

Gilpin Geosciences, Inc
Earthquake & Engineering Geology

July 23, 2021
91707.01

Mr. Drew Aspegren
Napa Valley Vineyard Engineering, Inc.
Main Street, Suite B
St Helena, CA 94574

Subject: Engineering Geological & Geotechnical Evaluation
Atlas Rock Vineyard, Track I
APN 033-010-059
3380 Atlas Peak Road
Napa, California

Dear Mr. Aspegren:

We are pleased to present the results of our engineering geological and geotechnical evaluation of the proposed planting of a new vineyard block, designated Block A at the Atlas Rock Vineyard near Atlas Peak in Napa County, California, as shown on Figure 1.

The site lies within the Milliken Reservoir subwatershed.

We understand that this evaluation will supplement the "Atlas Rock Vineyard Erosion Control Plan, Track I", prepared by Napa Valley Vineyard Engineering, Inc., July 2021.

SCOPE OF SERVICES

The purpose of this evaluation was to review the proposed vineyard development and evaluate the potential impact to local surface erosion and slope stability. To accomplish this, we performed the following tasks:

- reviewed published and unpublished reports and maps of the site;
- reviewed aerial photographs to evaluate the surficial geological features on the site; and,
- performed a geologic reconnaissance on 9 July 2021.

REGIONAL GEOLOGY

The site is located in the Coast Ranges geomorphic province, which is characterized by northwest-southeast trending valleys and ridges. These are controlled by folds and faults that resulted from the collision of the Farallon and North American plates and subsequent shearing along the San Andreas fault.

The site lies southeast of Atlas Peak, a prominent topographic knob at Elevation 2,663 feet that is composed of andesitic lava flow. The site lies at elevations ranging from approximately 1,470 feet to 1,515 feet (Napa County GIS, 2018). The bedrock in the site vicinity is mapped as the basaltic andesite and andesite lavas of the Sonoma Volcanics (Delattre and Sowers, 2006; Fox and others, 1973), as shown on Figure 2. The Sonoma Volcanics andesitic to basaltic lava flows cap the upland of Atlas Peak above the site.

Dwyer and others, (1976) show no landslides in the site vicinity on their published landslide map.

The soil mapped at the site is the Aiken Loam on 2 to 15 percent and 30 to 50 percent slopes and Hambright rock outcrop complex on 30 to 75 percent slopes. Most of the Block is underlain by Hambright rock outcrop. The eastern portion of the vineyard Block is underlain by Aiken loam. The Aiken soils are characterized as developing on basic volcanic rocks and the Hambright rock outcrop complex is mapped as bedrock outcrop with little soil development (USDA, 1978).

Faults and Seismicity

The major active faults in the area are the Hunting Creek, West Napa, and Green Valley. Numerous damaging earthquakes have occurred along these faults in recorded time. For these and other active faults within a 50-kilometer radius of the site, the distance from the site and estimated characteristic moment magnitude¹ [Petersen et al. (2014) & Thompson et al. (2016)] are summarized in Table 1. These references are based on the Third Uniform California Earthquake Rupture Forecast (UCERF3), prepared by Field et al. (2013).

¹ Moment magnitude (M_w) is an energy-based scale and provides a physically meaningful measure of the size of a faulting event. Moment magnitude is directly related to average slip and fault rupture area.

TABLE 1
Regional Faults and Seismicity

Fault Segment	Approximate Distance from Site (km)	Direction	Characteristic Moment Magnitude
Hunting Creek (Berryessa)	1.3	East	6.69
Green Valley	1.4	East	6.30
West Napa	13	Southwest	6.97
Great Valley 04b (Gordon Valley)	19	East	6.77
Great Valley 04a (Trout Creek)	25	East	6.60
Great Valley 05 (Pittsburg - Kirby Hills alt2)	27	East	6.66
Total Hayward + Rodgers Creek (RC+HN+HS+HE)	31	Southwest	7.58
Rodgers Creek - Healdsburg	31	Southwest	7.19
Hunting Creek (Bartlett Springs connector)	32	North	6.79
Hayward (North, HN)	32	Southwest	6.90
Great Valley 05 (Pittsburg - Kirby Hills alt1)	34	Southeast	6.60
Great Valley 03 (Mysterious Ridge)	35	Northeast	7.03
Great Valley 06 (Midland alt1)	37	East	7.27
Maacama	37	West	7.55
Great Valley 03a (Dunnigan Hills)	39	Northeast	6.53
Concord	43	Southeast	6.45
Collayami	45	Northwest	6.70

As a part of the UCERF3 project, researchers estimated that the probability of at least one $M_w \geq 6.7$ earthquake occurring in the greater San Francisco Bay Area during a 30-year period (starting in 2014) is 72 percent. The highest probabilities are assigned to sections of the Hayward (South), Calaveras (Central), and the North San Andreas (Santa Cruz Mountains) faults. The respective probabilities are approximately 25, 21 , and 17 percent.

The central portion of the Hunting Creek fault trends north-northwest approximately 1.3 km east of the site and is characterized as a Holocene-active (last 11,000 years) fault. It is a series of discontinuous fault strands that is

believed to conduct right lateral slip transferred from the Green Valley fault to the south (Lienkaemper, 2012).

SITE CONDITIONS

We evaluated site conditions based on aerial photo interpretation and a geological reconnaissance on 9 July 2021.

The proposed new vineyard block lies on the upland volcanic surface formed around the southern slopes of Atlas Peak. The site lies centrally located on the uplands and is drained by a very gently inclined channel at the southwestern edge of the property.

We noted abundant field stone (weathered in-place volcanic blocks) on the gently sloping volcanic uplands surface. We did not identify any indications of active landslides or significant erosion that would impact or be impacted by the proposed development.

CONCLUSIONS AND RECOMMENDATIONS

Based on our research and review of the site conditions, we conclude the proposed vineyard development is feasible from an erosion control and slope stability perspective. In our opinion, the proposed vineyard is located in an area where strong and hard volcanic bedrock is present at shallow depths. Further, we did not observe any evidence of global slope instability caused by landslides or soil creep.

We do not anticipate any significant changes to the surface conditions caused by the proposed vineyard development, given implementation of the Erosion Control Plan prepared by Napa Valley Vineyard Engineering. We did not observe any evidence of global slope instability caused by landslides or soil creep during our site reconnaissance.

Therefore, we find that the vineyard development is feasible based on our engineering geological and geotechnical evaluation and the site has favorable slope stability conditions with competent bedrock at a shallow depth and low to moderate slope inclinations, the stability of which will not be significantly affected by the proposed development.

LIMITATIONS

Our services have been performed in accordance with generally accepted principles and practices of the geological and geotechnical profession. This warranty is in lieu of all other warranties, either expressed or implied. In addition, the conclusions presented in this report are professional opinions based on the indicated project criteria and data described in this report. They are intended only for the purpose, site location and project indicated.

We trust that this provides you with the information you need. If you have any questions, please call.

Sincerely,

GILPIN GEOSCIENCES, INC.



Lou M. Gilpin, PhD
Engineering Geologist



ROCKRIDGE GEOTECHNICAL, INC.



Craig Shields
Geotechnical Engineer

Attachments:

References

FIGURES

Figure 1	Location Map
Figure 2	Regional Geology Map

REFERENCES

Delattre, M. P. and Sowers, J.M., 2006, Geologic Map of the Capell Valley 7.5' Quadrangle Napa County, California: A Digital Database: California Geological Survey Preliminary Geologic map, scale 1:24,000.

Dwyer, M. J., Noguchi, N., and O'Rourke, J., 1976, Reconnaissance photo-interpretation map of landslides in 24 selected 7.5 minute quadrangles in Lake, Napa, Solano, and Sonoma Counties, California: U.S. Geological Survey Open File Report 76-74, St. Helena Quadrangle, scale 1:24,000.

Fox, K.T., Sims, J.D., Bartow, J.A., and Helley, E.J., 1973, Preliminary Geologic map of Eastern Sonoma County and western Napa County, California: U.S. Geological Survey Miscellaneous Field Studies MF-483, scale 1:62,500.

International Conference of Building Officials, 1988, Maps of known active fault near-source zones in California and adjacent portions of Nevada: prepared by California Division of Conservation Division of Mines and Geology, p. 19, with maps.

Napa Valley Vineyard Engineering, Inc., 2021, Atlas Rock Vineyard 3380 Atlas Peak Road Erosion Control Plan: 4p., Appendix, map scale 1-inch=200-feet., dated July 2019.

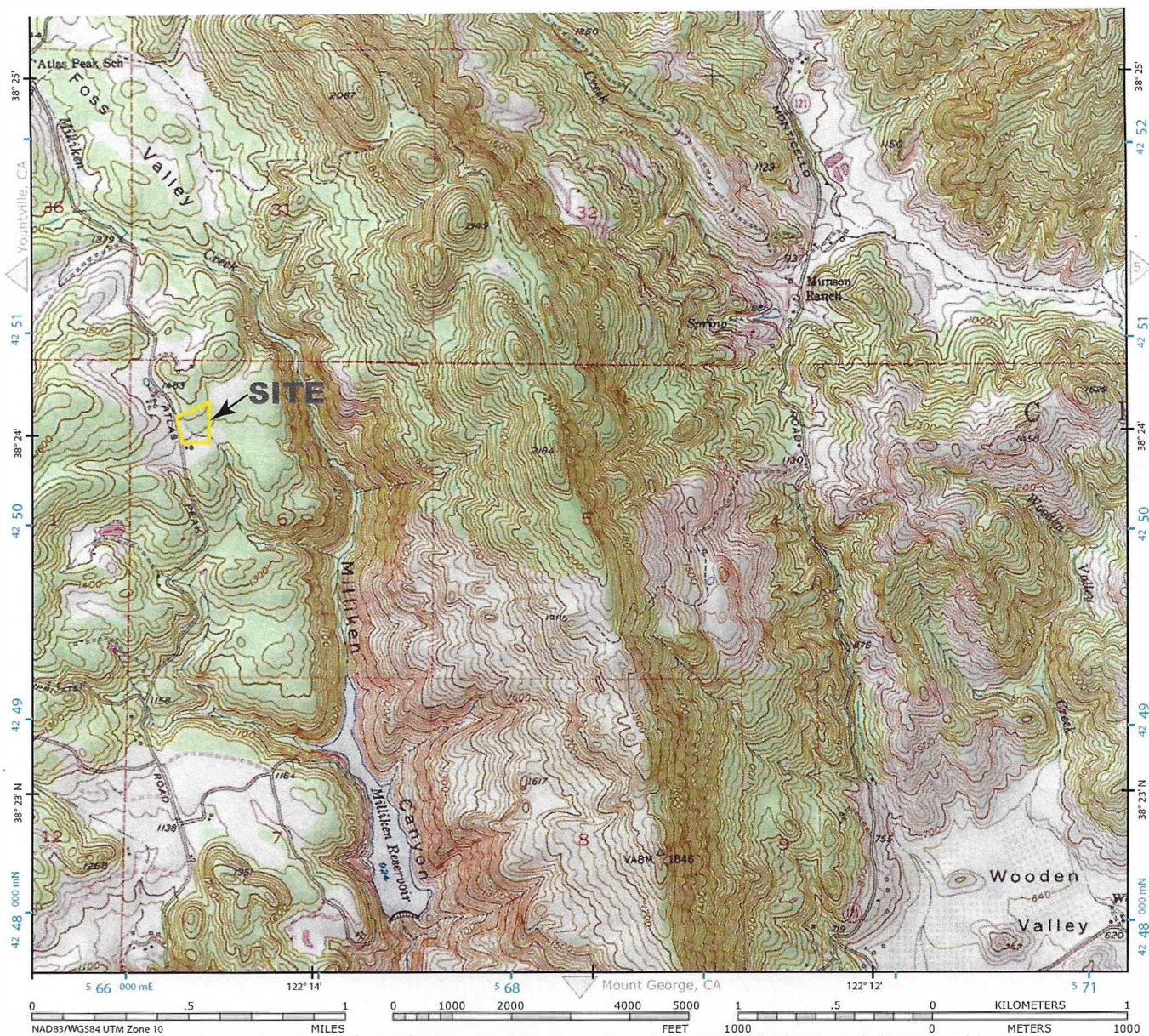
Sims, J.D., Fox, K.F., Bartow, J.A., and Helley, E.J., 1973, Preliminary Geologic Map of Solano County and parts of Napa, Contra Costa, Marin and Yolo Counties, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-484, scale 1:62,500.

U.S. Department of Agriculture, 1978, Soil Survey of Napa County, California: U.S. Department of Agriculture Soil Conservation Service, Washington, D.C.

U.S. Geological Survey, 1978, Capell Valley Quadrangle California 7.5 Minute Series (Topographic), scale 1:24,000.

Aerial Photographs

<u>Date</u>	<u>Photo Number</u>	<u>Scale</u>	<u>Source</u>
10/08/99	CIR 6323-13- 32, 33	1:12,000	Pacific Aerial Survey
07/2/91	AV 4070-20- 10, 11	1:12,000	Pacific Aerial Survey



NAD83/WGS84 UTM Zone 10
 © 2016 National Geographic Partners. Please refer to index map on page 1 for more details. User assumes all risk associated with the use of this map.

LOCATION MAP

ATLAS ROCK VINEYARD
3380 Atlas Peak Road
 Napa, California

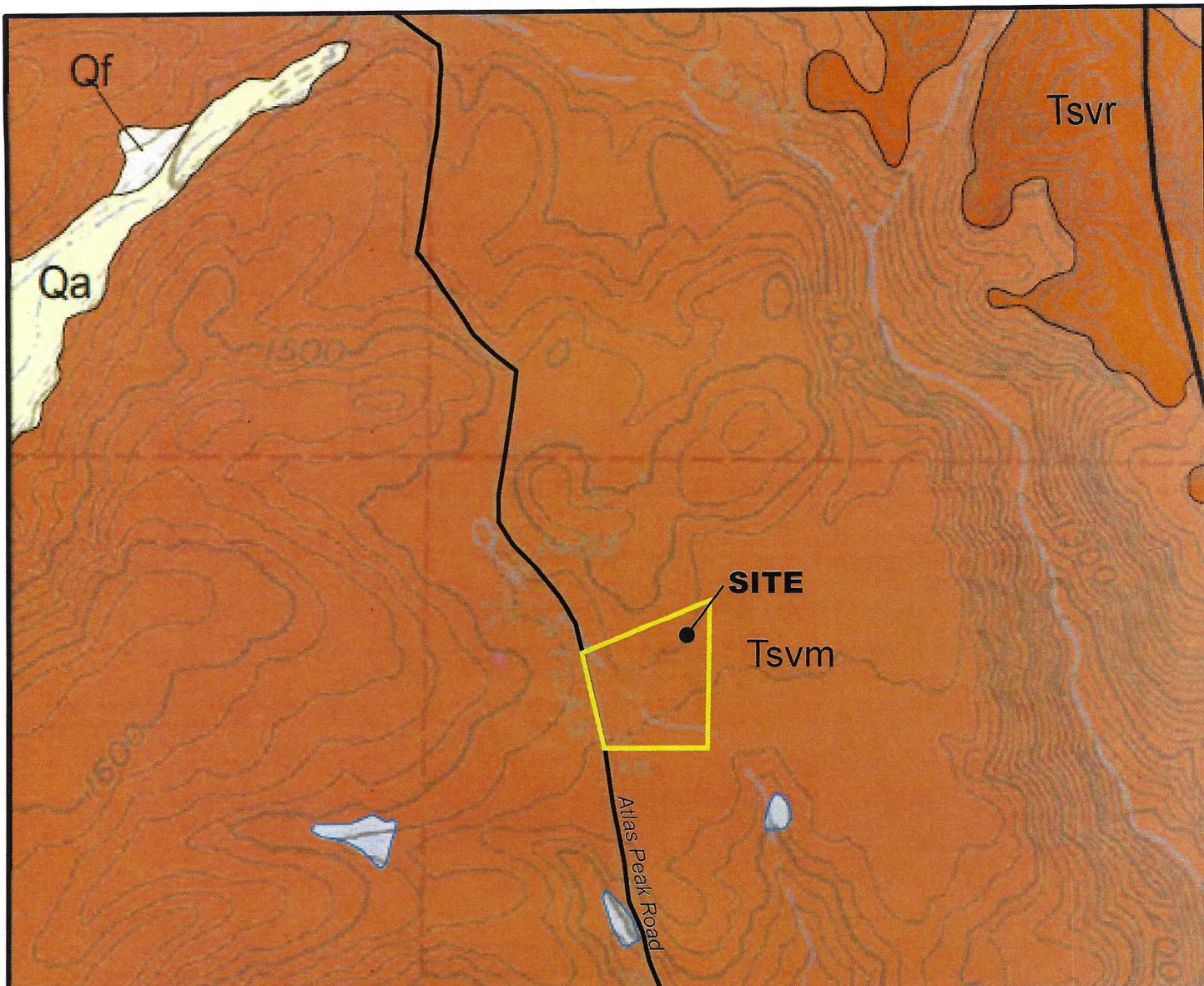
Date 7/23/21

Project No. 91707.01

Figure 1



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EXPLANATION

Geologic Units

Qf - Alluvial fan deposits

Qa - Alluvium

Sonoma Volcanics

Tsvm - Basaltic andesite and andesite lavas

Tsvr - Rhyolite flows and tuff



N



0 1,000 ft

Scale
(approx)

Reference: Delattre and Sowers, 2006.

REGIONAL GEOLOGY MAP

ATLAS ROCK VINEYARD

3380 Atlas Peak Road
Napa, California

FIGURE

2



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