active faults.

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The distance to the faults (or portions of faults) considered seismically active according to current AP Zone criteria are presented in the following table. The indicated distances are interpolated from the map prepared by Wagner and Bortugno, 1982, and may not correspond to the 1997 UBC criteria.

<u>Fault</u>	<u>Direction from the Site</u>	<u>Distance (miles)</u>
West Napa	SE	1-1/2
Hunting Creek-Berryessa	NE	11
Green Valley	SE	12
Cordelia	SE	14
Healdsburg-Rodgers Creek	SW	13
San Andreas	SW	33

Historical records indicate a potential for moderate to strong earthquake shaking within the area. The intensity of future ground shaking will be dependent on several factors such as distance from the site to the earthquake focus, magnitude of the earthquake, and response of the underlying soil and rock. Severe ground shaking could induce slope failures in weak soil/bedrock materials and/or on steep slopes.

### DISCUSSION AND CONCLUSIONS

Based on the results of our work, we judge that the planned development is feasible from a geotechnical engineering viewpoint. In general, the conditions appear to be similar to the conditions encountered at the adjacent Cardinale Winery property. A discussion of potential geotechnical concerns and mitigation methods are discussed in the following paragraphs.

The site is underlain by bedrock that will provide suitable support for the planned development. The firm alluvial soils should likewise provide suitable support. However, where individual structures will span across areas underlain by both bedrock and alluvium, there will be a potential for differential support. Mitigation may be provided by several methods such as extending all foundation support into bedrock or providing a uniform fill blanket beneath the structure. Slab-on-grade floors could be structurally supported on the foundation system to reduce the risk of differential settlement.

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The on-site soils and rock typically appear suitable for reuse as general fill. However, expansive soils will not be suitable for reuse at select fill areas. Large rock boulders generated from excavated areas will typically not be suitable for reuse within fills. Further, if a high percentage of granular materials are generated from the excavations, it may be necessary to combine these materials with import finer grained material. However, our previous experience has been that this concern is not frequently encountered.

Excavation of the volcanic bedrock can occasionally be problematic. However, our previous experience in the area and with the Sonoma Volcanics at other locations has been that the bedrock is generally sufficiently fractured to permit excavation with a D-8 equipped with single tooth rippers. Confined excavations such as for utility lines or footings may require use of a hoe-ram or jackhammer. Subsurface exploration is generally limited with typical backhoe equipment. Although not frequently used, geophysical exploration (i.e. seismic refraction) could be considered as a supplemental method to evaluate excavation difficulty.

The result of our literature review did not reveal active faults passing through the planned development area. Therefore, since future faulting is generally considered most likely to follow the trace of the most recent fault rupture, we estimate that the likelihood of future surface rupture at the development is low.

We anticipate that the intensity of earthquake shaking should be similar to that of other sites in the vicinity. The intensity of future shaking will depend on the distance from the site to the earthquake focus, magnitude of the earthquake, and the response of the structure to the underlying soil and/or rock. If the development will be located with areas underlain by alluvial soils, it may be necessary to evaluate the potential for liquefaction. The project should be designed in strict accordance with current standards for earthquake resistant construction.

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### SUPPLEMENTAL SERVICES

A detailed geotechnical investigation, including subsurface exploration should be performed as a part of the final project design. The results should be analyzed to provide the following geotechnical information:

1. Description of soil and geologic conditions encountered;
2. Site grading;
3. Foundation and design criteria;
4. Retaining wall design criteria, as necessary;
5. Recommendations for slab-on-grade construction, as applicable;
6. Geotechnical engineering drainage recommendations;
7. Recommended additional supplemental services.

### LIMITATIONS

Our work has been performed in accordance with generally accepted standards of geotechnical engineering practice. The information in this report should be considered preliminary and subject to modification as subsurface information and/or more detailed information is available. We are unable to guarantee the stability of any hillside construction.

Our work did not include an evaluation of any hazardous materials at the site. Site conditions and standards of practice change. Therefore, we should be notified to update this letter if the geotechnical investigation is not performed within 18 months of the submittal date.

BAUER ASSOCIATES

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We trust this provides the information you require at this time. If you have questions or wish to discuss this further, please call.

Very truly yours,

BAUER ASSOCIATES



Christopher L. Kramer  
Engineering Geologist - 1231



Bryce Bauer  
Geotechnical Engineer



CLK/BB (recon/gamble vineyards)  
Attachments: Plate 1  
Copies submitted: 6



Reference: [http://gis.napa.ca.gov/prcl\\_smry/prcl\\_info.asp?parcel=031100031000&profile=CITIZEN](http://gis.napa.ca.gov/prcl_smry/prcl_info.asp?parcel=031100031000&profile=CITIZEN)  
 Note: The location of all features are approximate and may vary.

<b>BAUER ASSOCIATES</b>	Job No: 2595.0	<b>SITE PLAN</b>	PLATE <b>1</b>
GEOTECHNICAL CONSULTANTS	Date: 6/08  By: CLK		

APN 031-100-031  
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 Napa County, California





January 28, 2009

Job No. 2595.1

Mr. Tom Gamble, Manager, 7554 LLC  
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Progress Report  
Geotechnical Investigation  
Planned Winery  
APN: 031-100-031  
7554 St. Helena Highway  
Napa, California

This summarizes the status of our geotechnical investigation for the proposed project. The preliminary development layout is indicated on Sheets S1.1 and S1.2, dated December 5, 2008, prepared by Morgan Conolly Architect.

We are performing our work as generally outlined in our agreement dated January 8, 2009. At this time, we have completed our site reconnaissance and subsurface exploration. We are currently completing our engineering analysis and report preparation.

Based on the results of our work, we conclude that the planned development is suitable from a geotechnical engineering viewpoint. The primary geotechnical concern is the presence of weak and expansive surface soils that will need to be reprocessed to provide suitable support of the planned development. We did not encounter soils considered susceptible to liquefaction.

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We trust this provides the information you require at this time. We anticipate that our investigation report will be completed within the next two to three weeks. If you have any questions, or wish to discuss this further, please call.

Yours very truly,

BAUER ASSOCIATES

A handwritten signature in black ink, appearing to read 'Chris Kramer', with a long horizontal flourish extending to the right.

Christopher L. Kramer  
Engineering Geologist - 1231

CLK/BB (cnslt/gamble)  
Copies submitted: 2