REPORT
FAULT RUPTURE HAZARD EVALUTION
PROPOSED MINOR SUBDIVISION
1276 JENSEN LANE
WINDSOR, CALIFORNIA

JOB NO. 7845.02

PREPARED FOR:

FAMIGLIA LIBERATA, LLC.
ATTENTION: KELLY HARRISON
855 BORDEAUX WAY, SUITE 210
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c/o: MUNSELLE CIVIL ENGINEERING
ATTENTION: CORT MUNSELLE
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PREPARED BY:

PJC & ASSOCIATES, INC.
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STEPHEN M. SCHURKE
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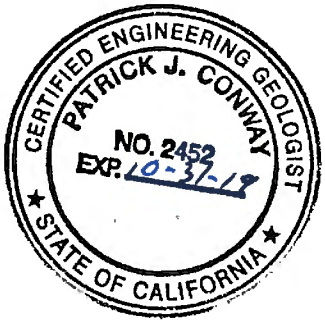

PATRICK J. CONWAY
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SEPTEMBER 5, 2019

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PJC & Associates, Inc.
Consulting Engineers & Geologists

September 5, 2019 Job No. 7845.02

Famiglia Liberata, LLC.
Attention: Kelly Harrison
855 Bordeaux Way, Suite 210
Napa, CA 94558
Kelly@swgnapa.com
c/o: Munselle Civil Engineering
Attention: Cort Munselle
cort@munsellecivil.com

Subject: Alquist-Priolo Earthquake Fault Study
Proposed Minor Subdivision
1276 Jensen Lane
Windsor, California

Dear Famiglia Liberata, LLC:

PJC & Associates, Inc. (PJC) is pleased to submit this report which presents the results of our Alquist-Priolo Earthquake Fault Study for the property located at 1276 Jensen Lane in Windsor, California. The location of the sites are shown on the Site Location Map, Plate 1. The approximate geographic latitude and longitudinal coordinates of the sites are the following- Lot 1: 38.5542° N / 122.7825° W, Lot 2: 38.5540° N / 122.7816° W, and Lot 3: 38.5523° N / 122.7799° W. Our services were completed in accordance with our proposal for geologic services dated May 31, 2019, and your authorization to proceed with the work dated July 1, 2019. The subject property is located in the Alquist-Priolo Earthquake Fault Zone. To evaluate for the presence or absence of active faulting at the property PJC performed an Alquist-Priolo Earthquake Fault Study. Included in this report are our findings, opinions, conclusions, and recommendations.

Based on the results of this study, we judge that the property is developable from a geological standpoint. We appreciate the opportunity to be of service. If you have any questions regarding this report, please contact us.

Sincerely,

PJC & ASSOCIATES, INC.

PJC:tjc:sms

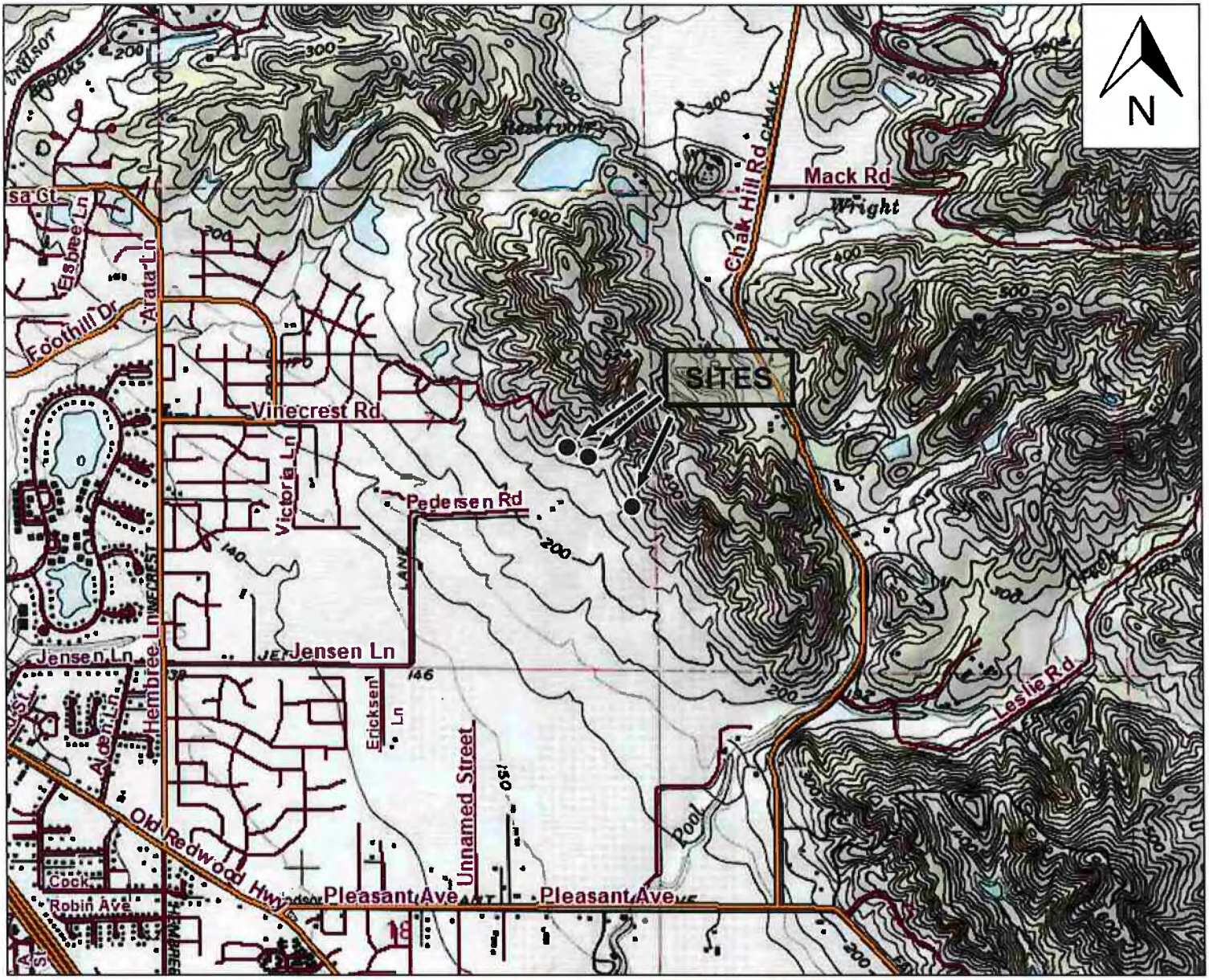
FAULT RUPTURE HAZARD EVALUATION
PROPOSED MINOR SUBDIVISION
1276 JENSEN LANE
WINDSOR, CALIFORNIA

1. INTRODUCTION

PJC & Associates, Inc. (PJC) is pleased to present the results of our fault rupture hazard evaluation for the potential building sites located at 1276 Jensen Lane in Windsor, California. The approximate locations of the sites are shown on the Site Location Map, Plate 1. The geographic latitudinal and longitudinal coordinates of the sites are the following: Lot 1: 38.5542° N / 122.7825° W, Lot 2: 38.5540° N / 122.7816° W, and Lot 3: 38.5523° N / 122.7799° W. Our services were completed in accordance with our proposal for geologic services dated May 31, 2019, and your authorization to proceed with the work dated July 1, 2019. Based on our review of the Healdsburg Quadrangle and the Alquist-Priolo Earthquake Fault Zone Map (APEFZ Map), the subject potential building sites are located within the State designated, Alquist-Priolo Earthquake Fault Zone (APEFZ). The location of the APEFZ in relation to the project sites is presented on Plate 2A. The Alquist-Priolo Earthquake Zoning Act (APEFZ Act), formerly called the Alquist-Priolo Special Studies Zones Act, was signed into California law on December 22, 1972. Under the APEFZ Act, earthquake fault zones were delineated along known active faults. An active fault is one that has shown evidence of surface displacement within Holocene time (the last 11,000 years). The purpose of our study was to evaluate for the presence or absence of active faulting at the potential building footprints.

2. PROJECT DESCRIPTION

The proposed minor subdivision was in the preliminary planning stage during the time of this report. Therefore, detailed project plans were unavailable at the time of this report. According to a preliminary site plan prepared by Munselle Civil Engineering, dated July 25, 2019, it is our understanding that it is planned to improve the property and subdivide the parcel into three separate residential lots. Although plans have not yet been devised, we assume the construction of a one or two story single-family dwelling at each of the three lots. Potential building envelopes are displayed on the site plan by Munselle Civil Engineering displayed on Plate 2B. The scope of this evaluation consisted of performing a fault rupture hazard assessment at the three potential building envelopes to evaluate for the presence or absence of active faulting.



SCALE: 1:24,000

REFERENCE: USGS HEALDSBURG, CALIFORNIA 7.5 MINUTE QUADRANGLE, REVISED 1993.

PJC & Associates, Inc.
Consulting Engineers & Geologists

SITE LOCATION MAP
PROPOSED MINOR SUBDIVISION
1276 JENSEN LANE
WINDSOR, CALIFORNIA

PLATE
1

Proj. No: 7845.02 Date: 8/19 App'd by: PJC

3. SCOPE OF SERVICES

Specifically, our work included the following:

a. Review of published geologic data from various sources, historic seismic data, aerial photographs, and LiDAR raster images of the project site. The data was used in the assessment of regional and local faulting, and to evaluate historical faulting at the site.

b. Coordinate the excavation of three exploratory fault trenches. One trench was excavated at each of the lots, shadowing the potential building envelopes. The sides of the trenches were cleaned by our staff geologists and our certified engineering geologist. The subsurface conditions encountered during the trench excavations were logged by our staff geologists and our certified engineering geologist.

c. Conduct a surfical reconnaissance and surface geologic mapping of the property. The reconnaissance was performed by our certified engineering geologist to observe topography and site geomorphic features.

d. Preparation of this report which presents our findings and conclusions and our recommendations for additional geologic and geotechnical work as the project proceeds.

4. SITE CONDITIONS

a. General. The 38 acre property is located approximately one-half mile east of Jensen Lane, and east of the City of Windsor. The square-shaped property will be separated into three lots which will consist of the following acreages; Lot 1: 12.3 acres, Lot 2: 10.4 acres, and Lot 3: 15.3 acres. The property is bounded by vineyards to the south and west, vineyards and undeveloped land to the north, and undeveloped forested hillsides to the east. At the time of our field investigation, the potential building envelopes were primarily occupied by active vineyard blocks and adjoining vineyard avenues. The remaining areas of the property are generally undeveloped and covered with oak trees, brush, ground vines, and perennial grasses.

b. Topography. Topography at the property consists of nearly level terrain to moderately sloping hillsides at the base of the rolling foothills east of the City of Windsor. According to the USGS

Healdsburg, California 7.5 Minute Quadrangle, Lot 1, 2, & 3 building envelopes are located near an elevation of 260', 257', & 273' above mean sea level (MSL) respectively. Lots 1 and 2 are situated on nearly level to gently sloping terrain along the topographic transition from gently sloping hillsides to the Santa Rosa Plain. A very shallow seasonal drainage course borders the potential building envelope on Lot 1 to the north. A well-defined and relatively shallow seasonal drainage course borders Lot 2 to the east. During our site reconnaissance we documented significant spring activity and a small active landslide in the vineyard block immediately north of the potential building envelope on Lot 2. The landslide is easily recognizable due to the contorted vine rows and significant surface seepage. Lot 3 is located on moderately sloping terrain which is bordered by a deeply incised seasonal drainage course to the north. Review of LiDAR images and our surficial reconnaissance has revealed the presence of a relatively large landslide deposit south and southeast of the potential building envelope on Lot 3. During our site reconnaissance we observed hummocky terrain within the forest and vineyard block south and southeast of the potential building envelope on Lot 3. The hummocky terrain is interpreted as accumulated landslide debris which was derived from a relatively large landslide on the steep slope west facing slope upslope and southeast of the potential building envelope on Lot 3. The subdued nature of the hummocks, and lack of an obvious landslide scarp suggest that this feature was likely an ancient landslide event. During our reconnaissance we also noted a rather sharp north-northwest to south-southeast trending ridgeline at the eastern margin of the property. The APEFZ Map indicates the approximate location of the Rodgers Creek fault trending north-northwest along a seasonal drainage course just east of the aforementioned ridgeline.

c. Drainage. Site drainage consists mainly of sheet flow and surface infiltration. As previously mentioned, several seasonal drainages extend through the property. At the time of our field investigation in July 2019, all of the drainage courses at the property were essentially dry. Although we did observe the presence of significant spring activity in the vineyard block north of the potential building envelope on Lot 2. Regional drainage is provided by the Russian River, which is located approximately four miles west of the project sites.

5. GEOLOGIC SETTING

a. Regional Geology. The project site is located in the Coast Ranges Geomorphic Province of California. This province is characterized

by northwest trending topographic and geologic features, and includes many separate ranges, coalescing mountain masses and several major structural valleys. The province is bounded on the east by the Great Valley and on the west by the Pacific Ocean. It extends north into Oregon and south to the Transverse Ranges in Ventura County.

The structure of the northern Coast Ranges region is extremely complex due to continuous tectonic deformation imposed over a long period of time. The initial tectonic episode in the northern Coast Ranges was a result of plate convergence, which is believed to have begun during the late Jurassic period. This process involved eastward thrusting of oceanic crust beneath the continental crust (Klamath Mountains and Sierra Nevada) and the scraping off of materials that are now accreted to the continent (northern Coast Ranges). East-dipping thrust and reverse faults were believed to be the dominant structures formed.

Right lateral, strike slip deformation was superimposed on the earlier structures beginning mid-Cenozoic time, and has progressed northward to the vicinity of Cape Mendocino in Southern Humboldt County. Thus, the principal structures south of Cape Mendocino are northwest trending, nearly vertical faults of the San Andreas system.

b. Local Geology. According to a geologic map of the Healdsburg 7.5 Minute Quadrangle, prepared by the California Geologic Survey (CGS), the site is underlain by Tertiary to Quaternary fluvial and lacustrine deposits (QTg), formerly known as the Glen Ellen Formation. This geologic unit is described as consisting of gravel, sandstone, siltstone, mudstone, lacustrine diatomite and silicic tuff. A regional geologic map is presented on Plate 2B. The Glen Ellen Formation was deposited during the Pliocene and Pleistocene epochs in a fluvial type environment. Our exploratory fault trenches confirmed that the property is underlain by these Quaternary and Tertiary age fluvial deposits and bedrock. We also observed Glen Ellen Formation deposits exposed in the incised drainage courses and within a cut at the upper eastern margin of the property. At the potential building sites the Glen Ellen Formation deposits and bedrock are generally mantled by a continuous stratum of topsoil and discontinuous residual soil strata with varying depths. A detailed discussion of the subsurface conditions encountered in our exploratory fault trenches are presented in Section 7 of this report.

c. Interpretation of Geomorphic Features. As previously discussed, the project site is located in a highly active fault zone. Topography

at the property generally consists of nearly level to gentle terrain which gradually steepens uphill to a moderately steep slope at the eastern margin of the property. The slope rises up to form a rather sharp north to south trending ridgeline at the eastern margin of the property. We interpret that the ridgeline at the property was likely uplifted due to transpression and/or thrusting, due to bends in the fault bends or offset faults in conjunction with differential erosion. The APEFZ Map indicates the approximate location of the Rodgers Creek fault within a north-northwest flowing season drainage course just east of the aforementioned sharp ridge. The APEFZ Map indicates the Rodgers Creek fault steeping over approximately 540 feet to the north-northwest, to another approximately located fault trace which continues to trend to the north-northwest.

6. FAULTING

a. General. The site is located in a highly active seismic zone associated with the Rodgers Creek fault. It is our understanding that the Rodgers Creek fault is essentially considered the northern continuation of the Hayward fault. Some geologic literature also labels the northern lineament of this fault trace as the Healdsburg Fault. The active faults which bisect the Bay Area region and the Coast Ranges are considered part of the San Andreas Fault system. The San Andreas Fault system has long been recognized as the major active fault system along the Pacific Coast of the United States. The Rodgers Creek fault and generally all of the faults associated with San Andreas Fault system exhibit right-lateral strike-slip relative movement. The Rodgers Creek fault, in the vicinity of the project site, generally trends at approximately north 26° to 32° west. The Rodgers Creek fault trace is often marked by sag ponds, offset stream channels, pressure ridges, shattered rock, fault gouge, etc. Contrary to popular belief, the boundaries of most faults typically do not consist of a single linear, straight line. Numerous jogs and step-overs are present throughout the entire length of the Rodgers Creek fault, as shown on Plate 2A.

b. Fault Location. According to the APEFZ map, approximately located active fault traces bisect the northern and eastern margins of the subject property. Based on our review of the APEFZ map, it appears that the mapped northern fault trace enters the property approximately 100 feet to the north of Lot 1. The southern terminus of this fault trace is approximately 225 feet to the northwest of Lot 2. The mapped active fault trace on the eastern margin appears to exit the property near the center of the eastern margin of the property, and at its closest point is approximately 145 feet to the northeast of Lot 3. The CGS geologic map of the Healdsburg 7.5

Minute quadrangle also indicates similar fault traces as the APEFZ Map. The State of California classifies an active fault as a fault which exhibits surface rupture features during the Holocene geologic epoch (the past 11,700 years). Based on the location of the two previously discussed faults on each side of the property, we interpret the ridgeline near the property as a pressure ridge which was likely uplifted due to transpression and/or thrusting, due to fault bends or offset faults in conjunction with differential erosion.

c. Probabilistic Maximum Magnitude Earthquake and Slip Rate. The maximum magnitude earthquake along the Rodgers Creek fault is considered to be M7.3. Geodetic data indicates that the Rodgers Creek fault accommodates approximately 9 millimeters per year (mm/yr) of strike-slip motion.

d. Deterministic Estimations. According to the computer fault modeling software program EQFAULT, the three closest known active faults to the project site are the Rodgers Creek, the Maacama (South), and the Collayomi faults. The Rodgers Creek fault is located 1.2 miles to the northeast, the Maacama (South) 4.6 miles to the northeast, and the Collayomi fault is located 16.5 miles north-northeast of the project site. Table 1 outlines the nearest known active faults, their associated maximum magnitudes and the estimated peak site accelerations due to earthquakes which are expected to occur on those faults.

TABLE 1
CLOSEST KNOWN ACTIVE FAULTS &
SITE DETERMINISTIC PARAMETERS

Fault Name	Distance from Site (Miles)	Maximum Earthquakes (Moment Magnitude	Estimated Peak Site Accelerations (g's)
Rodgers Creek	1.2	7.3	0.448
Maacama (South)	4.6	6.9	0.300
Collayomi	16.5	6.5	0.105

Reference- "EQFAULT" Ver 3.00, software program.

e. Historical Seismic Events. Our site-specific seismic investigation consisted of utilizing both a historic and deterministic approach to evaluate the peak ground acceleration that the project site has experienced in the past, and may experience in the future. Our historic approach incorporated the use of the computer fault modeling software program EQSEARCH version 3.0 (Blake, 2000a). The software employs a seismic database covering events from the years 1800 to 2000 to estimate historical peak ground accelerations. The program attributes fault characteristics and user

selected attenuation relationship(s) to estimate the peak ground acceleration which could be expected at the site.

The site has experienced strong ground shaking due to several seismic events in the past. For this assessment, earthquakes within a 30 miles radius of the site were used to estimate the historical peak ground acceleration. Our search returned 62 earthquakes within the defined search perimeters. The closest known earthquake to the site occurred in 1969 (M5.7), approximately 8.9 miles south-southeast of the project site. The aforementioned 1969 earthquake was a doublet with a tandem M5.6 earthquake which occurred on the same day. Other notable earthquakes that have occurred in the region include: the 1906 San Francisco, the 1989 Loma Prieta, and the 2014 South Napa earthquakes. A summary of our historical search is presented below.

Search Radius	30 miles
Time Period (1800 to 2000)	201 years
Distance to nearest earthquake (M>4.0)	8.9 miles
Largest earthquake magnitude within the search area	6.2
Number of events exceeding a magnitude of 4.0	62

f. Aseismic Creep. In recent years, measurements of movement along the Rodgers Creek using specially designed "creep recorders," indicate that the fault is undergoing aseismic creep. Aseismic creep is described as measurable movements along an active fault, with the absence of detectable earthquakes.

7. SUBSURFACE CONDITIONS

a. Methods of Exploration. The subsurface conditions at the property were investigated by excavating three exploratory fault trenches. The trenches varied in length from approximately 255 to 335 feet and varied in depth from approximately three to seven and one-quarter feet below the existing ground surface. The fault trenches were excavated as close to perpendicular to the mapped fault trace in order to have the greatest potential of intersecting the north-northwest trend of the Rodgers Creek fault. The fault trench locations are shown on the Fault Trench Location Plan, Plate 2B. Cross sections of the south & southeast faces of the trenches are provided on Plates 3 through 5. The soils were classified in accordance with the Unified Soil Classification System, as explained on Plate 6. The bedrock was classified according to Plate 7.

b. Site Geologic Conditions and Interpretation. The fault trenches

generally encountered a continuous surface topsoil deposit overlying discontinuous sandy clay and granular residual soil strata and silty sandstone and mudstone bedrock of the Glen Ellen Formation. Although bedrock was not encountered continuously along the maximum depths of the exploratory fault trenches the residual soil strata at those depths are clearly derived from weathered emplaced bedrock of this formation. The discontinuous nature of the residual soil strata and fluvial deposits were interpreted terrestrial depositional features. Channel fill structures of sandy gravels and some occasional cobbles were interpreted as ancient braided stream channels. No obvious geologic features attributed to fault ground rupture were observed in the exploratory trenches.

c. Groundwater. Groundwater or seepage was not encountered during the excavation of our fault trenches on July 18, 22, & 23, 2019. We anticipate subsurface seepage is possible at the property and would likely be confirmed to the predominately granular clastic seams that we observed in the exploratory trenches. No groundwater barriers associated with previous faulting were observed in the exploratory trenches.

8. DISCUSSION AND CONCLUSIONS

Based upon the results of our fault rupture hazard evaluation, it is our opinion that the potential building footprints as shown on the July 25, 2019 site plan by Munselle Civil Engineering, are developable from a geologic point of view. During our subsurface exploration, we did not observe the presence of any shear zones, deformation, or offset bedding which would be attributed to active faulting at the site. Furthermore, during our investigation we did not observe any slickensides or polished soil faces, which commonly are associated with evidence of active faulting. Therefore, we conclude that active faulting is not present through the potential building envelopes.

The trenches were excavated near an orientation of which would have the greatest potential of intersecting the north-northwest trend of the nearest mapped active fault traces of the Rodgers Creek fault zone. However, it is our understanding that secondary faults can occur subparallel to the main fault trace or even deviate several tens of degrees from the orientation of the main fault. Furthermore, fault rupture most often occurs along known active fault breaks. However, it is our understanding that fault rupture can also occur on planes of weakness including bedding planes, fractures, previously considered dominant faults or even previously unfaulted ground. We should also point out that due to the presence of channel fill deposits, it is possible that evidence of active faulting has been erased

over time by differential erosion. The future land owners and/or property developers should be well informed and understand that building in an active fault zone has an inherently higher than normal risk for ground fault rupture and severe ground shaking.

Due to the close proximity of the active fault traces, it should be anticipated that the project site will experience strong to severe ground shaking in the future. As a precautionary measure, we recommend that the project structural engineer apply a higher than normal seismic factor of safety to the foundation design for all of the structures constructed at the property to accommodate the potential future risk of nearby ground rupture and strong ground shaking. We recommend that foundations and slabs be strengthened additionally to accommodate severe shaking. Preliminary foundations options could consist of post-tensioned slabs-on-grade or heavily reinforced double layer mat slabs-on-grade. We also recommend flexible utility connections to reduce potential pipe ruptures and limit damage to conduits.

We also documented significant spring activity and a small active landslide in the vineyard block immediately north of the potential building envelope on Lot 2. The landslide is easily recognizable due to the contorted vine rows and significant surface seepage. This landslide did not appear to be a significant geologic hazard to the potential building envelope on Lot 2 but should be monitored and repaired as the project develops. Additionally, during our site reconnaissance we observed hummocky terrain within the forest and vineyard block south and southeast of the potential building envelope on Lot 3. The subdued nature of the hummocks, and lack of an obvious landslide scarp suggest that this feature was likely an ancient landslide event. This landslide did not appear to be a significant geologic hazard to the potential building envelope on Lot 3. PJC is currently performing a quantitative slope stability analysis to provide a professional opinion on slope stability at the project site. A slope stability report is forthcoming.

9. LIMITATIONS

The data, information, interpretations and recommendations contained in this report are presented solely for the proposed minor subdivision located at 1276 Jensen Lane in Windsor, California. The conclusions and professional opinions presented herein were developed by PJC in accordance with generally accepted geotechnical engineering principles and practices. No warranty, either expressed or implied, is intended.

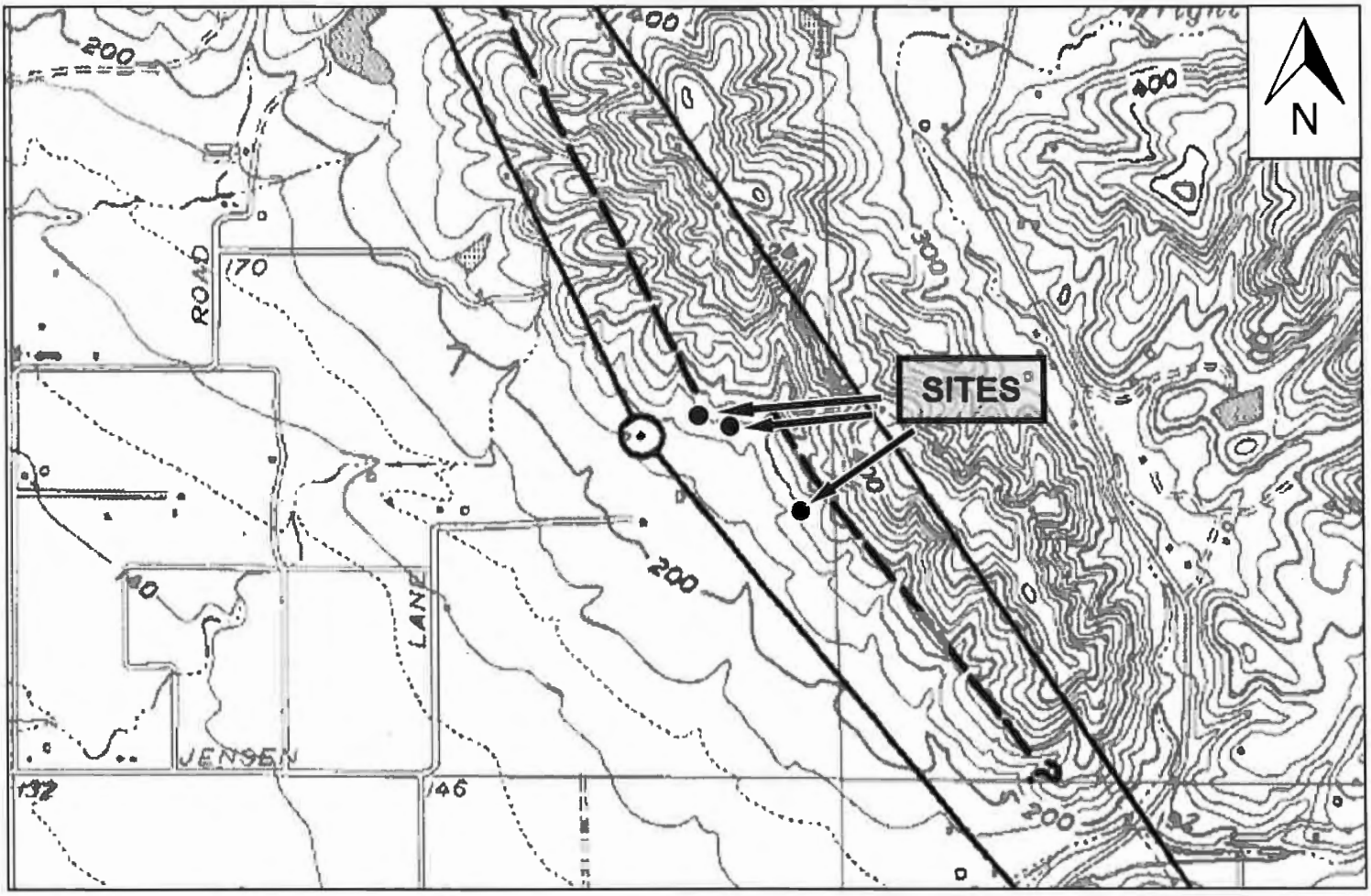
This report has not been prepared for use by parties other than the designers of the project. It may not contain sufficient information for the purposes of other parties or other uses. If any changes are made in the

project as described in this report, the conclusions and recommendations contained herein should not be considered valid, unless the changes are reviewed by PJC and the conclusions and recommendations are modified or approved in writing. This report and the figures contained herein are intended for design purposes only. They are not intended to act by themselves as construction drawings or specifications.

Soil deposits and bedrock formations may vary in type, strength, and many other important properties between points of observation and exploration. Additionally, changes can occur in groundwater and soil moisture conditions due to seasonal variations or for other reasons. Therefore, it must be recognized that we do not and cannot have complete knowledge of the subsurface conditions underlying the subject site. The criteria presented are based on the findings at the points of exploration and on interpretative data, including interpolation and extrapolation of information obtained at points of observation.

10. ADDITIONAL SERVICES

At this time, we did not consider other potential geologic hazards such as liquefaction, lateral spreading, expansive soils, etc. It is our understanding that a slope stability report has been requested for the potential building footprint at Lot 3. PJC is currently working on the slope stability analysis for the project. As the project proceeds and the exact building envelopes have been established, more detailed geotechnical investigations including additional subsurface exploration, laboratory testing, and engineering analysis should be performed at each lot. The geotechnical investigations can provide lot specific foundation options as well as recommendations and design criteria for all structural elements.



APPROXIMATE SCALE: 1" = 1050'

MAP EXPLANATION

ACTIVE FAULTS:

1906 C

Faults considered to have been active during Holocene time and to have a relatively high potential for surface rupture, solid line where accurately located, long dash where approximately located, short dash where inferred, dotted where concealed, query (?) indicates additional uncertainty. Evidence of historic offset indicated b year of earthquake-associated event or C for displacement caused by creep or possible creep.

SPECIAL STUDIES ZONE BOUNDARIES:

These are delineated as straight line segments that connect encircled turning points so as to define special studies zone segments.

Seaward projection of zone boundary.

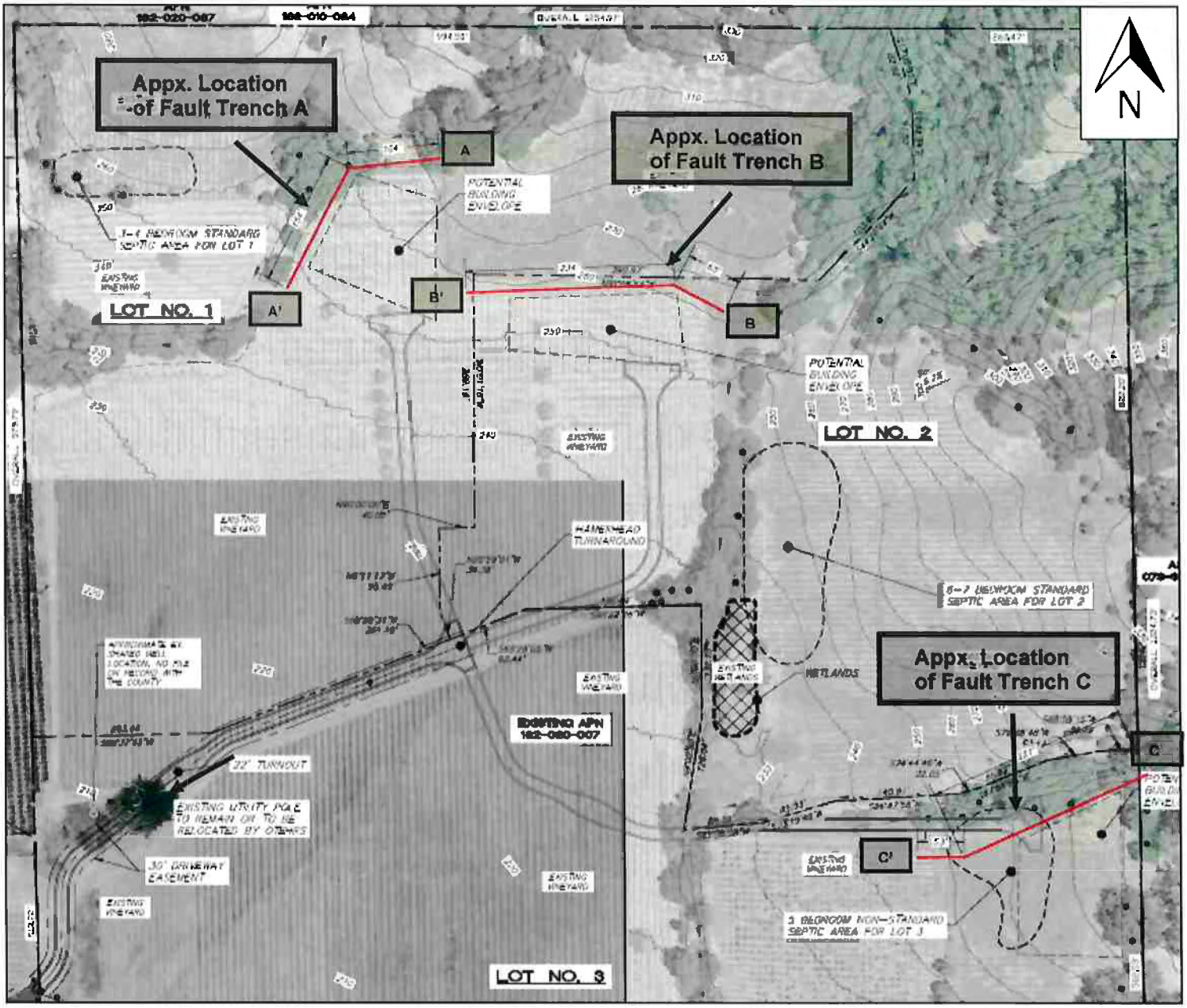
REFERENCE: California Department of Conservation "State of California Special Studies Zone, Healdsburg Quadrangle," Dated July 1, 1983.

PJC & Associates, Inc.
Consulting Engineers & Geologists

ALQUIST PRIOLO LOCATION MAP
PROPOSED MINOR SUBDIVISON
1276 JENSEN LANE
WINDSOR, CALIFORNIA

PLATE
2A

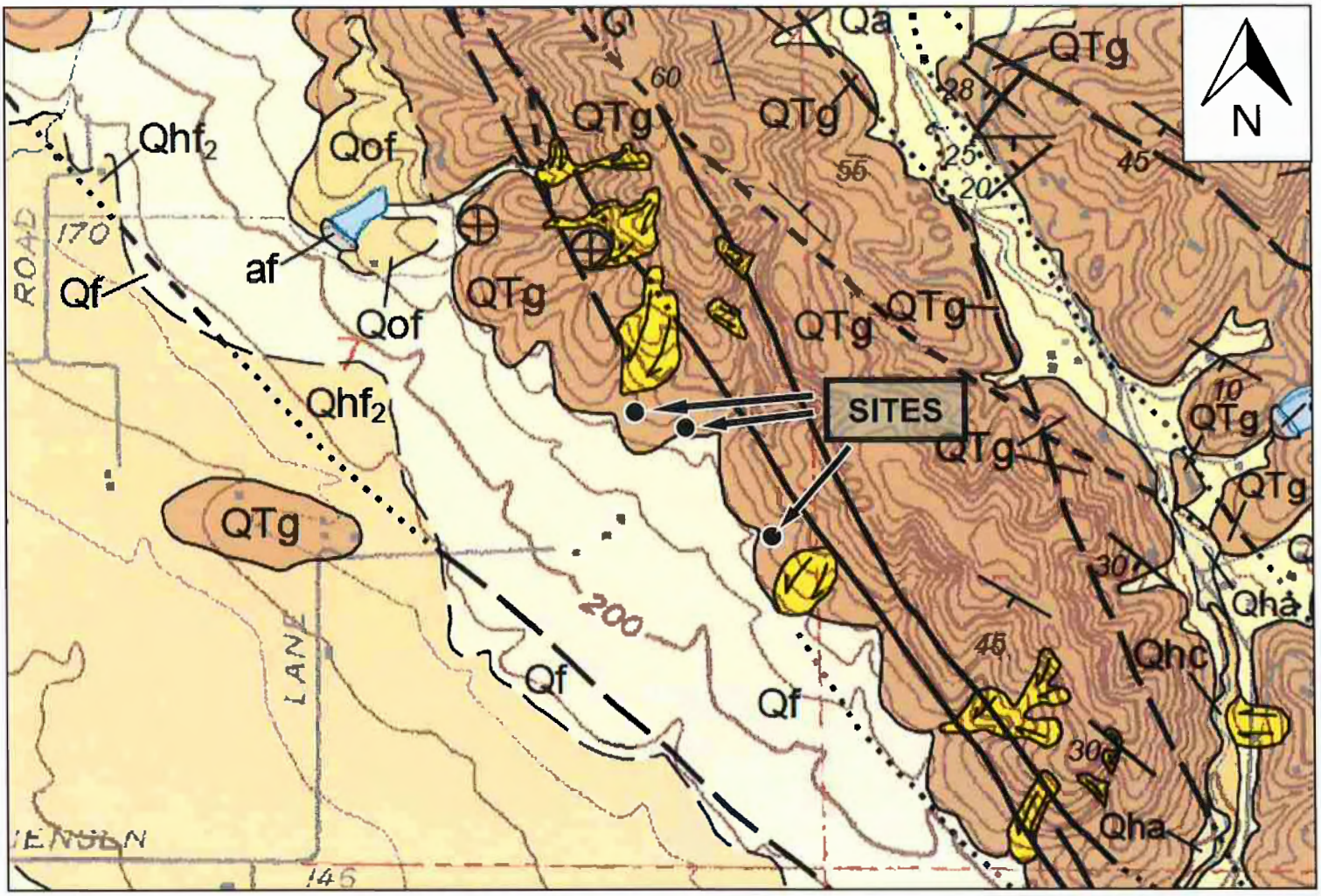
Proj. No: 7845.02 Date: 8/19 App'd by: PJC



APPROXIMATE SCALE: 1" = 150'

REFERENCE: TENTATIVE MAP TITLED "PROPOSED CHALK VISTA SUBDIVSION," PREPARED BY MUNSELLE CIVIL ENGINEERING, SHEET 1, DATED JULY 25, 2019.

PJC & Associates, Inc. Consulting Engineers & Geologists	FAULT TRENCH LOCATION MAP PROPOSED MINOR SUBDIVISION 1276 JENSEN LANE WINDSOR, CALIFORNIA	PLATE **2B**
	Proj. No: 7845.02 Date: 8/19 App'd by: PJC	



Reference: Geologic Map of the Healdsburg Quadrangle, 7.5 Minute, prepared by the California Geological Survey, compiled by Mark P. Delattre, and Carlos I. Guiterrez, dated 2011.

APPROXIMATE SCALE: 1" = 850'

EXPLANATION

Qf — **Alluvial fan deposits (Holocene to latest Pleistocene)** – Moderately to poorly sorted deposits of sand, gravel, silt, and clay mapped on sloping, fan-shaped, slightly to moderately dissected, alluvial surfaces.

QTg — **Unnamed fluvial deposits (early Pleistocene to Pliocene)** – Light-brown to yellow-brown, weakly consolidated gravel, tuffaceous sand, silt, clay, and reworked tuff. Clasts are derived from Tertiary volcanic and Franciscan basement rocks. Includes gravels previously mapped as Glen Ellen and Huichica formations; names not used here because of unreliable lithologic and age criteria for distinguishing between the units and correlation with the formation type localities (McLaughlin and others, 2008). The unit includes obsidian pebbles (characteristic of the Glen Ellen Formation) in relative abundance throughout the southern portion of the quadrangle west of the Healdsburg Fault, becoming increasingly sparse or absent northward and to the east of the Healdsburg Fault. Gravels east of the Healdsburg Fault include interbeds of ash-flow and air fall tuff that appear to represent interfingering with the upper part of the Sonoma Volcanics (Tsvt).

Landslide - arrows indicate principal direction of movement.

Contact between map units – Solid where accurately located; dashed where approximately located; dotted where concealed, queried where uncertain.

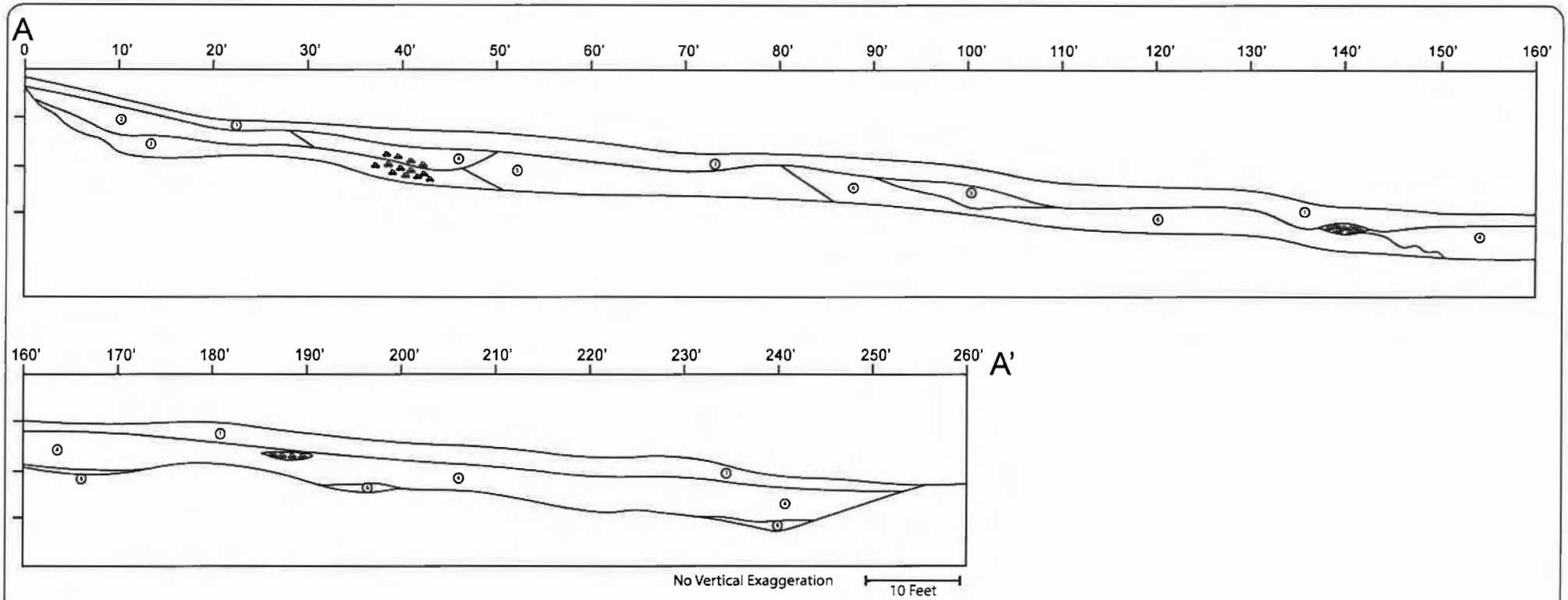
Fault – Solid where accurately located, dashed where approximately located; short dash where inferred; dotted where concealed; queried where uncertain. Dip of fault shown by arrow normal to fault. Relative horizontal movement shown by arrows parallel to fault. Relative vertical movement shown by U on upthrown block; D on down-dropped block.

PJC & Associates, Inc.
Consulting Engineers & Geologists

REGIONAL GEOLOGIC MAP
PROPOSED MINOR SUBDIVISION
1276 JENSEN LANE
WINDSOR, CALIFORNIA

PLATE
2C

Proj. No: 7845.02 Date: 8/19 App'd by: PJC



1

Orangish yellow brown
Silty Sand
Dry
Medium Stiff
Fine to Coarse
(SM) (Topsoil)

2

Yellow with Black Tarnish
Sandy Gravels with Clay
Moist
Dense
Well graded
(GW) (QTg)

3

Olive Brown
Silty Sandstone
Slightly Hard
Moderately Strong
Moderately Weathered
(QTg) (Bedrock)

4

Moderate Brown
Sandy Clay
Slightly Moist
Very Stiff to Hard
High Plasticity
(CH) (Residual Soil)

5

Moderate Brown
Clayey Gravel
Moist
Dense
Well Graded
(GC) (Residual Soil)
Exhibits Normal Grading

6

Olive Brown With Trace Oxidation
Mudstone
Slightly Hard
Moderately Strong
Moderately Weathered
(QTg) (Bedrock)

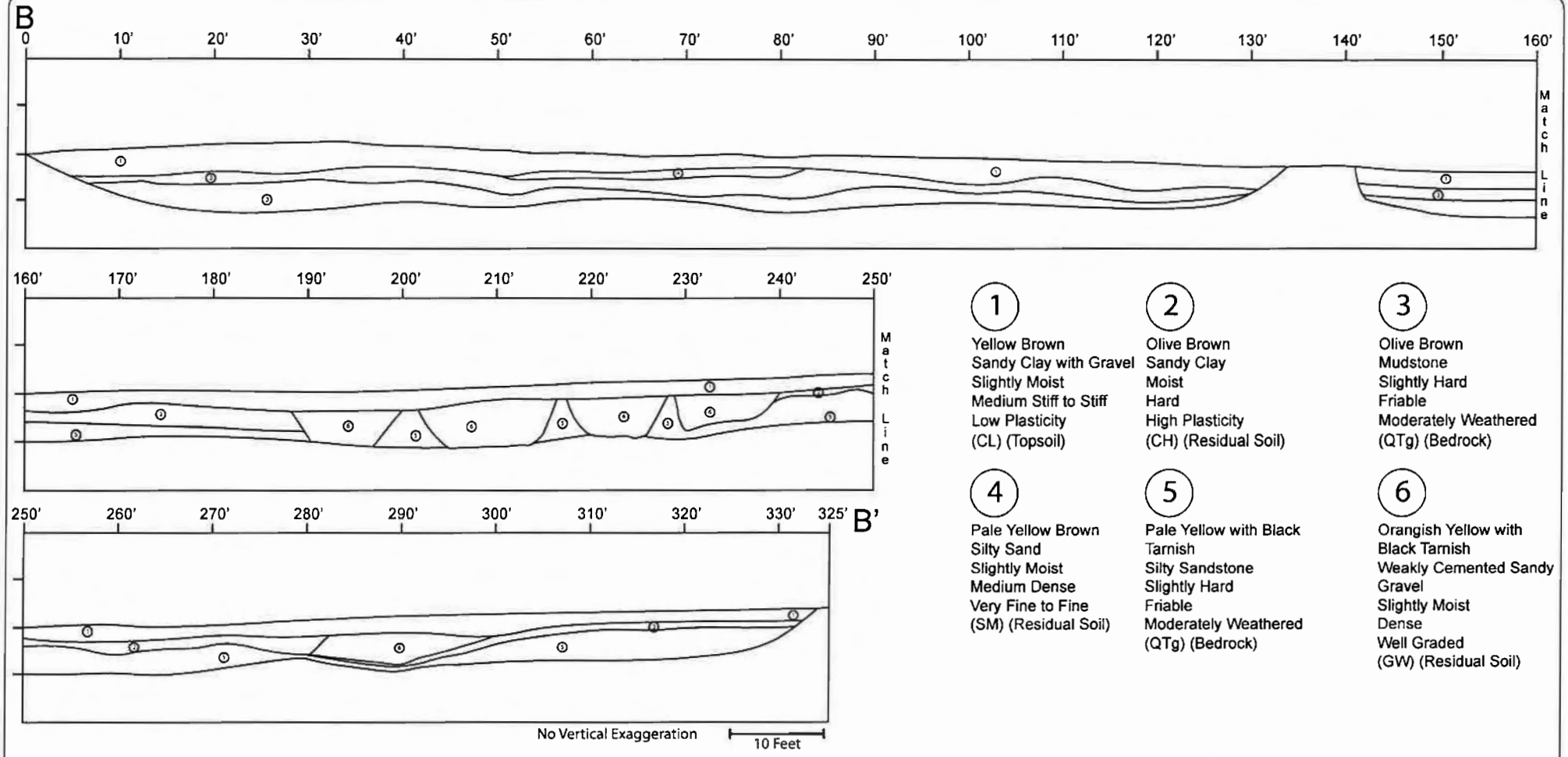
Key

- Large Cobbles
- Seepage
- Clay Films
- Large Roots

Trench Cross Section A-A'
Proposed Minor Subdivision
1276 Jensen Lane
Windsor, California

Proj. No: 7845.02
Date: 8/17
Appd By: PJC
PLATE 3

PJC & Associates, Inc.
Consulting Engineers & Geologists



1
Yellow Brown
Sandy Clay with Gravel
Slightly Moist
Medium Stiff to Stiff
Low Plasticity
(CL) (Topsoil)

2
Olive Brown
Sandy Clay
Moist
Hard
High Plasticity
(CH) (Residual Soil)

3
Olive Brown
Mudstone
Slightly Hard
Friable
Moderately Weathered
(QTg) (Bedrock)

4
Pale Yellow Brown
Silty Sand
Slightly Moist
Medium Dense
Very Fine to Fine
(SM) (Residual Soil)

5
Pale Yellow with Black Tarnish
Silty Sandstone
Slightly Hard
Friable
Moderately Weathered
(QTg) (Bedrock)

6
Orangish Yellow with Black Tarnish
Weakly Cemented Sandy Gravel
Slightly Moist
Dense
Well Graded
(GW) (Residual Soil)

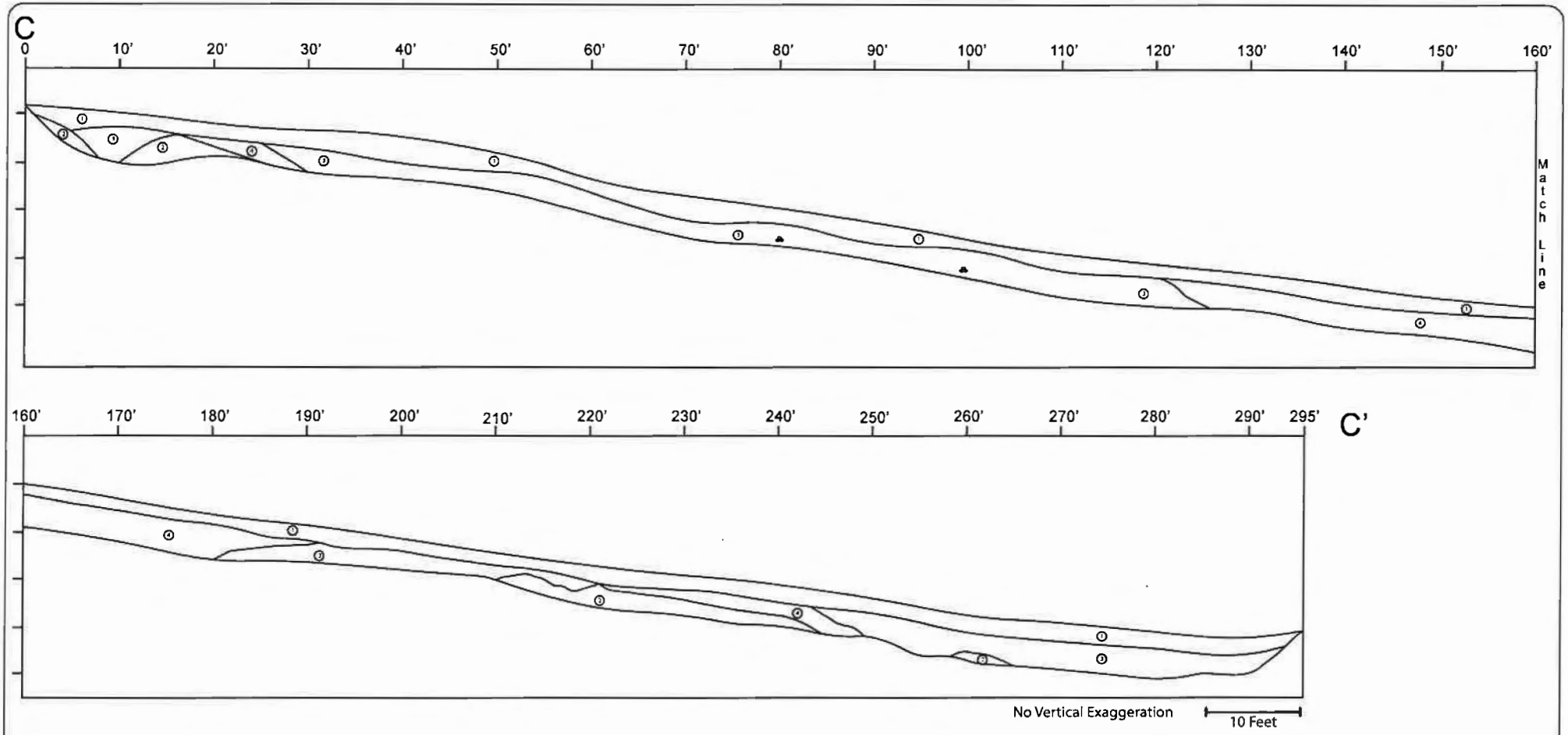
Key

- Large Cobbles
- Seepage
- Clay Films
- Large Roots

Trench Cross Section B-B'
Proposed Minor Subdivision
1276 Jensen Lane
Windsor, California

Proj. No: 7845.02
Date: 8/17
Appd By: PJC
PLATE 4

PJC & Associates, Inc.
Consulting Engineers & Geologists



Key

- Large Cobbles
- Seepage
- Clay Films
- Large Roots

1
Grayish Brown
Sandy Clay
Slightly Moist
Stiff
Low Plasticity
(CL) (Topsoil)
Porous and Weak

2
Pale Yellow
Silty Sandstone
Slighty hard
Friable to Weak
Moderately Weathered
(QTg) (Bedrock)

3
Pale Brown with Orange Oxidation
Sandy Gravel with Clay
Moist
Dense
Well Graded
(GW) (Residual Soil)
With Cobbles and Boulders

4
Pale to Moderate Brown
Sandy Clay with Gravel
Moist
Hard
High Plasticity
(CH) (Residual Soil)

Trench Cross Section C-C'
Proposed Minor Subdivision
1276 Jensen Lane
Windsor, California

PJC & Associates, Inc.
Consulting Engineers & Geologists

Proj. No: 7845.02
Date: 8/17
Appd By: PJC
PLATE 5

MAJOR DIVISIONS					TYPICAL NAMES
COARSE GRAINED SOILS More than half is larger than #200 sieve	GRAVELS more than half coarse fraction is larger than no. 4 sieve size	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES
			GP		POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH OVER 12% FINES	GM		SILTY GRAVELS, POORLY GRADED GRAVEL-SAND MIXTURES
			GC		CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND MIXTURES
	SANDS more than half coarse fraction is smaller than no. 4 sieve size	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS, GRAVELLY SANDS
			SP		POORLY GRADED SANDS, GRAVEL-SAND MIXTURES
		SANDS WITH OVER 12% FINES	SM		SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
			SC		CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS More than half is smaller than #200 sieve	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML		INORGANIC SILTS, SILTY OR CLAYEY FINE SANDS, VERY FINE SANDS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS OR LEAN CLAYS
			OL		ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt		PEAT AND OTHER HIGHLY ORGANIC SOILS

KEY TO TEST DATA

LL — Liquid Limit (in %)
PL — Plastic Limit (in %)
G — Specific Gravity
SA — Sieve Analysis
Consol — Consolidation
■ "Undisturbed" Sample
☒ Bulk or Disturbed Sample
□ No Sample Recovery

	Shear Strength, psf	Confining Pressure, psf	
*Tx	320	(2600)	Unconsolidated Undrained Triaxial
Tx CU	320	(2600)	Consolidated Undrained Triaxial
DS	2750	(2000)	Consolidated Drained Direct Shear
FVS	470		Field Vane Shear
*UC	2000		Unconfined Compression
LVS	700		Laboratory Vane Shear

Notes: (1) All strength tests on 2.8" or 2.4" diameter sample unless otherwise indicated
(2) * Indicates 1.4" diameter sample

ROCK TYPES

 Conglomerate

 Shale

 Metamorphic Rocks
Hydrothermally Altered Rocks

 Sandstone

 Sheared Shale Melange

 Igneous Rocks

 Meta-Sandstone

 Chert

Bedding Thickness		Joint, Fracture or Shear Spacing	
Massive	Greater than 6 feet	Very Widely Spaced	Greater than 6 feet
Thickly Bedded	2 to 6 feet	Widely Spaced	2 to 6 feet
Medium Bedded	8 to 24 inches	Moderately Widely Spaced	8 to 24 inches
Thinly Bedded	2-1/2 to 8 inches	Closely Spaced	2-1/2 inches
Very Thinly Bedded	3/4 to 2-1/2 inches	Very Closely Spaced	3/4 to 2-1/2 inches
Closely Laminated	1/4 to 3/4 inches	Extremely Closely Spaced	Less than 3/4 Inch
Very Closely Laminated	Less than 1/4 inch		

HARDNESS

Soft - Pliable, can be dug by hand

Slightly Hard - Can be gouged deeply or carved with a pocket knife

Moderately Hard - Can be readily scratched by a knife Blade; Scratch leaves heavy trace of dust and is readily visible after the powder has been blown away

Hard - Can be scratched with difficulty; scratch produced little powder and is faintly visible

Very Hard - cannot be scratched with pocket knife, leaves metallic streak

STRENGTH

Plastic- Capable of being molded by hand

Friable - Crumbles by rubbing with fingers

Weak - an unfractured specimen of such material will crumble under light hammer blows

Moderately Strong - Specimen will withstand a few heavy hammer blows before breaking

Strong - Specimen will withstand a few heaving ringing hammer blows and usually yields large fragments

Very Strong - Rock will resist heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments

DEGREE OF WEATHERING

Highly Weathered - Abundant fractures coated with oxides, carbonates, sulphates, mud, etc., through discoloration, rock disintegration, mineral decomposition

Moderately Weathered - Some fracture coating, moderate or localized discoloration, little to no effect on cementation, slight mineral decomposition

Slightly Weathered - A few stained fractures, slight discoloration, little to no effect on cementation, no mineral decomposition

Fresh - Unaffected by weathering agents, no appreciable change with depth

APPENDIX
REFERENCES

1. USGS Healdsburg, California Quadrangle 7.5-Minute Topographic Map, photo revised 1993.

2. Geologic Map of the Healdsburg 7.5' Quadrangle Sonoma County, California, California Geological Survey, Compiled by Marc Delattre, dated 2011.

3. Lidar Images, prepared by Earthscope.org, provided by Google Earth, dated 2009.

4. "EQFAULT" Ver 3.00, software program.

5. Topographic Map titled, "Proposed Chalk Vista Subdivision," prepared by Munselle Civil Engineering, Inc., dated July 25, 2019.

6. State of California, Special Studies Zones, Healdsburg Quadrangle, Revised Official Map, Effective July 1, 1983.