“I”

Preliminary Geotechnical Evaluation

Dry Creek/Mount Veeder Winery P17-00343 & P17-00345
Planning Commission Hearing April 18, 2018

CONDOR EARTH
21663 Brian Lane, P.O. Box 3905
Sonora, CA 95370
209.532.0361
Fax 209.532.0773
www.condorearth.com

Condor Project No. 7464

September 8, 2017

Thomas F. Carey
c/o Law Office of Thomas F. Carey
PO Box 5662
Napa, CA 94581

Subject: Preliminary Geologic Hazards Evaluation
Proposed Winery and Wine Cave – Dry Creek-Mt. Veeder Project
Oakville Winery, LLC, Napa County, California
APN 027-310-039

Dear Mr. Carey:

As requested, Condor Earth (Condor) has reviewed the subject project site conditions, available published data, and in accordance with our discussion during our initial meeting and consultation proposal, we herein present our preliminary finding regarding geologic site constraints.

SUMMARY AND INTRODUCTION

In summary, our preliminary findings indicate that the proposed winery and cave improvements are capable of being developed at the location shown on the attached Figures. However, as per Section 15.08.050 of the Napa County Code, a comprehensive Geologic Hazards Report will be required at the time of Building Permit submittal for this project.

During the period of January through July 2017, Condor performed site reconnaissance and observations on several occasions, and met with the project team to discuss the proposed project components. Condor also reviewed published literature, and available aerial and topographic data related to the site conditions. Our findings are based on review of this information, as well as our experience during the design and construction of numerous wineries and wine caves in the area.

PRELIMINARY FINDINGS

The parcel is located adjacent to the intersection of Mt. Veeder Road and Dry Creek Road, and much of the parcel occupies the nose of a topographic spur ridge that faces to the east, as shown on Figure 1. A topographic "lower flat" is present at the northeast corner of the parcel where previous farming activities are evident, adjacent to Dry Creek. Two water supply wells have recently been completed adjacent to the lower flat (Figures 2A and 2B). It appears that some decades ago, trees were cleared from a moderately sloping area comprising several acres adjacent to the lower flat; the "old cleared tree line" is shown on Figures 2A and 2B. Overhead powerlines cross the lower flat and extend over the nose of the spur ridge (area cleared of trees due to the low height of the power lines above the ground). A steep and prominent ridge line trends up to the west from the flat; approximately 1,000 feet horizontal and 300 feet vertical up the ridge the slopes flatten somewhat, where a "clearing with bush" occurs (forms a good reference point). A "seasonal drainage" is located to the south of the prominent ridge line, and roughly slits the

parcel along an approximate east-west line into northern and southern sections. A "high flat" occurs near the west parcel boundary in the southern sections of the parcel (Figures 2A and 2B). Other than the wells and power lines mentioned above, no other permanent improvements were observed on the parcel.

The site geology appears to be challenging for development of site improvements in many areas of the parcel, but one area has good potential. We reviewed two published geologic maps that cover the parcel area, which are shown on Figures 3A and 3B. Figure 3A suggests that the entire parcel, except for a small portion of the lower flat, is underlain by a massive landslide. Figure 3B shows an alternate geologic interpretation, suggesting that the parcel is underlain by in-place rock of the Great Valley Sequence (shale and sandstone). Figure 4 illustrates that no mapped potentially active faults traverse the site. Figure 5A suggests that the nearby massive landslides do not underlie the parcel, but that smaller landslide deposits are present in the vicinity of the old cleared tree area. Other common geologic hazards such as seismically induced or regional settlement, soils expansion/collapse, soil corrosivity, naturally occurring asbestos and radon, solution cavities, volcanism, tsunamis and floods do not appear to significantly affect this site, based on our site and literature review.

Condor's preliminary evaluation of the site included studying aerial imagery including stereo-paired air photos (1:7200 scale BW dated 1988 and 1:12000 scale CIR dated 2000), LiDAR Hillshade (recent) and Google Earth (recent), and our on site reconnaissance. The information shown on Figures 6 and 7 illustrate the results of our preliminary landslide evaluation, which is described below.

It appears that the parcel is most likely <u>not</u> underlain by a massive landslide deposit. We observed a continuous outcropping of a resistant sandstone bed that forms the spine of the prominent ridge, labeled "rocky ridge" on Figure 6. The presence of this continuous sandstone bed suggests that the ground is in-place (landslide deposits from the mostly shale Great Valley Sequence would be expected to be broken-up). In addition, our aerial imagery interpretation (Figure 7) suggests that the published landslide mapping (Figure 5A) is more accurate than Figure 3A. However, our observations of hummocky ground on site, coupled with our study of the aerial imagery, suggest that numerous smaller but not-recent landslides are present along the north flank of the rocky ridge and along the parcel-central seasonal drainage. Areas near the toe of slope adjacent to Well #1 and lower flat, near the "clearing with bush," and near the "upper flat" appear more stable.

The proposed winery and wine cave development area is located at the low end of the spur ridge, where the slopes are relatively low and not too steep, where the natural ground appears stronger, and where no old landslide features (scarps or hummocky ground) were observed.

PRELIMINARY RECOMMENDATIONS

We suggest that, from a geologic hazards point of view, the area near the toe of slope and Well #1, and the adjacent area where the powerlines cross the nose of the ridge, are feasible areas for winery and cave development. Therefore, the project team selected this area for the proposed winery and cave development. We understand Well #1 will be abandoned to accommodate project construction. The area near the "clearing with bush" also appears feasible for the proposed wastewater disposal system from a geologic hazards standpoint.

We recommend that subsurface geologic exploration (drilling and test pits) should be performed to confirm our findings prior to Building Permit submittal, as a part of the future Geologic Hazards Report mentioned in the Introduction of this letter.

ADDITIONAL SERVICES

Once the overall project scope is confirmed, Condor or another qualified firm(s) should provide design phase geologic and geotechnical services, including site investigation, geologic hazards report, geotechnical report for winery, cave and cave portals; tunnel/portal engineering; and construction phase services. To confirm site conditions prior to Building Permit and construction, we also recommend geologic/geotechnical exploration to investigate natural ground temperatures, potential groundwater seepage conditions, and to optimize the cave/portal design and estimate probable construction costs.

Because subsurface conditions at this site appear to vary, it is not possible to include all details related to geologic and geotechnical engineering aspects of the project in designs. Geologic and geotechnical engineering recommendations depend on the possible need for adjustment in the field during construction. The adjustments depend on conditions revealed during construction that Condor could previously only assume based on limited data from this preliminary investigation. Therefore, Condor or another qualified firm(s) should perform geotechnical engineering observations and tests during earthwork, and during construction of retaining walls, foundations, tunnels and related project features. The purpose of the work during construction will be to check for subsurface conditions that vary from the conditions encountered during site investigation and to develop supplemental recommendations, as necessary. In addition, the purpose is to verify that the Contractor follows the general intent of our recommendations during construction and that they perform the geotechnical engineering aspects of the work according to the approved designs.

LIMITATIONS

The descriptions and other data contained in this letter are for project entitlement purposes for the proposed site development described above in Napa County, California. These data are not valid for other sites.

The preliminary findings submitted in this letter are based upon the data obtained from a limited site reconnaissance, literature and data review, and on our experience in the project site vicinity. This letter does not reflect subsurface variations which may, and usually do, occur at project sites. The nature and extent of such variations will not likely become evident until subsurface investigation is performed and construction is initiated.

The validity of the findings contained in this letter is also dependent upon proper engineering design, and an adequate testing and observation program during the construction phase. Our firm assumes no responsibility for construction compliance with the design concepts or recommendations unless we have been retained to perform onsite testing and observation during construction.

This letter was prepared in accordance with the generally accepted standards of engineering geologic and geotechnical engineering practice that exists in Napa County at the time the letter was written. No other warranty, express or implied, is made.

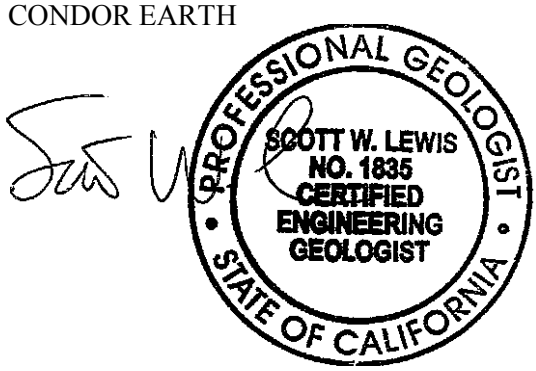
It is the Client's responsibility to see that all parties to the project, including the owner, designers, engineers, contractors, subcontractors, etc., are made aware of this letter and attachments.

CLOSURE

We trust this letter contains the information required. Please contact Scott Lewis at 209.536.7370 or 209.601.5585 with questions.

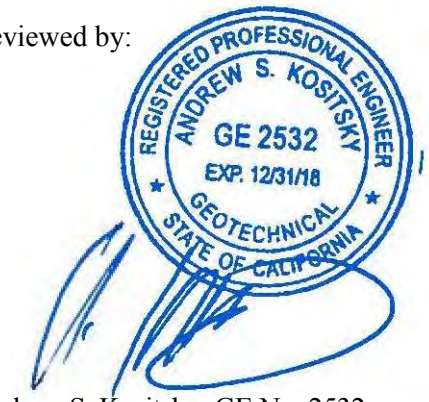
Respectfully submitted,

CONDOR EARTH



Scott W. Lewis, CEG No. 1835
Principal Engineering Geologist

Reviewed by:

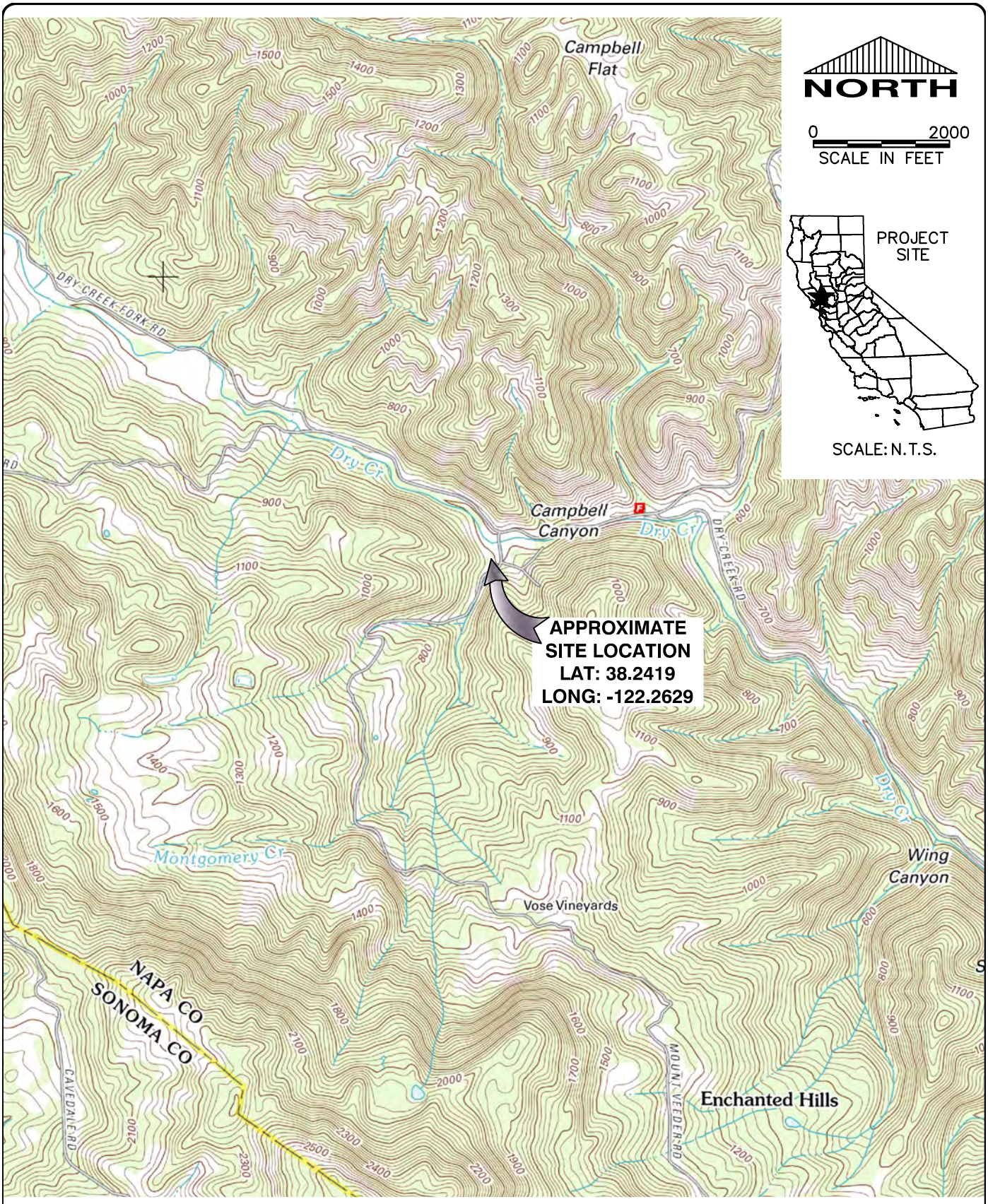


Andrew S. Kositsky, GE No. 2532
Registered Geotechnical Engineer

Cc: Mike Muelrath, Applied Civil Engineering Incorporated

Attachments:

Figure 1	Vicinity Map
Figure 2A	Aerial Image
Figure 2B	Site Topography – 5 Foot Contours
Figure 3A	Geologic Map (Clahan, 2005)
Figure 3B	Geologic Map (Fox, 1973)
Figure 4	Region Fault Map
Figure 5A	Landslide Map (plan)
Figure 5B	Landslide Map (legend)
Figure 6	LiDAR Hillshade
Figure 7	Oblique Aerial View



BACKGROUND IMAGE: USGS 7.5 MINUTE QUADRANGLE, RUTHERFORD 2012

CONDOR EARTH
21663 Brian Lane
P.O. Box 3905
Sonora, CA 95370
(209) 532-0361
fax(209) 532-0773
www.condorearth.com

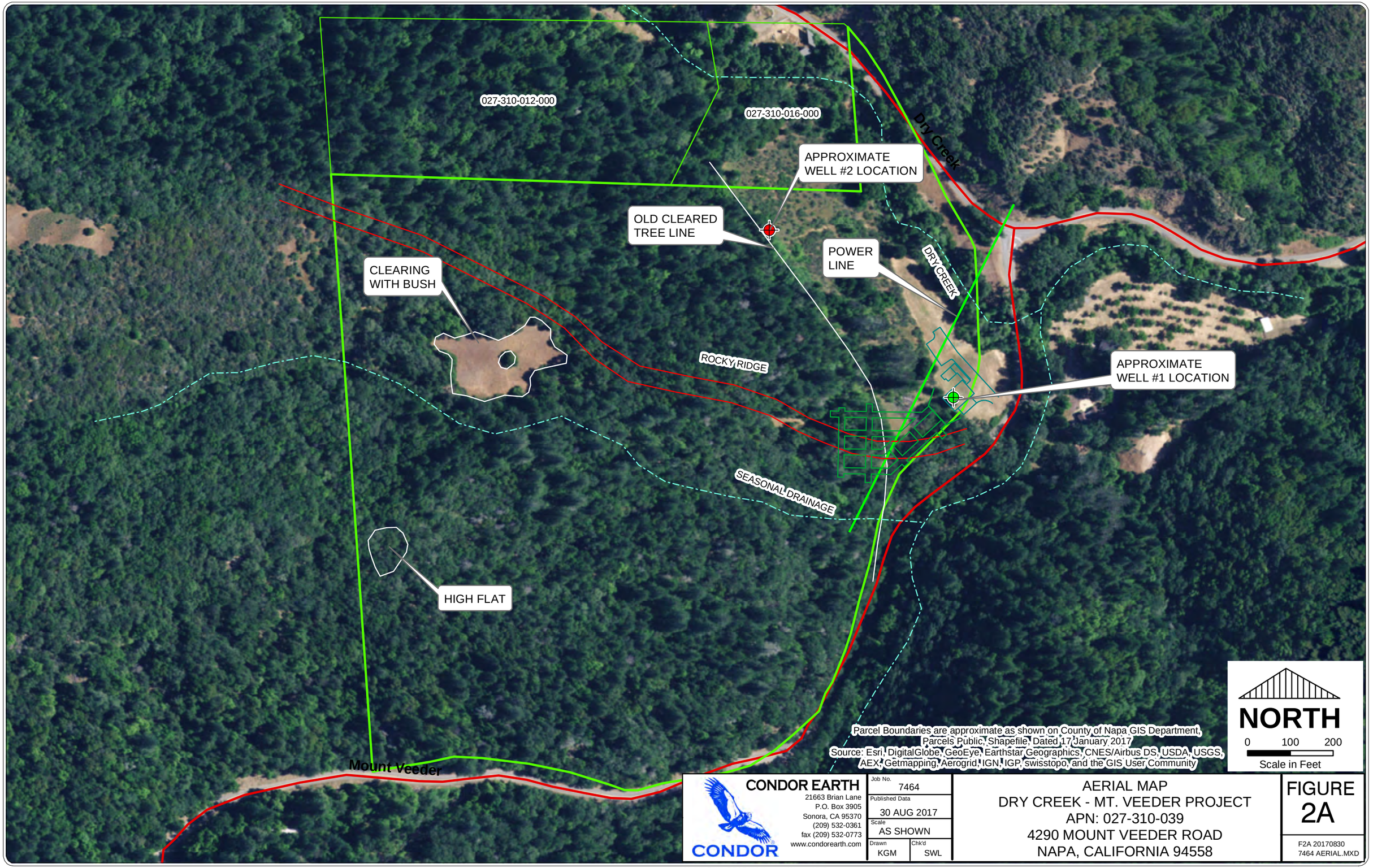
Job No.	7464
Published Date	30 AUG 2017
Scale	AS SHOWN
Drawn / Chk'd	KGM / SWL

VICINITY MAP
DRY CREEK – MT. VEEDER PROJECT
APN 027-310-039
4290 MOUNT VEEDER ROAD
NAPA, CALIFORNIA 94558

FIGURE 1

File No. 7464_F1

X:\Project\7000_prj\7464 Oakville Winery Wine Cave\7464 Wine Cave\7464_CAD\DWG\GEOTECH\7464_F1.dwg 8-30-17 04:05:33 PM kmckinley



CONDOR EARTH
21663 Brian Lane
P.O. Box 3905
Sonora, CA 95370
(209) 532-0361
fax (209) 532-0773
www.condorearth.com

Job No.	7464
Published Data	30 AUG 2017
Scale	AS SHOWN
Drawn	KGM
Chk'd	SWL

AERIAL MAP
DRY CREEK - MT. VEEDER PROJECT
APN: 027-310-039
4290 MOUNT VEEDER ROAD
NAPA, CALIFORNIA 94558

FIGURE
2A

F2A 20170830
7464 AERIAL.MXD

X:\GIS\7000_PRJ\7464 Oakville Winery\MXD

027-310-012-000

027-310-016-000

APPROXIMATE
WELL #2 LOCATION

Dry Creek

OLD CLEARED
TREE LINE

POWER
LINE

DRY CREEK

CLEARING
WITH BUSH

ROCKY RIDGE

APPROXIMATE
WELL #1 LOCATION

027-310-039-000

SEASONAL DRAINAGE

Mount Veeder

HIGH FLAT

NORTH

0 100 200

Scale in Feet

Parcel Boundaries are approximate as shown on County of Napa GIS Department, Parcels Public, Shapefile, Dated 17 January 2017

CONDOR EARTH
21663 Brian Lane
P.O. Box 3905
Sonora, CA 95370
(209) 532-0361
fax (209) 532-0773
www.condorearth.com

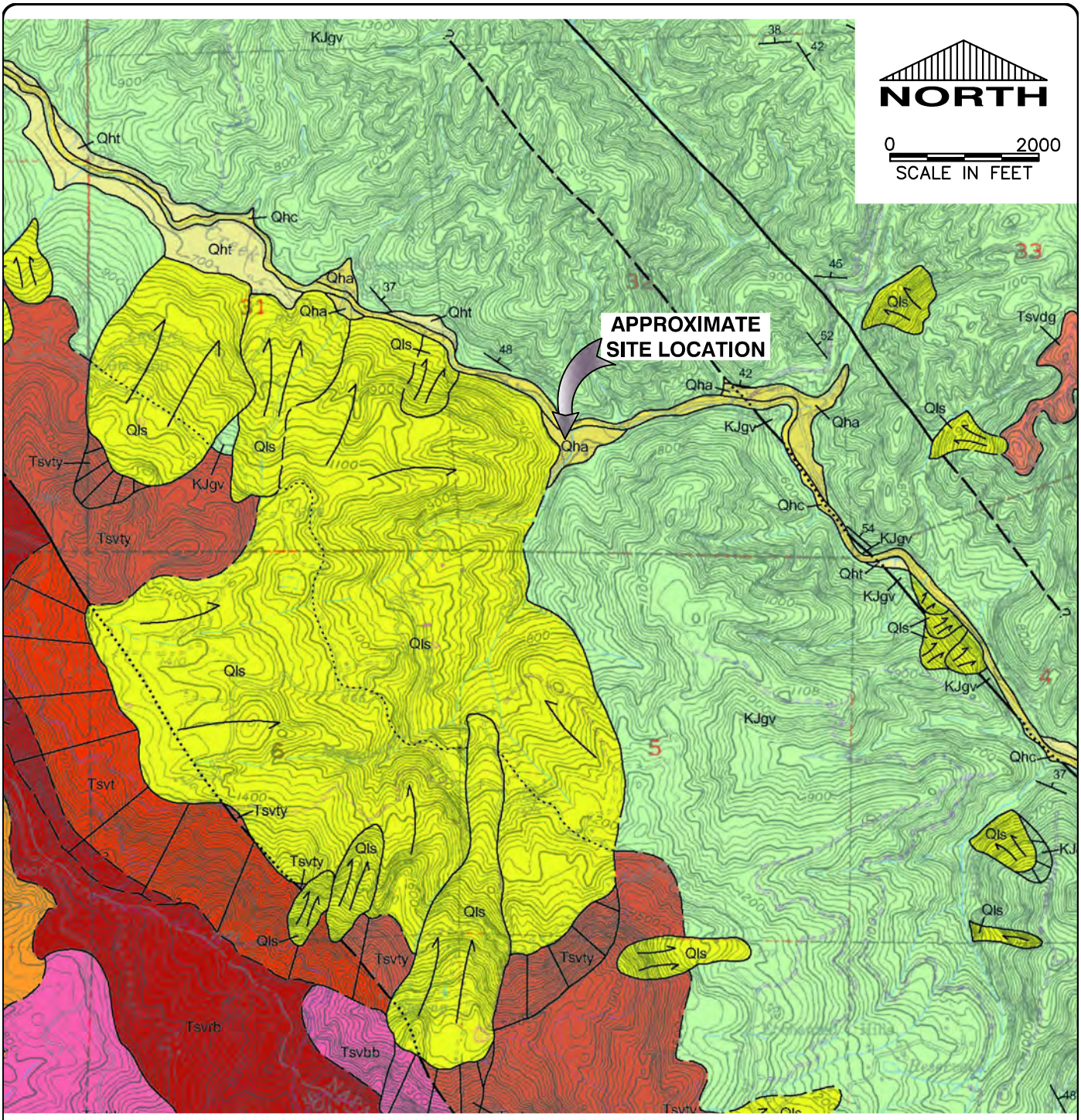
Job No.	7464
Published Data	30 AUG 2017
Scale	AS SHOWN
Drawn	KGM
Chk'd	SWL

CONTOUR MAP
DRY CREEK - MT. VEEDER PROJECT
APN: 027-310-039
4290 MOUNT VEEDER ROAD
NAPA, CALIFORNIA 94558

FIGURE
2B

F2B 20170830
7464 CONTOUR.MXD

X:\GIS\7000_PRJ\7464 Oakville Winery\7464A Water Availability Anaylsis\MXD



Qha	Alluvium, undivided (Holocene) - Alluvium deposited on fans, terraces, or in basins; composed of sand, gravel, silt, and clay that are poorly sorted.
Qls	Landslide deposits (Holocene and Pleistocene) - Includes debris flows and block slides.
KJgv	Great Valley Sequence (Early Cretaceous and Late Jurassic) - Sandstone, pebble conglomerate, siltstone, and shale.

GEOLOGIC MAP OF THE RUTHERFORD 7.5' QUADRANGLE, NAPA AND SONOMA COUNTIES, CLAHAN 2005

CONDOR EARTH
21663 Brian Lane
P.O. Box 3905
Sonora, CA 95370
(209) 532-0361
fax(209) 532-0773
www.condorearth.com

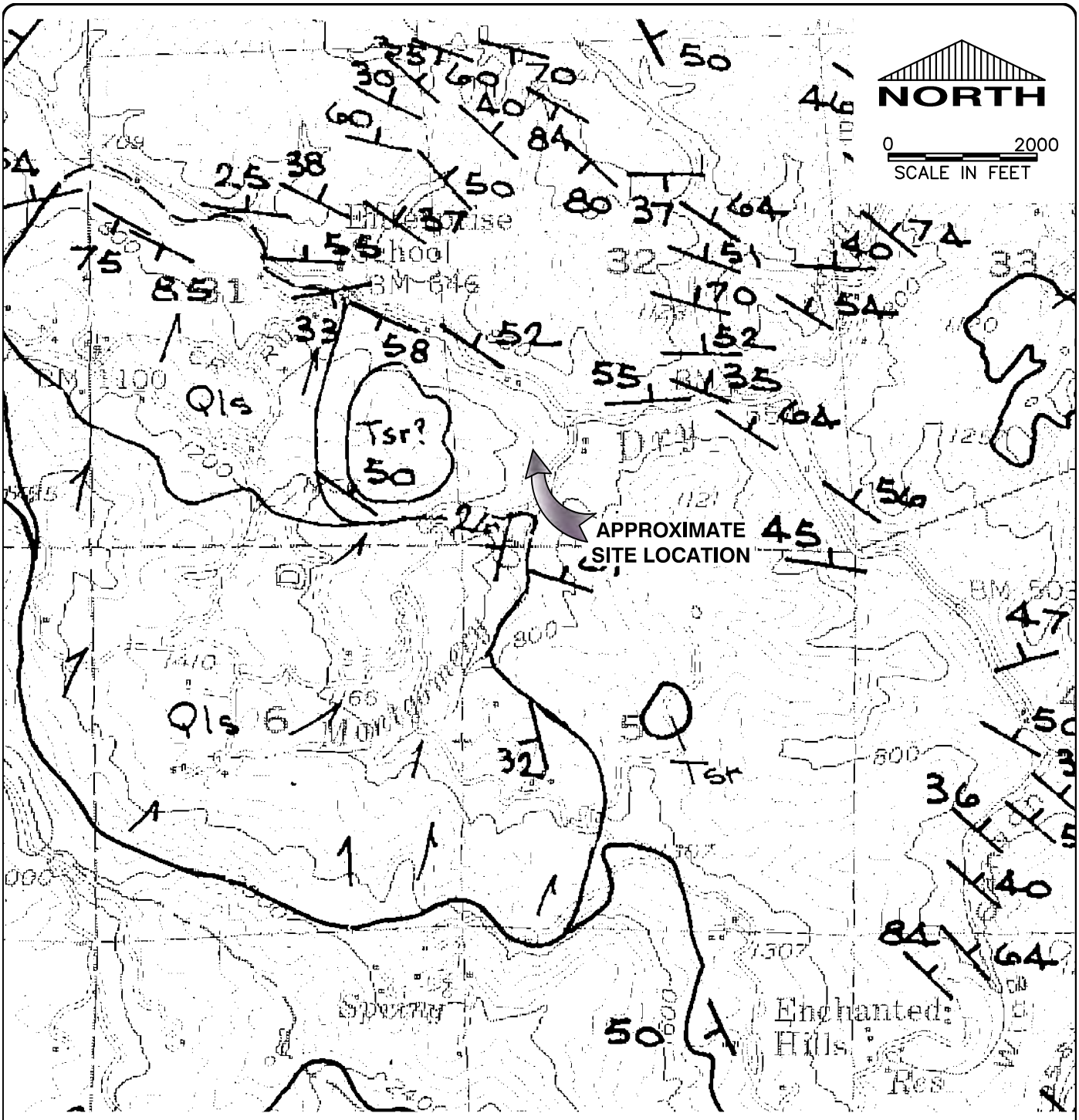
Job No. 7464
Published Date 30 AUG 2017
Scale AS SHOWN
Drawn KGM
Chk'd SWL

GEOLOGIC MAP
DRY CREEK – MT. VEEDER PROJECT
APN 027-310-039
4290 MOUNT VEEDER ROAD
NAPA, CALIFORNIA 94558

FIGURE 3A

File No. 7464_F3A

X:\Project\7000_prj\7464 Oakville Winery Wine Cave\7464 Wine Cave\7464_CAD\DWG\GEOTECH\7464_F3A.dwg 8-30-17 04:31:03 PM kmckinley



PRELIMINARY GEOLOGIC MAP OF EASTERN SONOMA COUNTY AND WESTERN NAPA COUNTY, FOX 1973

CONDOR EARTH
21663 Brian Lane
P.O. Box 3905
Sonora, CA 95370
(209) 532-0361
fax(209) 532-0773
www.condorearth.com

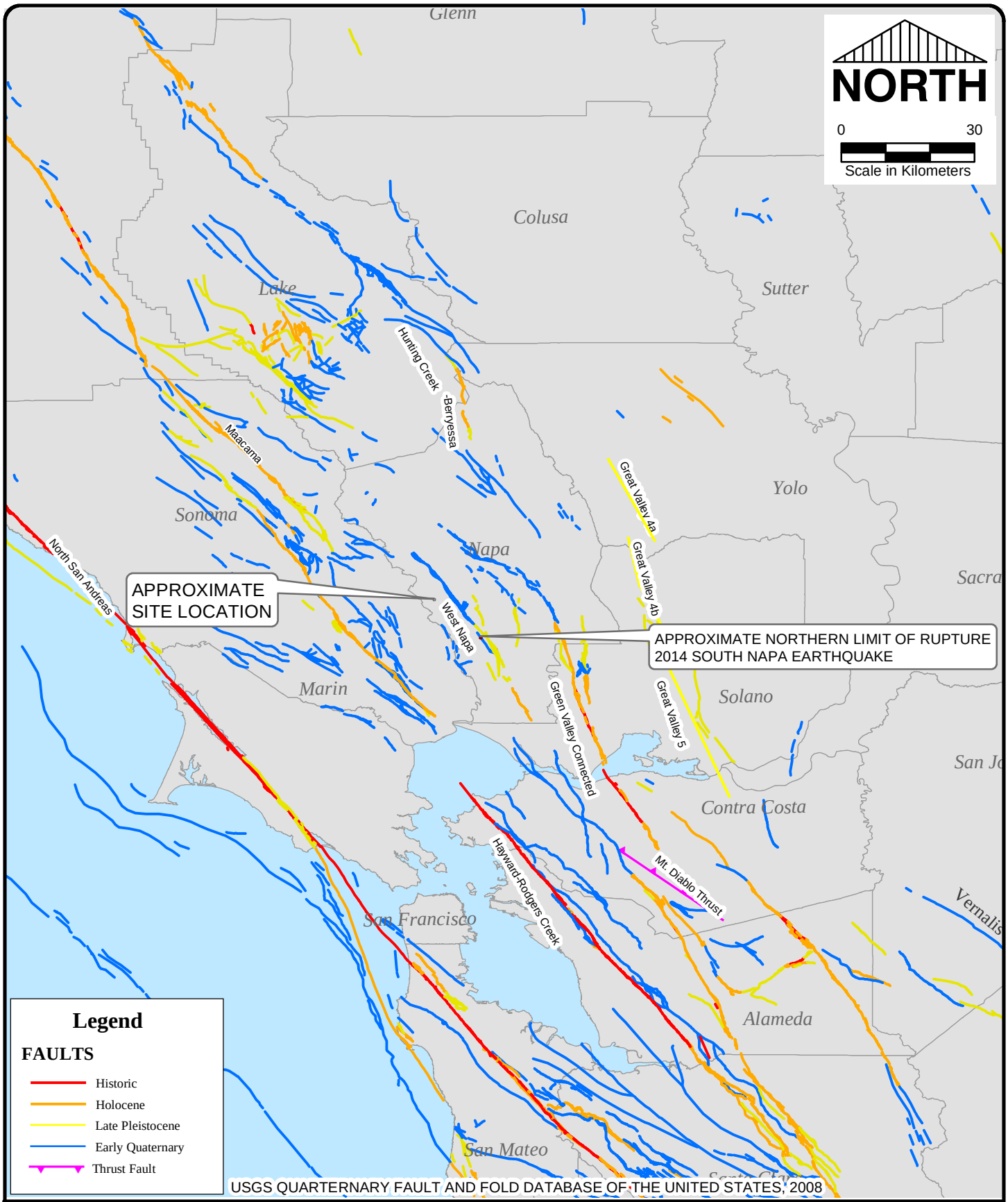
Job No.	7464
Published Date	30 AUG 2017
Scale	AS SHOWN
Drawn / Chk'd	KGM / SWL

GEOLOGIC MAP
DRY CREEK – MT. VEEDER PROJECT
APN 027-310-039
4290 MOUNT VEEDER ROAD
NAPA, CALIFORNIA 94558

FIGURE
3B

File No. 7464_F3B

X:\Project\7000_prj\7464 Oakville Winery Wine Cave\7464 Wine Cave\7464_CAD\DWG\GEOTECH\7464_F3B.dwg 8-30-17 04:31:34 PM kmckinley



CONDOR EARTH
21663 Brian Lane
P.O. Box 3905
Sonora, CA 95370
(209) 532-0361
fax (209) 532-0773
www.condorearth.com

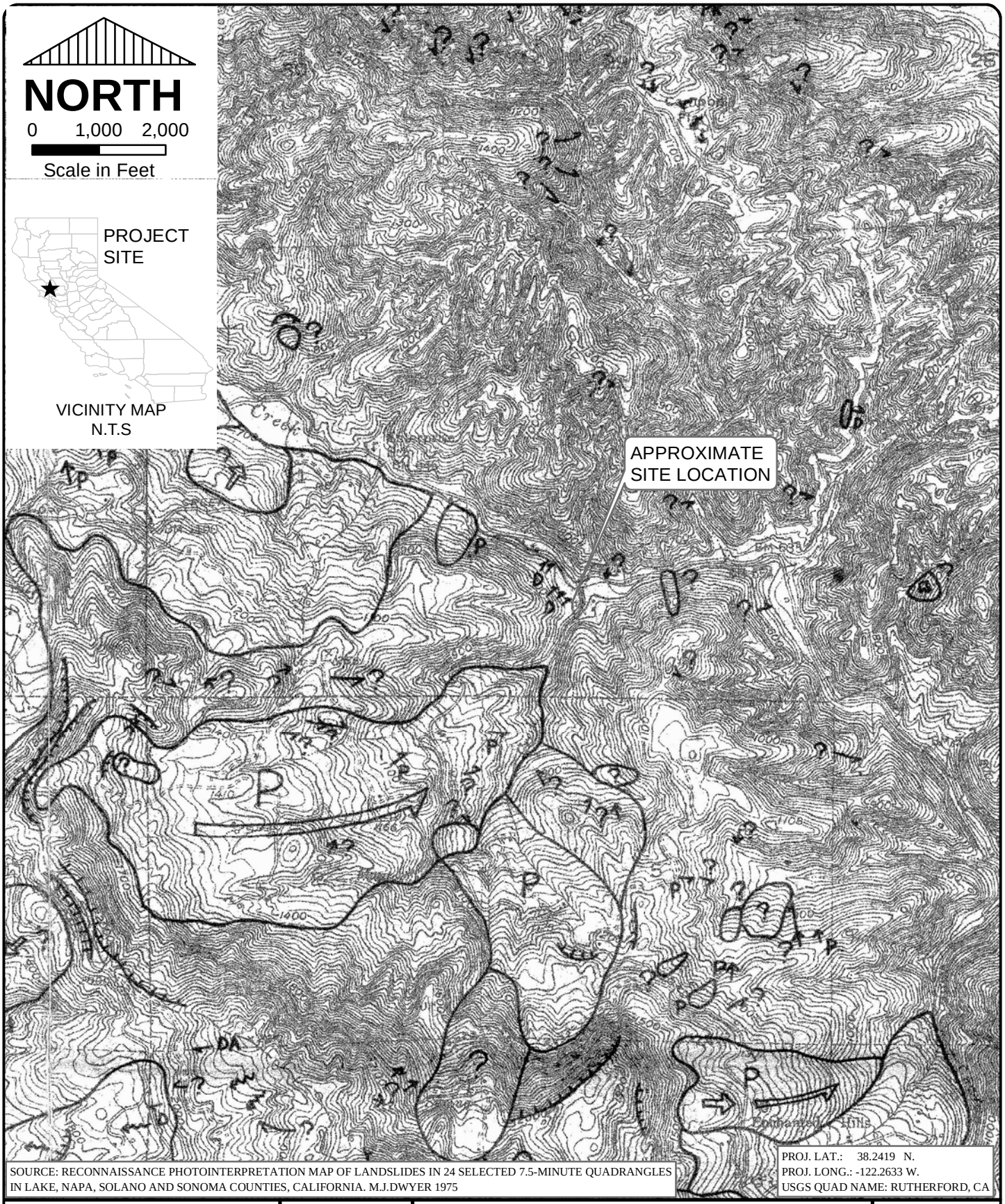
Job No.	Published Data	Scale	Drawn	Chk'd
7464	30 AUG 2017	AS SHOWN	KGM	SWL

REGIONAL FAULT MAP
DRY CREEK - MT. VEEDER PROJECT
APN: 027-310-039
4290 MOUNT VEEDER ROAD
NAPA, CALIFORNIA 94558

FIGURE 4

F4 20170830
7464 FAULT.MXD

X:\GIS\7000_PRJ\7464 Oakville Winery\MXD



CONDOR EARTH
21663 Brian Lane
P.O. Box 3905
Sonora, CA 95370
(209) 532-0361
fax (209) 532-0773
www.condorearth.com

Job No.	Published Data	Scale	Drawn	Chk'd
7464	30 AUG 2017	AS SHOWN	KGM	SWL

LANDSLIDE MAP
DRY CREEK - MT. VEEDER PROJECT
APN: 027-310-039
4290 MOUNT VEEDER ROAD
NAPA, CALIFORNIA 94558

FIGURE 5A

F5A 20170830
7464 LANDSLIDE.MXD

X:\GIS\7000_PRJ\7464 Oakville Winery\MXD

SYMBOLS USED

LARGE LANDSLIDE DEPOSITS

Landslide which is 50 ft or more in maximum dimension. Arrows indicated general direction of downslope movement (omitted for lack of space on some landslides and on all questionable landslides). Double barbed arrows indicated primarily slump of block slump landslide movement. Single barbed arrows indicated primarily flow movement, while a combination of double and single barbed arrows indicated a complex movement, slump or block slump with earthflow extending downslope from foot. smaller arrows within a large landslide indicated smaller more recent landslides occurring on a large landslide mass. Capital letters shown on each landslide have the following designations: D, DEFINITE landslide activity; P, PROBABLE landslide deposits; Q, QUESTIONABLE landslide deposits; R, landslides features on photographs strongly suggest a RAPID rate of slide movement. A, landslide features on photographs strongly suggest recent ACTIVITY. Hachured lines show the approximate position of inferred landscape scarps.

Recognition of some or all of the following landslide–formed features, if well defined and readily observable in aerial photographs, lead to interpretation of definite landslide (D on map); (1) broken ground, including scarps and fissures; (2) primary and secondary slump blocks; (3) sag ponds; (4) slide toes; (5) hummocky topography; (6) springs and seeps often with water–loving vegetation; (7) abrupt and irregular changes in slope and drainage pattern and stream gradient.

Topographic features recognized wit the following landforms are interpreted as being very probable of landslide origin (P on maps): (1) continuous, relatively sharp breaks on slope interpreted as being poorly preserved and/or poorly developed slide scarps; (2) topographic flats, or benches interpreted as being poorly preserved and/or poorly developed slump blocks; (3) small, presently free–draining areas, of gently relief interpreted as old bog ponds which have become infilled by sediment.

Topographic features whose outlines are subdued by weathering and/or largely obscured by vegetation but whose overall form is suggestive of landslide origin are called questionable landslides (? on maps).

SMALL LANDSLIDE DEPOSITS

100 to 500 feet maximum dimension. Arrows indicated general direction of downslope movement and are centered over the location of deposits. Meaning of symbols: arrows, D, P, ?, R and A are the same as for LARGE LANDSLIDE DEPOSITS.

SOIL CREEP

Areas of suspected soil creep, the shallow and gradual downhill movement of soil and loose rock material. Undulating arrows indicated general direction of creep and are centered over the location of creep areas. Areas with a maximum dimension of less than 500 feet are shown only by undulating arrows.

LANDSLIDE ZONE

Slide area consisting of numerous coalesced and superposed landslides of various sizes, types of movement, and degree of activity. because of spatial complexity, it is generally not feasible to delineate individual slides composing these zones. Meaning of symbols: D, P, and A are the same as of LARGE LANDSLIDE DEPOSITS. The following symbols are used only for the LANDSLIDE ZONES: D–DA, landslide zone consists primarily DEFINITE TO DEFINITE and ACTIVE landslide deposits; P–?, landslide zone consists primarily PROBABLE to QUESTIONABLE landslide deposits; S, Stable appearing areas within a landslide zone.

SOURCE: RECONNAISSANCE PHOTOINTERPRETATION MAP OF LANDSLIDES IN 24 SELECTED 7.5-MINUTE QUADRANGLES IN LAKE, NAPA, SOLANO AND SONOMA COUNTIES, CALIFORNIA. M.J.DWYER 1975

CONDOR EARTH
21663 Brian Lane
P.O. Box 3905
Sonora, CA 95370
(209) 532-0361
fax (209) 532-0773
www.condorearth.com

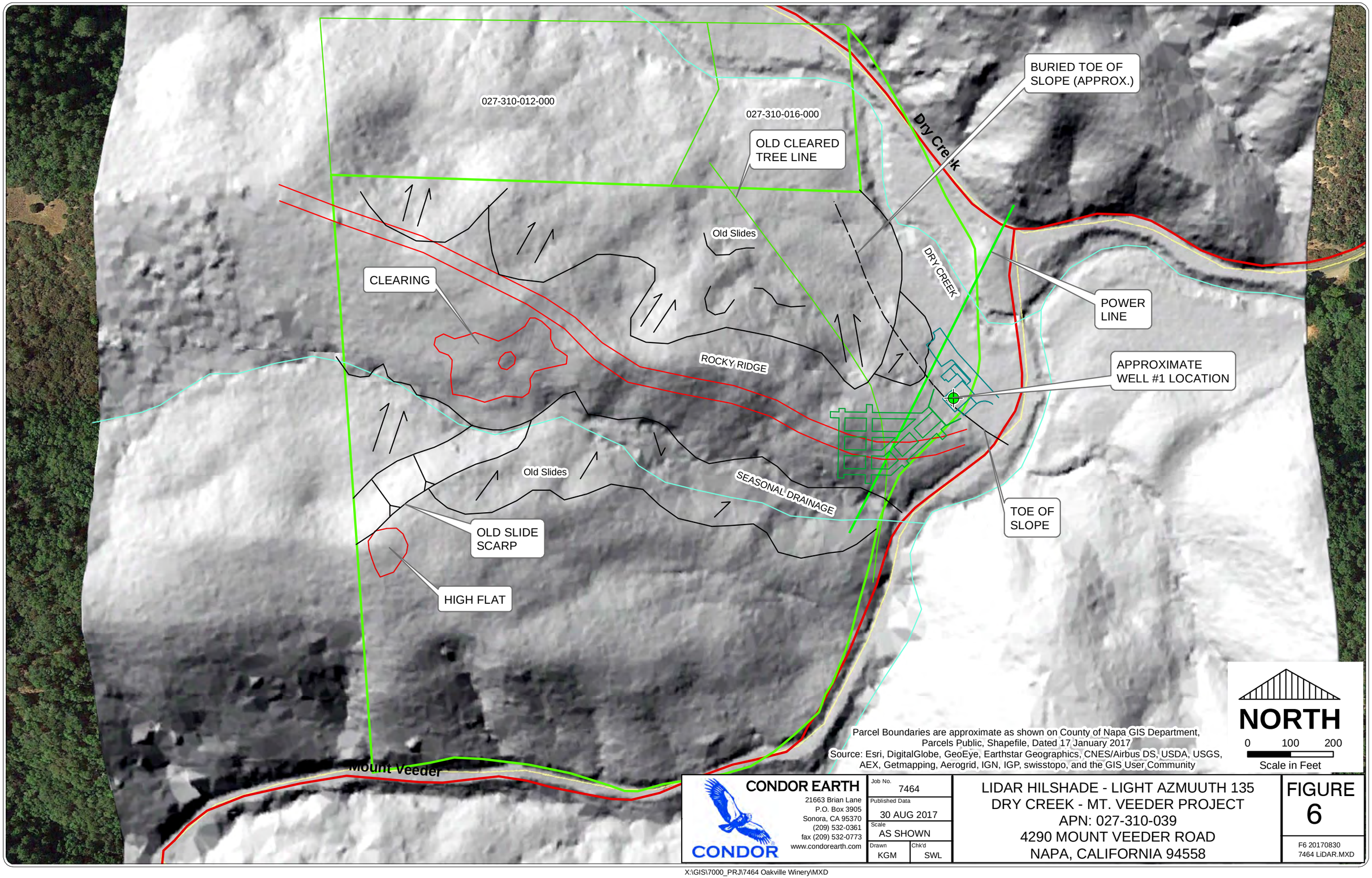
Job No.	7464
Published Data	30 AUG 2017
Scale	AS SHOWN
Drawn	KGM
Chk'd	SWL

LANDSLIDE MAP
DRY CREEK - MT. VEEDER PROJECT
APN: 027-310-039
4290 MOUNT VEEDER ROAD
NAPA, CALIFORNIA 94558

FIGURE
5B

F5B 20170830 7464
LANDSLIDE-LEGEND

X:\GIS\7000_PRJ\7464 Oakville Winery\MXD



Parcel Boundaries are approximate as shown on County of Napa GIS Department, Parcels Public, Shapefile, Dated 17 January 2017
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

CONDOR EARTH
21663 Brian Lane
P.O. Box 3905
Sonora, CA 95370
(209) 532-0361
fax (209) 532-0773
www.condorearth.com

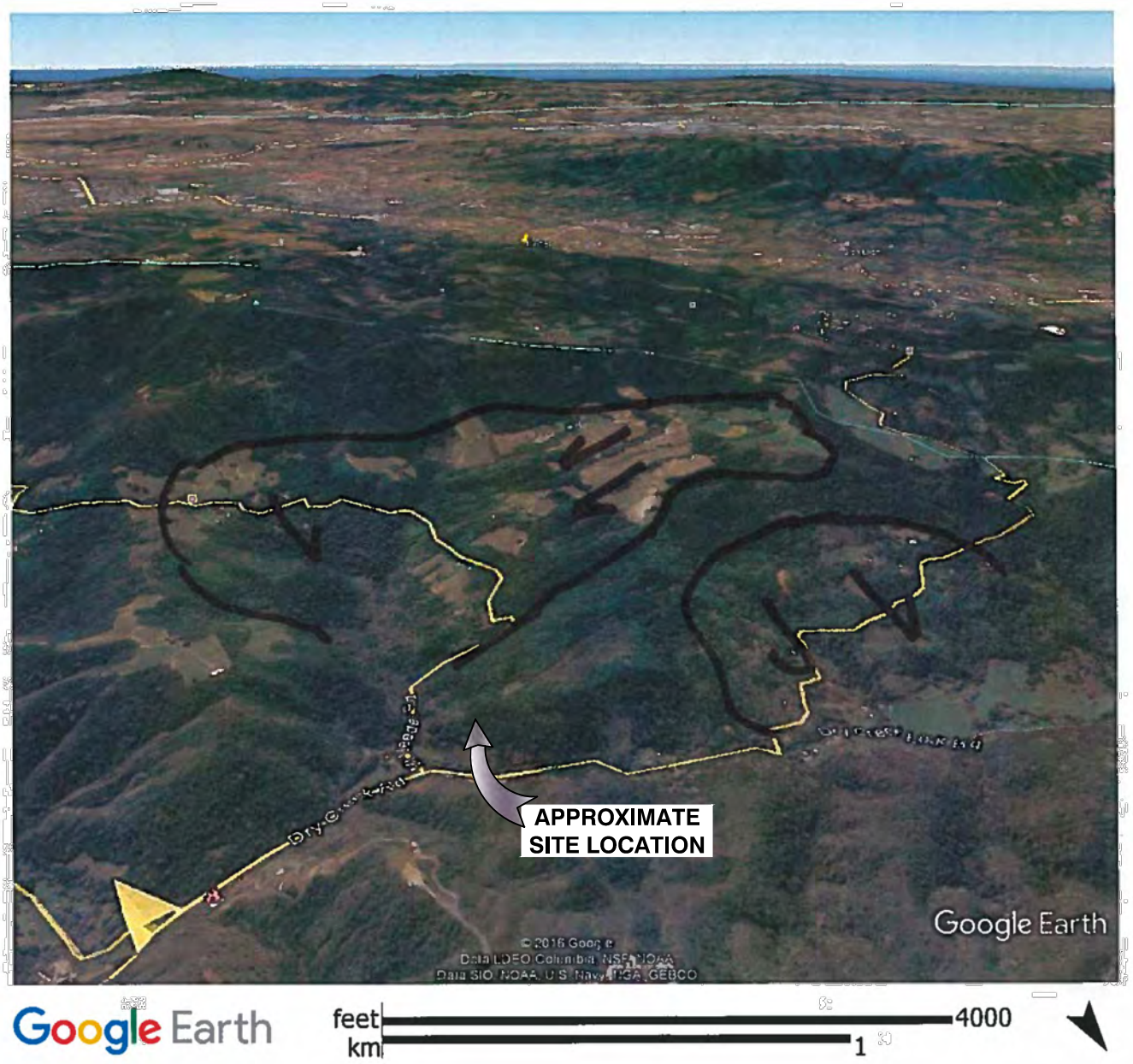
Job No.	7464
Published Data	30 AUG 2017
Scale	AS SHOWN
Drawn	KGM
Chk'd	SWL

LIDAR HILSHADE - LIGHT AZMUUTH 135
DRY CREEK - MT. VEEDER PROJECT
APN: 027-310-039
4290 MOUNT VEEDER ROAD
NAPA, CALIFORNIA 94558

FIGURE 6

F6 20170830
7464 LiDAR.MXD

X:\GIS\7000_PRJ\7464 Oakville Winery\MXD



Google Earth

feet 4000
km 1

CONDOR EARTH
21663 Brian Lane
P.O. Box 3905
Sonora, CA 95370
(209) 532-0361
fax(209) 532-0773
www.condorearth.com

Job No.	7464
Published Date	30 AUG 2017
Scale	AS SHOWN
Drawn / Chk'd	KGM / SWL

OBLIQUE AERIAL VIEW
DRY CREEK – MT. VEEDER PROJECT
APN 027-310-039
4290 MOUNT VEEDER ROAD
NAPA, CALIFORNIA 94558

FIGURE 7

File No. 7464_F7

X:\Project\7000_prj\7464 Oakville Winery Wine Cave\7464 Wine Cave\7464_CAD\DWG\GEOTECH\7464_F7.dwg 8-30-17 04:41:35 PM kmckinley