

# Exhibit E

**Gilpin Geosciences, Inc**  
**Earthquake & Engineering Geology**

August 30, 2019  
91675.01

**RECEIVED**

**SEP 23 2019**

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

**Napa County Planning, Building  
& Environmental Services**

**Subject:      Engineering Geological & Geotechnical Evaluation  
                 Atlas View Vineyards  
                 APN 032-120-015  
                 4300 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 eight vineyard blocks designated A, through H, totalling 17.1 net acres at the Atlas View Vineyards near Atlas Peak in Napa County, California, as shown on Figure 1.

The site lies within the lower Napa River watershed, Upper Capell Creek and within the Milliken Reservoir Planning sub watershed.

We understand that this evaluation will supplement the "Atlas View LLC Atlas View II Vineyard Erosion Control Plan", prepared by Napa Valley Vineyard Engineering, Inc., March 4, 2019.

## **SCOPE OF SERVICES**

The objective 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 objective, we performed the following tasks:

- reviewed published and unpublished reports and maps of the site;
- reviewed aerial photographs in order to evaluate the surficial geological features on the site; and,
- performed a geologic reconnaissance on 24 June 2019.

## 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 2,663 feet elevation, composed of andesitic lava flow. The site lies at elevations ranging from 1,500 to 2000 feet (USGS, 1978). The bedrock in the site vicinity is mapped as the Great Valley Sequence melange, a tectonic unit that is folded along an anticline trending west-northwest (Delattre and Sowers, 2006; Fox and others, 1973) through the site as shown on Figure 2.

Sonoma Volcanics andesitic to basaltic lava flows cap the upland of Atlas Peak above the site. The contact between the younger volcanic units and underlying sheared shale rocks is marked by prominent landslides that skirt the upland surfaces on the northeast-facing slopes of Atlas Peak (Figure 2).

The various published geologic maps show different interpretation of landslides in the site vicinity (Fox and others, 1973; Dwyer and others, 1976; Delattre and Sowers, 2006). The maps all depict the source of the landsliding as the contact between the volcanic deposits and the underlying older bedrock. The most recent mapping (Figure 2) shows the upper elevations of the site with approximately one third to half of the site mapped as being underlain by landslide deposits (Delattre and Sowers, 2006). A similar landslide configuration is shown by Dwyer and others, 1976 (Figure 3). Fox and others (1973) show two distinct landslides crossing the site with one landslide crossing part of the southeastern corner of the site and the other covering most of the northern half of the property (Figure 4).

Dwyer and others (1976) map two queried debris flow landslides (Figure 3) that are in the southern part of Block E and G. We also observed these landslides on aerial photographs and during our site reconnaissance as shown on the Site Geology Map, Figure 5. Other queried landslides were mapped within the property; however, these slides do not impact any of the proposed vineyard blocks.

The soil mapped at the site is the Aiken Loam on 2-15 percent slopes and Forward gravelly loam on 9 to 75 percent slopes that are characterized as developing on basic volcanic rocks, and weathered rhyolite tuff, respectively (USDA, 1978). Based on geologic mapping, the Aiken series is likely appropriate for the landslide deposits derived from the upland volcanic bedrock; however, the lower elevations of the site, underlain by the melange unit, are more likely to

develop Felton or Diablo Series soils underlain by shale and sandstone bedrock (USDA, 1978).

Active faults have been mapped in the vicinity. The closest active fault to the site is the Hunting Creek-Berryessa Fault approximately 3 miles northeast of the site. The Hunting Creek-Berryessa fault is classified as a type B fault by the UBC, (ICBO, 1988) and is capable of generating a Moment Magnitude 6.9 earthquake.

## **SITE CONDITIONS**

We evaluated site conditions based on aerial photo interpretation and a geological reconnaissance on 24 June 2019.

The proposed vineyard blocks lie on upland benches and gently east-sloping ridgelines on the eastern slopes of Atlas Peak. The site lies at the eastern edge of the broad plateau formed around Atlas Peak and ranges in elevation from approximately 1,500 to 2,000 feet (NVVE, 2019).

The large landslide complex mapped along the eastern flank of Atlas Peak is highlighted by a prominent palisade-like rock cliff upslope of the site below which is mapped a large landslide deposit (Figure 4; Dwyer and others, 1976).

We mapped two distinct ancient landslide masses (Qlso; Figure 3) crossing the site. Vineyard Blocks A and B lie on a prominent bench formed by the uppermost part of the old landslide deposits. Vineyard Blocks C and E likewise are proposed for localized topographic benches formed on the old landslide surface. Vineyard Blocks D and F are proposed for the gently east-sloping topographic ridgelines on the old landslide deposit. Vineyard Blocks G and H are located on a broad ridgeline with several topographic benches underlain by the shale/melange bedrock.

Based on our mapping and aerial photograph analysis (Figure 3), we believe the mapped landslides are very old, ancient features that were initiated some time after the deposition of the 5.5- to 4-million-year-old Tertiary volcanics (Fox and others, 1985). The rilled relief characterizing the topography is typical of unconsolidated sediments on sloping topography and do not indicate ongoing landslide movement. Parts of these old slide masses may have, over time, reactivated since the initial failure. We did identify two active debris landslides that encroach into the proposed vineyard Blocks F and H. These correspond to two queried debris slides shown on the Dwyer and others (1976) map, shown on Figure 4.

We show a recommended 50-foot setback within Blocks F and H on the Site Geologic Map, Figure 5. We did not identify any other indications of active landslides that would be characterized by bulging soil masses at the toe of the deposits, ground cracking associated with the upper, lateral, or lower extents of the deposit, any hummocky areas indicative of coherent landslide units.

The larger landslides shown on published geologic maps are characterized as emanating from the upland volcanic plateau edge. Typically, surface water infiltration into the volcanic uplands is impeded from flowing into the underlying less permeable shale/melange bedrock units and is thus forced to daylight in springs and seeps at the geologic contact. This exacerbates slope stability issues on the steep flanks of Atlas Peak resulting in the massive landslide failures. The lower portions of the steep landslide scars at the edges of the upland volcanic plateau are presently characterized by rockfall debris accumulated as talus fans on the slopes below the volcanic rock outcrops. The proposed vineyard Blocks A and B are situated on the distal edge of such debris fans which accumulated over tens of thousands of years.

## CONCLUSIONS AND RECOMMENDATIONS

Based on our research and review of the site conditions, the proposed vineyard development is feasible from an erosion control and slope stability perspective. In our opinion, the proposed vineyard development will reduce the long term erosion of the site slopes by controlling runoff and infiltration from the various vineyard blocks and by surface water control such as road bars, catchment basins and the irrigation.

Vineyard development of Blocks F and H should be set back 50 feet from the active debris landslides mapped on the southern flanks of the central ridgeline in Blocks F and H. Surface runoff should be directed away from these two active landslides.

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

The surface drainage improvements associated with the existing vineyard and those proposed on the Erosion Control Plan for the replanting incorporate controls to inhibit concentrated surface runoff that would lead to gullying and sediment removal.

The Erosion Control Plan (Napa Valley Vineyard Engineering, 2019) calls for several temporary drainage improvements for the proposed vineyard blocks that include straw mulch and straw wattles. The layout as shown in the plan appears appropriate with respect to the existing surface conditions described in this letter.

Therefore, we conclude the vineyard planting is feasible based on our engineering geological and geotechnical evaluation. Further, in our opinion, the site has favorable slope stability conditions with low to moderate slope inclinations that will not be significantly affected by the proposed improvements.

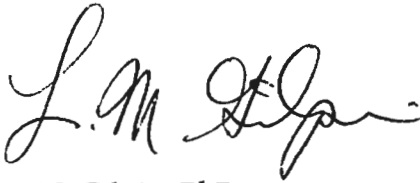
## **LIMITATIONS**

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

- |          |  |
|----------|--|
| Figure 1 | Location Map   |
| Figure 3 | Photointerpretation Map of Landslides (Dwyer and others, 1976) |
| Figure 4 | Regional Geology Map (Fox and others, 1973)                    |
| Figure 5 | Site Geology Map   |
| Figure 6 | Geologic Cross Sections  |

## 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., Fleck, R.J., Curtis, G.H., and Meyer, C.E., 1985, Potassium-Argon and Fission Track Ages of the Sonoma Volcanics in an area North of San Pablo Bay, California: US Geological Survey Miscellaneous Field Studies MF-1753, scale 1:125,000.

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 1:62500.

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., 2019, Atlas View LLC Atlas View Vineyards Erosion Control Plan: 4p., Appendix, map scale 1-inch=200-feet., dated March 4, 2019.

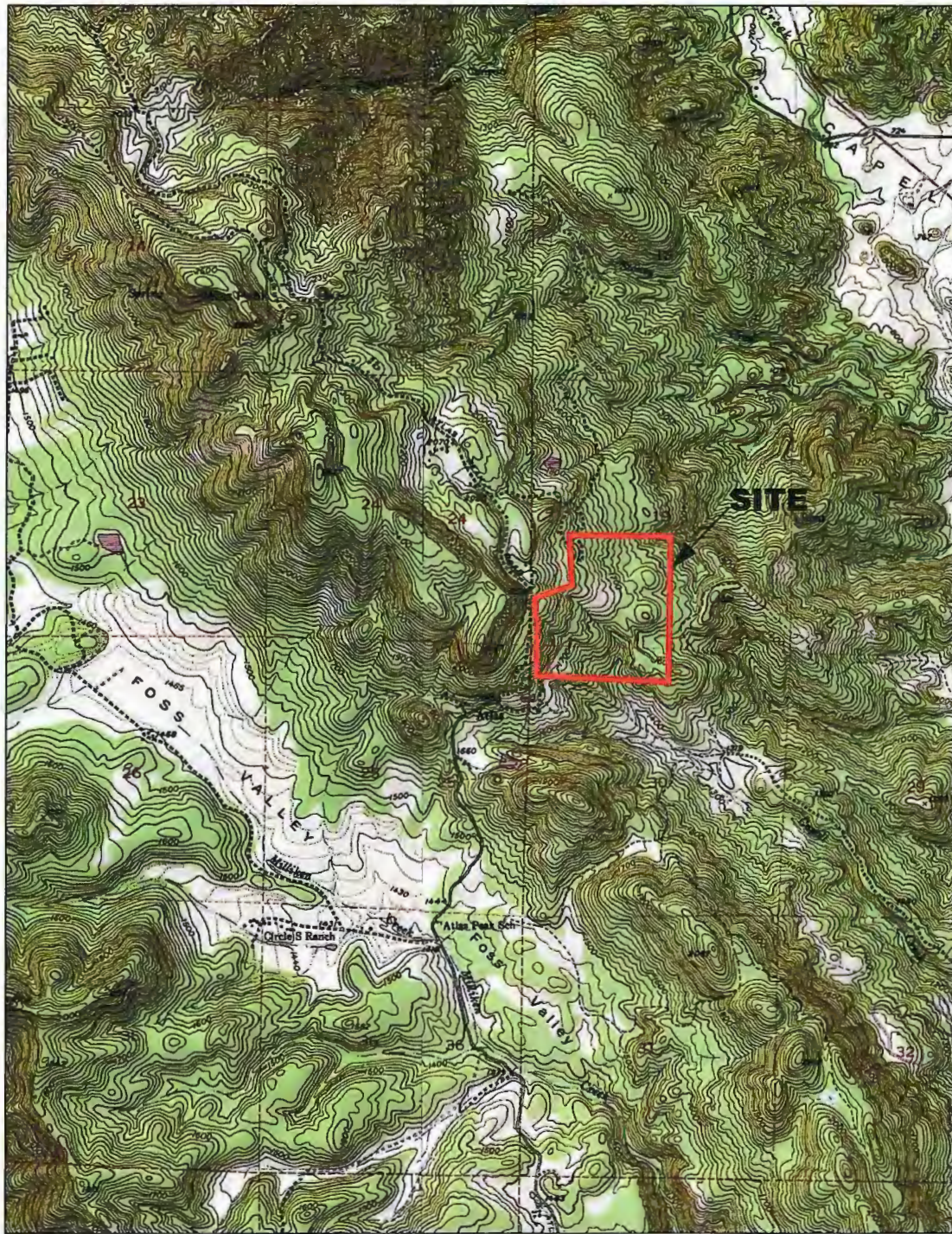
U.S. Department of Agriculture, 1978, Soil Survey of Napa County, California: U.S. Department of Agriculture Soil Conservation Service, Washington, D.C.

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





TN\* / MN  
15°

0 1000 FEET 0 500 1000 METERS  
Printed from TOPOI ©2001 National Geographic Holdings (www.topo.com)

## LOCATION MAP

**ATLAS VIEW VINEYARDS**  
4300 Atlas Peak Road  
Napa, California

Date 7/19/19

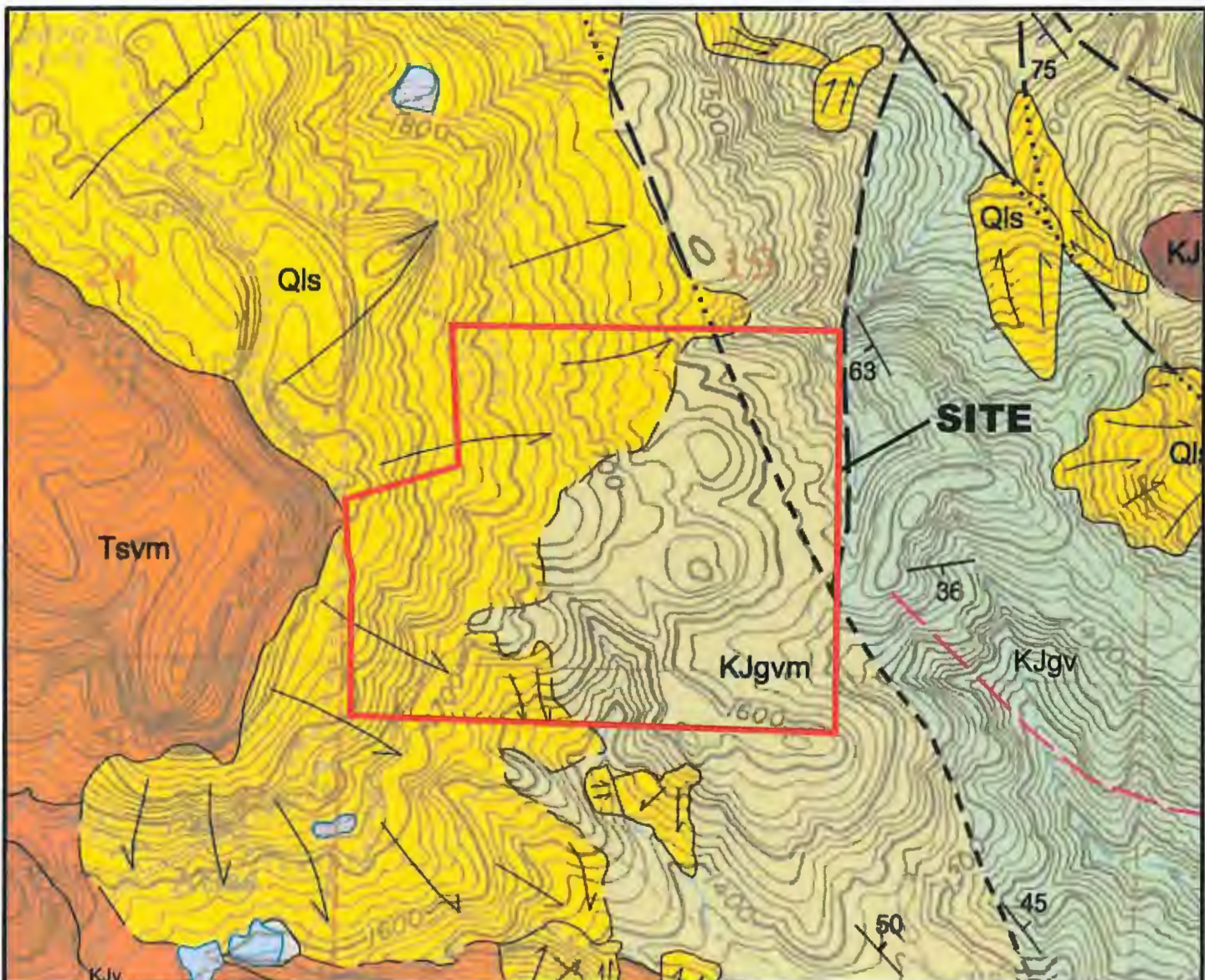
Project No. 91675.01

Figure 1



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# EXPLANATION

## Geologic Units

Qls - Landslide deposits

## Sonoma Volcanics

Tsvm - Basaltic andesite and andesite lavas

## Great Valley Sequence

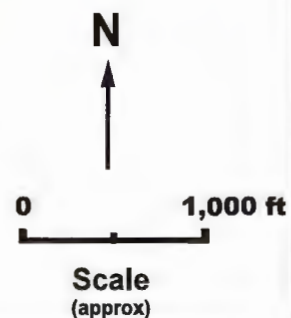
KJgvm - melange

KJgv - sandstone, siltstone, conglomerate

KJv - greenstone

**Fault**

**Strike** of bedding with direction and manitude of dip indicated



Reference: Delattre and Sowers, 2006.

## REGIONAL GEOLOGY MAP

### ATLAS VIEW VINEYARDS

4300 Atlas Peak Road  
Napa, California

FIGURE

2

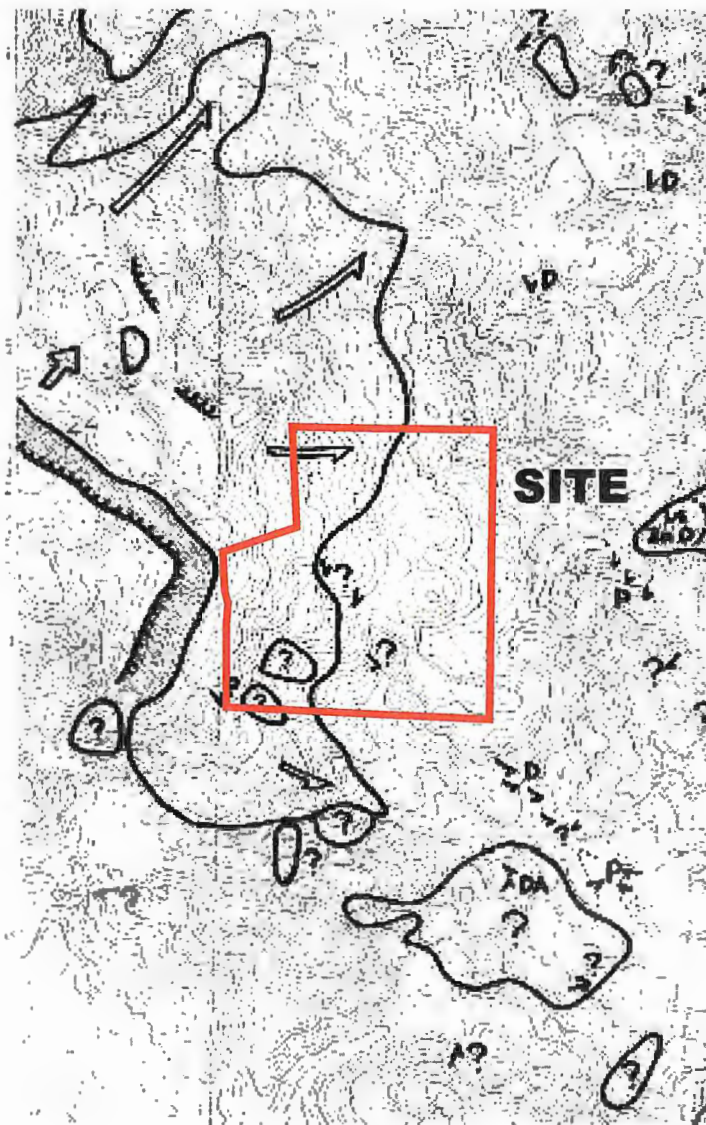


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

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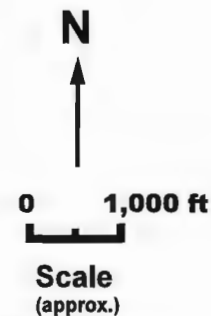
DATE  
7/19/19





### EXPLANATION

-  - Questionable Landslide deposits  
 - Landslide deposit with hachured headscarp  
 P - Probable, D - Definite, single barb arrow = debris flow, double barb arrow = block slide.



Reference: Dwyer and others, 1976.

### PHOTOINTERPRETATION MAP OF LANDSLIDES


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### ATLAS VIEW VINEYARDS

4300 Atlas Peak Road  
Napa, California

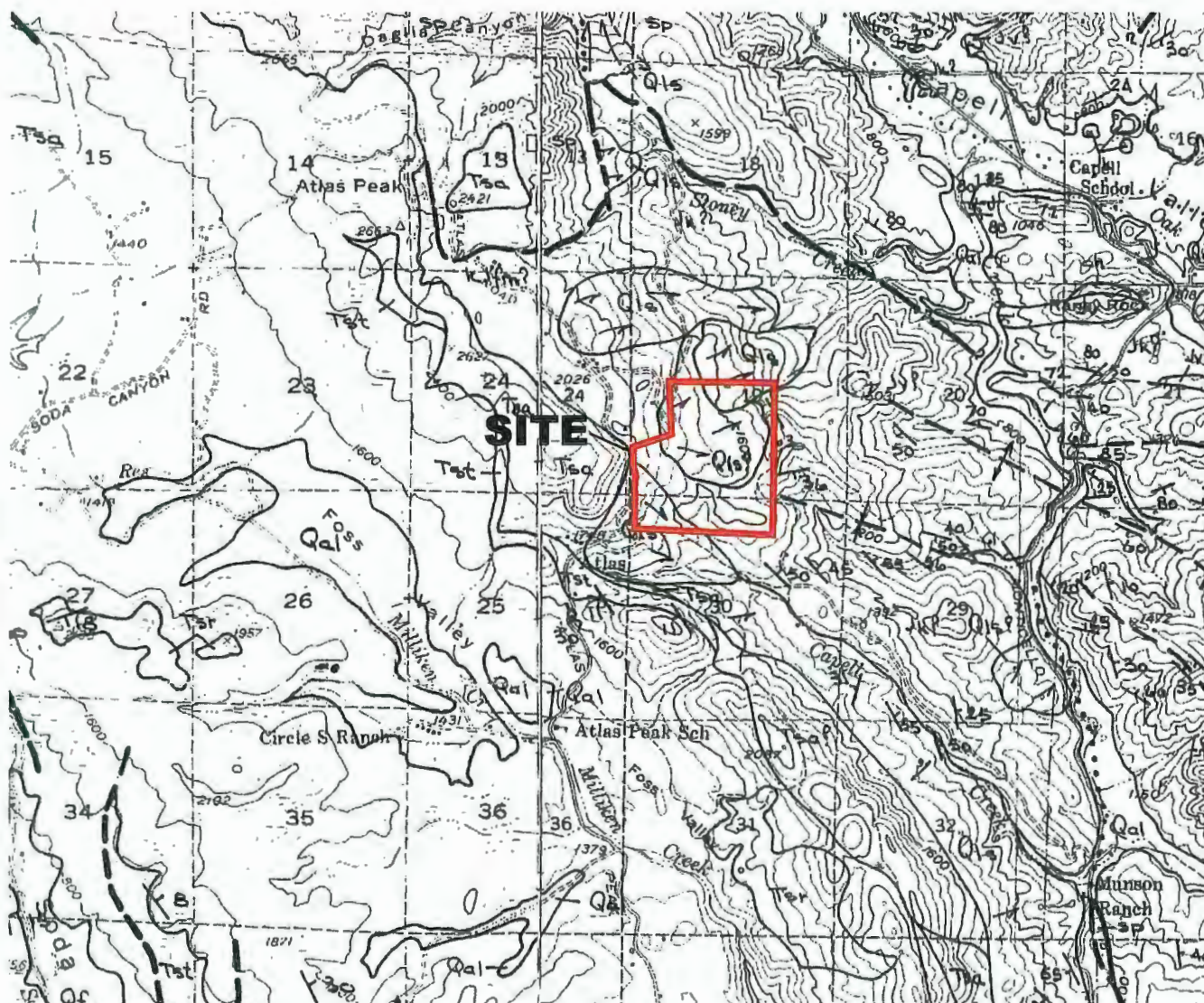
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DATE  
7/30/19

FIGURE

3





# EXPLANATION

## Geologic Units

- af - artificial fill
- Qal - Alluvium
- Qls - Landslide deposits

## Sonoma Volcanics

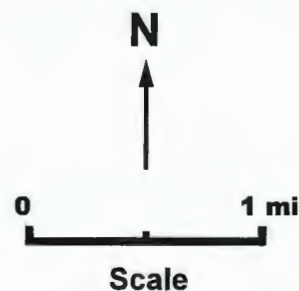
- Tsa - Andesite lavas
- Tst - Tuffaceous rocks
- Tsr - Rhyolitic lava flows and breccias

## Great Valley Sequence

- KJgvm - sandstone, siltstone, conglomerate
- KJfm - melange

sp - serpentinite

Reference: Fox and others, 1973.



## REGIONAL GEOLOGY MAP

### ATLAS VIEW VINEYARDS

4300 Atlas Peak Road  
Napa, California

FIGURE

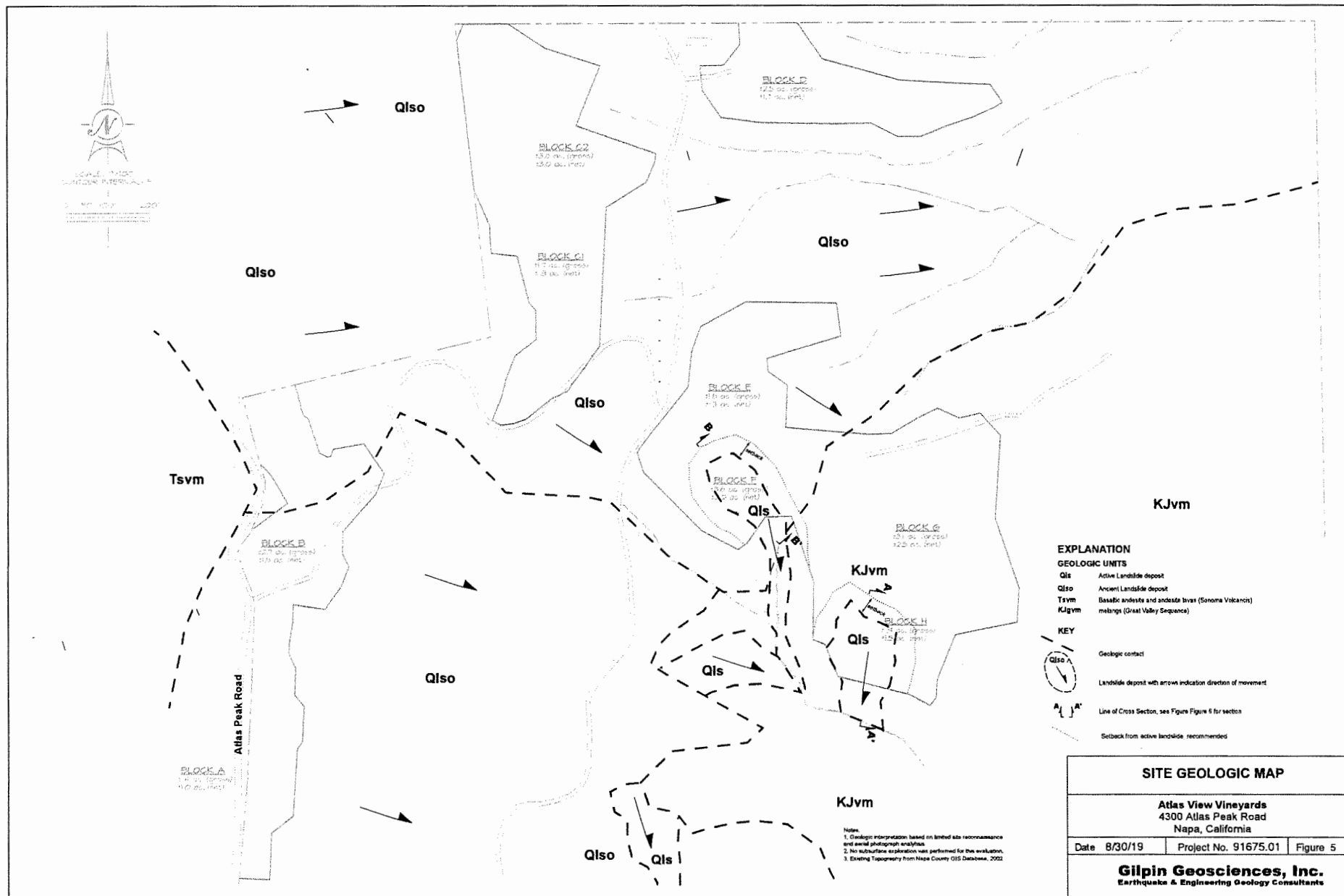
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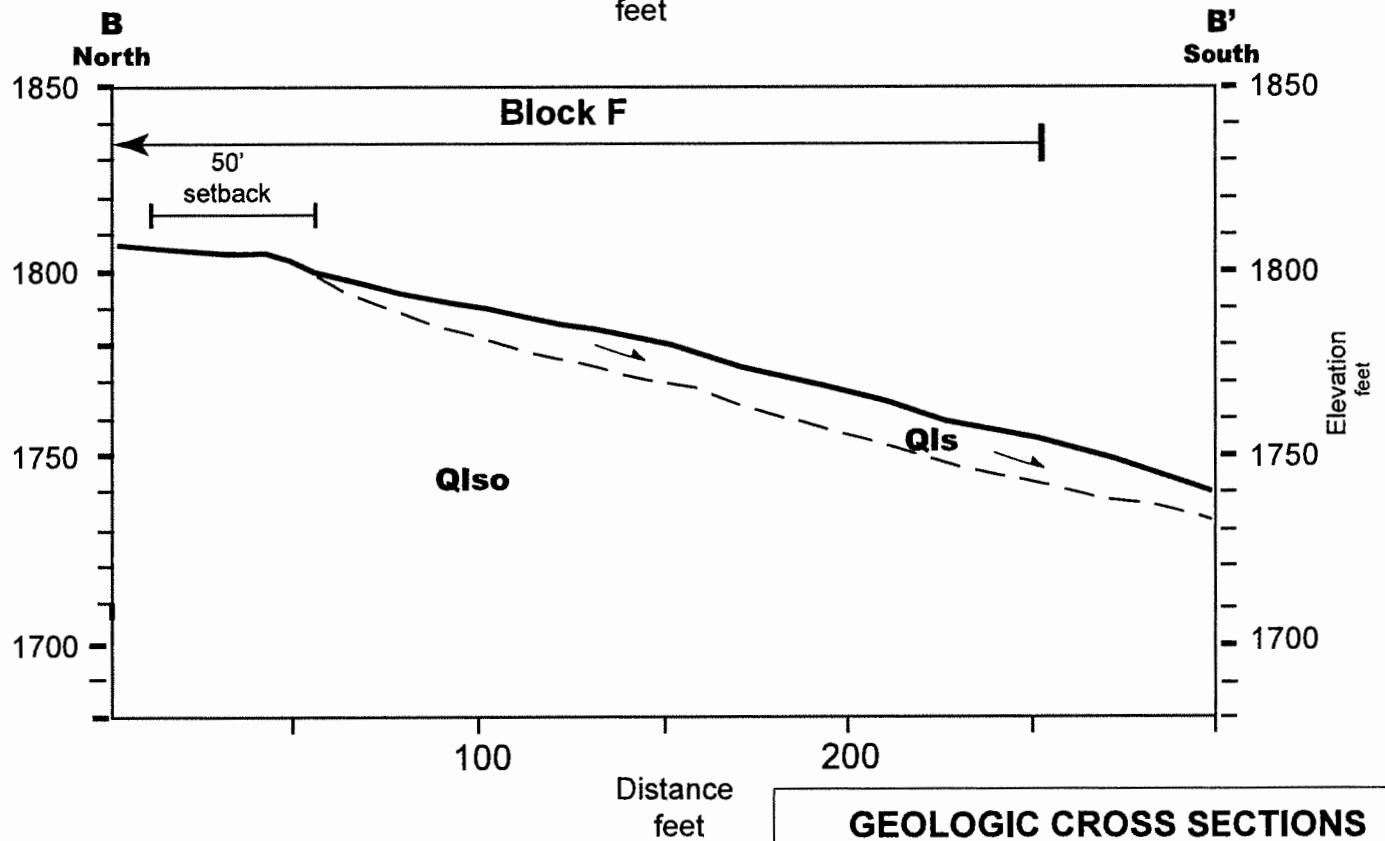
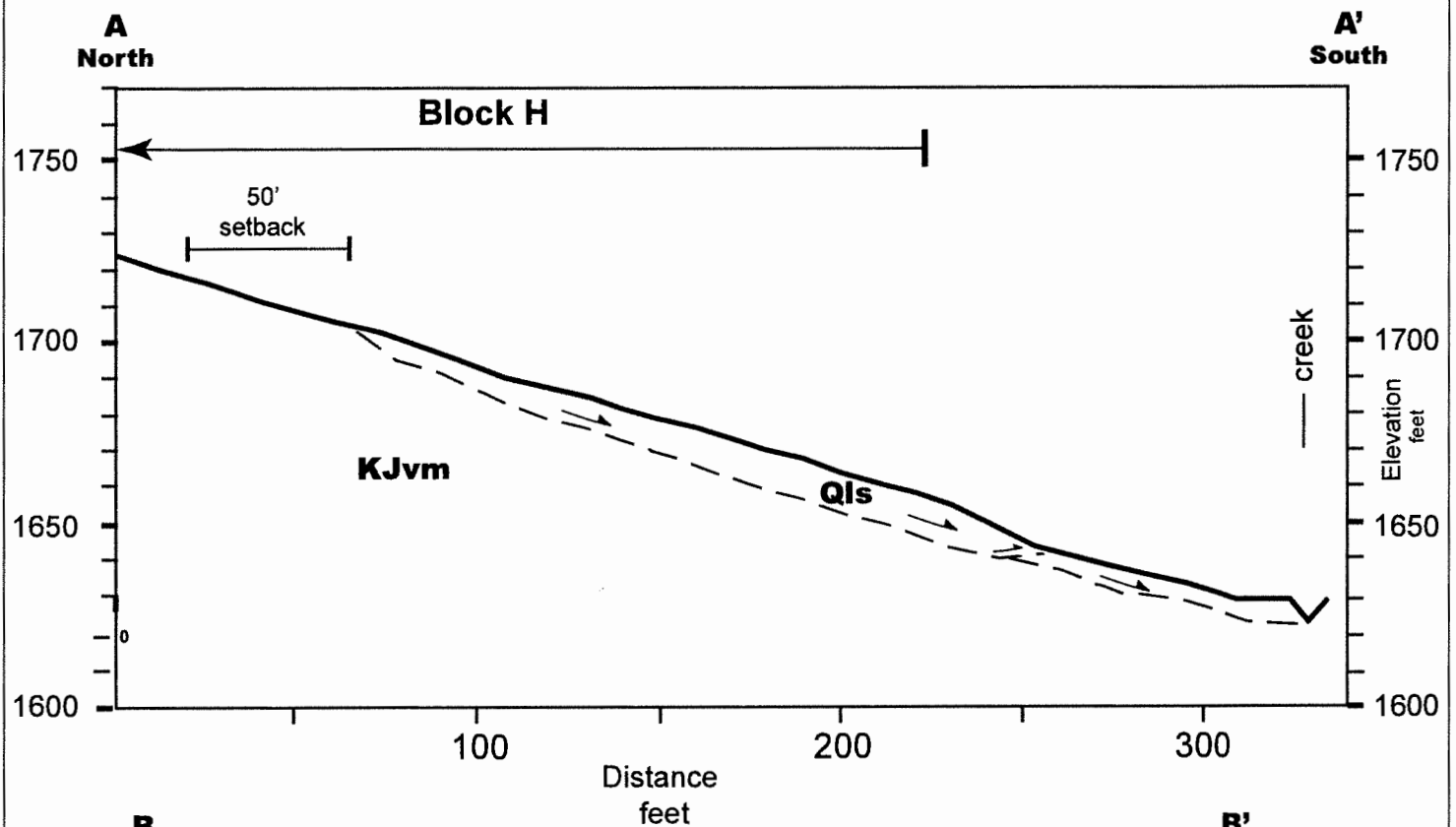
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91675.01

DATE  
7/30/19







## GEOLOGIC CROSS SECTIONS A-A' AND B-B'

Atlas View Ranch  
Napa, CA

Date 8/30/19

Project No. 91675.01

Figure 6



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