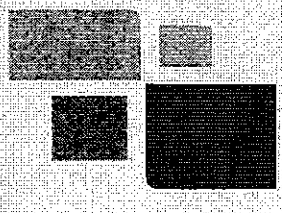

FAULT RUPTURE HAZARD INVESTIGATION, CASA BLANCA RANCH PROJECT, NORTH OF OAK GLEN ROAD, CITY OF YUCAIPA, SAN BERNARDINO COUNTY, CALIFORNIA

MERIDIAN LAND DEVELOPMENT

JUNE 27, 2013
J.N. 12-291

Riverside County

40880 County Center Drive, Suite R
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T: 951-600-9271

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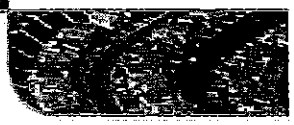


past + present + future
it's in our science

Engineers, Geologists
Environmental Scientists

June 27, 2013
J.N. 12-291

Mr. Jonathan Weldy
MERIDIAN LAND DEVELOPMENT
19153 Town Center Drive, 106
Apple Valley, California 92308

Subject: **Fault Rupture Hazard Investigation, *Casa Blanca Ranch Project*, North of Oak Glen Road, City of Yucaipa, San Bernardino County, California**

Dear Mr. Weldy:

This report presents the results of our fault investigation within a portion of the Casa Blanca Ranch project site, located north of Oak Glen Road and east of Jefferson Street in the City of Yucaipa, California (Figure 1). The purposes of this investigation were to assess potential fault rupture within the site, and to recommend appropriate setback zones for habitable structures if necessary. The overall project site is approximately 238 acres of land; however the subject fault investigation was located in the southern portion of the site approximately 1,300 feet west of the eastern property line (Figure 2). This work was performed in accordance with the scope of work outlined in our supplemental proposal dated April 17, 2003.

The site is not located within the boundaries of a State of California Alquist-Priolo Earthquake Fault Zone (APEFZ), however two escarpments are mapped as faults within the project site and are delineated on the City of Yucaipa Fault Rupture Hazards Zones plan. As such these mapped fault traces are considered "potentially" active and required further geologic study which was conducted in the spirit of an APEFZ study. The APEFZ requires that buildings for human occupancy not be built over known active faults. Within an APEFZ, geologic studies are conducted prior to construction of habitable or other critical structures to avoid placing such development over faults that may potentially produce ground rupture. Additionally, habitable structures are "set back" a reasonable distance from active fault traces, consistent with the level of site-specific investigations.

SCOPE OF WORK

This investigation specifically assess both the presence or absence of faulting and assesses the risk of ground surface rupture across the mapped escarpments within the subject portion of the property. The conclusions and recommendations in this report are used to determine project feasibility and final design, so that structures for human occupancy are not constructed over active faults. The State of California currently defines an "active fault" as one that has had surface displacement within Holocene time, about the last 11,500 years (Bryant and Hart, 2007). This investigation followed the California Geological Survey guidelines for evaluating the hazards of surface fault rupture (CGS, 2002).

The scope of services for this investigation included the following:

- Reviewing pertinent technical literature, geologic maps and stereographic aerial photographs relative to the site geology and potential location of faults (see References).
- Surface reconnaissance and observation of the general site geology and geomorphologic features particularly expressive of potential active faults. The fault trenches limits were also delineated in the field such that the existing grain crops in the area could be harvested by the current farmer.
- Excavating, cleaning and geologic logging of two exploratory fault trenches totaling approximately 655 linear feet to document fault presence or absence, estimated age and the continuity of unbroken sediments. The trenches were logged and interpreted under the direction of the undersigned geologist. The trenches were also observed by the Independent Peer Reviewer, Dr. Miles Kenney, as well as the City of Yucaipa Reviewer Mr. Scott Magorien.
- Loosely backfilled the trenches with the excavated soil cuttings.
- Organizing and interpreting appropriate geologic data.
- Preparing this Fault Rupture Hazard Investigation report and related figures and trench logs.

CEQA Significance Thresholds

Appendix G of Title 14 of the California Code of Regulations (the CEQA Guidelines) specifies nine possible environmental impacts to consider when evaluating geology and soils impacts. These include an assessment of how the proposed project could be affected by geology hazards:

a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
   i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (Refer to CGS Special Publication 42-Bryant and Hart, 2007).
   ii) Strong seismic ground shaking.

iii) Seismic-related ground failure, including liquefaction.
iv) Landslides.

b. Result in substantial soil erosion or the loss of topsoil
c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.
d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.
e. Having soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

It should be noted that this investigation addresses only item a.i) above. Subsequent engineering geologic and geotechnical investigations to be performed during the design stage of the project will address the remaining items.

SITE DESCRIPTION

The overall Casa Blanca Ranch project site consists of an essentially rectangular shaped property constituting approximately 238-acres of land that is bounded by Oak Glen Road to the south and by Jefferson Street to the west. The fault investigation took place on the southern side of the property just north and east of an existing San Bernardino Valley Municipal Water District reservoir. Based on aerial photograph interpretation a relatively weak tonal lineament was observed in the area of two mapped fault strands (Matti, et. al., 2003). The site location and approximate locations of the mapped escarpments are shown on the attached Site Location Map, Figure 1 and the surveyed location of the fault trenches within the property boundary are shown on Figure 3.

Vacant undeveloped land bounds the site to the north and east. The overall 238-acre site consists of four separate parcels, APN's 321-082-15, 321-101-02, 321-101-12 and 321-101-20. The site is a predominately vacant ranchland with plateaus and canyons used for active dry farming. The subject site has a gentle to moderate gradient descending from the eastern to the western portion of the site. Steeper gradients were observed within the canyon areas and some gradients approached near vertical (bluff) at the main bend in Wilson Creek. The main branch of Wilson Creek emanates from the northeast corner of the subject site and extends through the west-central portion of the site where it enters a stone culvert under Jefferson Street. The highest elevations within the property form gently sloping plateaus with tributary canyons which dissect the ridge lines and flow to Wilson Creek. Vegetation throughout the site consisted of a variety of grasses, shrubs and small stands of trees as well as grain crops within the plateau

areas. Thicker stands of trees were observed along the southern boundary of the site in the vicinity of Oak Glen Road.

PROPOSED DEVELOPMENT

Based on preliminary lotting studies by AEI-CASC, the proposed development on the southern and western portions of the property (plateau areas) will consist of a slightly terraced single-family residential development which will include manufactured slopes and various infrastructure, i.e. underground utilities, drainage facilities and streets. All building structures and site improvements will be constructed in accordance with applicable building codes.

SITE INVESTIGATION

Although the mapped escarpments within the project site were anticipated to be of Pleistocene age, i.e. older than recent or Holocene time, they were considered to be potentially active. In accordance with current geologic standards of practice, an independent fault trenching program and fault analysis was specially developed for this site. This investigation took place between May 13 and 30, 2013.

After review of pertinent literature and interpretation of aerial photographs and topographic maps, two exploratory trenches were strategically placed across a suspected escarpment mapped as two relative short fault segments (Matti, et. al., 2003). A small westward flowing incised drainage channel bisects the two mapped escarpments. The total trench length totaled about 655 linear feet with depths up to approximately 10 to 10.5 feet below existing grades. A five foot wide, mid-height bench was established within both sides of each trench. Trench T-1 is approximately 330 feet long and was placed across the southern mapped escarpment approximately 200 to 300 feet north of the existing water reservoir. Trench T-2 is approximately 325 feet long and was placed across the northern mapped escarpment approximately 550 feet north of T-1. The trenches were oriented approximately perpendicular to the general mapped escarpment and topographic break in the area. The trench locations were surveyed by Hess Development Inc. during the course of our fieldwork as shown on Figure 3.

The walls of the trenches were cleaned of loose or smeared soil and a graphic log was compiled on the northern trench walls that illustrates the locations and orientations of the pertinent soil deposits observed. Colors described in the logs are based on the Munsell Soil Color notation. The trench logs are included as Plates 1 through 8 of this report. Dr. Miles Kenney (of Kenney Geoscience), who is not associated with Petra Geotechnical, Inc., visited the trenches following our initial logging to provide independent

quality assurance and generalized age dating of the exposed stratigraphy. Additionally Mr. Scott Magorien, geologic reviewer for the City of Yucaipa visited the site on May 22, 2013 to observe and inspect the trenches. Both trenches were loosely backfilled following the completion of geologic fieldwork.

REGIONAL GEOLOGIC AND TECTONIC SETTING

Regional and Local Geology

The subject property is situated within the San Gabriel Mountains Block (upper plate of the Vincent thrust) within the northern part of the Peninsular Ranges Geomorphic Province. The upper plate of the San Gabriel Mountains Block is underlain by plutonic granitic crystalline rock (granodiorites, diorites and tonalities) that is Cretaceous in age or older. The subject block is bounded on the east-northeast by the San Andreas fault zone and the San Bernardino Mountains, on the south-southwest by the Banning Fault and on the north-northwest by the Vincent Thrust.

In closer proximity, the Casa Blanca Ranch site is located just east/southeast of an area of northeast trending thrust faulting associated with the Vincent Thrust and the Crafton Hills Fault Zone (Yucaipa Graben Complex). The site lies near the boundary between the upper and lower San Gabriel Mountains Blocks which are separated by the Vincent Thrust and the Yucaipa Grabben Complex. The site lies less than half a mile north of the flanks of the Yucaipa Ridge, just under one mile south-southwest of the San Bernardino Mountains, and approximately two miles east of the Crafton Hills.

The subject site is situated on the southern portion of a relatively narrow alluvial valley located between the San Bernardino Mountains and Yucaipa Ridge emanating from Potato Canyon to the east. Recent Quaternary alluvial deposits within this valley extend southwest into the Yucaipa basin from the flanks of the nearby San Bernardino Mountains, Yucaipa Ridge and Crafton Hills. The active alluvial drainage Wilson Creek enters the project site at the northeast corner of the property and exits the site at the west central portion boundary. Oak Glen Creek generally flows to the west/southwest immediately south of the project site. The attached Figure 2 depicts the general area geology as mapped by Matti et. al (2003).

The current fault investigation, located in the south-central portion of the project site (Figure 3), lies on an abandoned alluvial fan surface (terrace) that has been deeply incised to the north and south by Wilson and Oak Glen Creeks respectively to create local mesas. The generally north-south trending escarpment areas

express a subtle break in the mesa's topography which was interpreted by Matti et. al. as two very short normal fault strands with the eastern block downdropped relative to the west.

The subject mesa (geomorphic surface) is mapped by Matti et. al. as old axial-valley deposits (Unit Qoa_2) consisting of terrestrial interstratified sand and gravel that are on the order of 30 feet thick which rest unconformably over unit Qoa_1. However, axial-valley deposits are similar in composition and characteristics to alluvial fan deposits, therefore based on our mapping and subsurface exposures within the fault trenches, the sediments contain appreciable cobbles and boulders which we interpret as more characteristic of alluvial fan and debris flow type deposits than finer grained axial steam flow deposits. Matti et. al. discuss their Qoa units as ranging in age from 50,000 to 500,000 years old and have postulated that these alluvial units may have emanated from the San Gorgonio River drainage during mid- to late-Pleistocene time and have been subsequently repositioned as a result of about 3 kilometers of right lateral slip along the nearby San Andreas Fault (San Bernardino strand).

Local Faults

The geologic structure of the southern California area is dominated mainly by northwest-trending major faults associated with the San Andreas Fault system. Based on our review of published and unpublished geologic maps and literature pertaining to the site and regional geology, the site does not lie within the boundaries of an Earthquake Fault zone as defined by the State of California Alquist-Priolo Earthquake Fault Zoning Act (Bryant and Hart, 2007). The closest AP zoned active faults to the site include the South Branch of the San Andreas Fault Zone – San Bernardino Mountain Section approximately 0.9 miles to the north and the Crafton Hills Fault Zone – Western Hills Fault, approximately 1.8 miles to the west/northwest. Other principal active faults in the general area include the Crafton Hills Fault Zone – Chicken Hill Fault, approximately 1,700 feet to the northwest; the San Gorgonio Pass fault approximately 4.2 miles to the south and the San Jacinto Fault Zone – San Jacinto Valley Section located approximately 9.5 miles to the southwest.

The San Andreas Fault Zone (SAFZ) is the most prominent active geologic structure in the area (Jennings and Bryant, 2010). It is primarily a right-lateral, strike-slip fault that trends northwest and is near vertical. However, local complexities between the SAFZ and the San Jacinto fault zone are postulated as having contributed toward local extensional faulting to the west. This deformation has formed a series of normal dip-slip faults which is locally referred to as the Crafton Hills horst-and-grabben complex which has uplifted the nearby Crafton Hills and downdropped the Yucaipa Valley. The Crafton Hills fault

essentially terminates at a series of normal faults referred to as the Yucaipa Grabben Complex which extends east-northeast of the Crafton Hills and generally located to the north and northwest of the overall project site. The postulated extension of the Chicken Hill Fault lies between the subject site and the Yucaipa Grabben Complex to the west/northwest and is believed to eventually connect with the Yucaipa Grabben Complex north of the site. The southwestern portion of the Chicken Hill Fault is an AP zoned active fault approximately 3.5 miles to the southwest of the site and the Crafton Hills horst-and-grabben complex to the north of the site is believed to have late Holocene displacements within younger fan deposits (Matti et. al.).

The two relatively short, north-south trending escarpments (possible fault segments) that are mapped within the central portion of the project site that are the subject of this study, are approximately depicted on the attached Figures 1 and 2 (City of Yucaipa, 2000, Matti et. al., 2003). These faults are mapped as having possible late Quaternary (Pleistocene) displacement but Holocene activity has not been ruled out; meaning they were considered at least potentially active. Based on our review of historic stero-paired aerial photographs, a tonal lineament and subtle break in topography coincides with the two mapped escarpments.

SITE-SPECIFIC FINDINGS

Aerial Photograph Analysis

Stereo-paired aerial photographs were reviewed to assess the recent geomorphology and potentially fault-related lineaments. Based on the aerial photos reviewed, see references, a relative weak lineament was observed principally as a tonal contrasts on the stereoscopic view of aerial photographs. The subtle break in topography was suspicious enough that is was mapped as a fault-related geomorphic feature by others.

Reconnaissance

Several visits were made to the subject site area during April and May, 2013 for the purpose of surface geologic mapping and reconnaissance in preparation of the fault study. Based on our field mapping, the center of the two fault trenches were strategically placed perpendicular to the gentle break in topography (mapped escarpment) and extended approximately 160 feet in either direction.

Fault Trench Findings

Based on trench exposures and as documented on the logs (Plates 1 through 8), the site is underlain by three main units of older alluvium and/or alluvial fan deposits; however the lower units (Qoa_2 and

especially within unit Qoa_3) had various sub-units or soil debris flow packages that established minor stratigraphy. These sub-units were not specifically logged but were occasionally mapped where the contact could be traced for 10 feet or longer.

The uppermost unit (Qoa_1) mantles the site with depths ranging from approximately 1.5 to 4 feet, and consists of a cumulic soil horizon characterized by dark brown to dark grayish brown (10 YR 3/2 to 5/4) silty fine sands with clay and abundant organic accumulations. This soil horizon has been highly disturbed in the upper 1 to 2 feet by recent and historical tilling. A cumulic soil horizon forms by slow incremental deposition that approximates rate of soil development and is typically structureless and highly bioturbated as was observed within the trench exposures. Minor pedogenic development was also observed within this surficial unit indicating an early to mid-Holocene soil development profile (Kenney, 2013). Also documented on the trench logs is a minor amount of artificial fill related to the establishing the access ramps into the trenches and a buried concrete drainage pipe encountered in T-1. This unit was continuous and unbroken across the fault trench exposure, although it thickened slightly near the center of the trench.

Unit Qoa_2 which directly underlies Qoa_1 in the eastern half of each trench (the unit terminates near Station 150 in both trenches) consists of fine-grained alluvial fan type deposits that is considerably coarser grained than Qoa_1, fine to medium sands with silt and scattered gravels, that was also friable and observed as brown to reddish brown (7.5 YR 3/3 to 5/4). This unit is generally massive, lacked any notable cobble or boulder inclusions and rested uncomfortably with the overlying Qoa_1 and underlying Qoa_3 units. This unit was also continuous and unbroken across the eastern half of the fault trench exposures and based on its stratigraphic relationship and degree of weathering is considered late Pleistocene in age (Kenney, 2013).

Unit Qoa_3 is the lowermost major member from our fault trench exposures and generally consists of gravelley sand to sandy gravel matrix within a cobble and boulder rich debris flow type deposits. The matrix is generally reddish yellow, yellowish brown to brownish yellow (7.5 YR 6/6, 10 YR 6/8 and 10 YR 3/6). The cobble and boulder component are most typically very strongly grussified diorites with minor accumulations of weathered granodiorites and trace amounts of schist. The boulder clasts exposed reached dimensions up to 6 feet in diameter but were more commonly on the order of 2 to 3 feet in diameter. Faint relic bedding could be occasionally traced into the bottom of the trench identifying individual debris flow contacts which appear to be slightly tilted to the east at a very low angle. Based on

the high degree of weathering in this unit, the age of these sediments could be conservatively stated as 50,000 years. This unit was also continuous and unbroken across the fault trench exposures.

The disappearance of unit Qoa_2 near the center of the trenches, which coincides closely with the escarpment trace, and the relationship of the exposed geology has led us to postulate that the finer grained Qoa_2 materials were considerable more erodible than the underlying more erosion resistant boulder-rich debris flow type deposits of unit Qoa_3 and that differential weathering and fluvial processes (i.e. inset drainages) across the abandoned terrace created the localized topographic break. This could be easily interpreted as the appearance of a downdropped block due to tectonic movement on a normal fault based on surface field mapping or aerial photo interpretation. The thickening of the younger unit Qoa_2 near Station 180 in the trenches is also nearly in-line with the axial drainages leading to the existing incised westerly-trending channel bisecting the two mapped escarpments.

CONCLUSIONS AND RECOMMENDATIONS

Based the exposed stratigraphy within two fault trenches excavated across the mapped escarpment, continuous unbroken older alluvium and alluvial fan sediments (Qoa) of at least late Pleistocene age, and probably older, were observed. These sediments, therefore, have not been subjected to ground rupture during Holocene time (~11,500 years). The deeper unbroken site sediments (Qoa_3) are at least 50 ka, as the abandoned alluvial fan terrace surface is approximately ~30 feet above the adjacent modern floodplains (Wilson and Oak Glen Creeks), and are more likely on the order of 100 to 120 ka old (Kenney, 2013). This age estimate is also supported by the moderately to strongly developed cumulic soil profile that caps these sediment (Qoa_1) and the highly grussified nature of the dirotie cobbles and boulders which are at least late Pleistocene in age. Therefore, these sediments have likely experienced many major seismic events over the preceding 11,500 years without experiencing ground rupture. Based on regional geomorphic expression and on site-specific exposures observed in the fault trenches, the potential for fault related ground rupture is very low.

Recommendations

1. Design and construct the project in accordance with all applicable building codes, including the current edition California Building Code (CBC), and any relevant amendments adopted by the City of Yucaipa.

2. Further geotechnical investigations should be conducted to characterize the geotechnical characteristics of the site and to insure that all building plans are designed in compliance with the geotechnical engineer.

3. The geotechnical inspection and testing should continue through the construction phase of the project to insure that construction complies with the geotechnical recommendations.

Concluding Statement

Based on our fault evaluation study, no known active faults have been identified within the site. While fault rupture would most likely occur along established fault traces, fault rupture could occur at other locations. The potential for significant impact from fault surface rupture is anticipated to be very low. Based on our findings provided above, the project site is considered appropriate for the proposed residential development with regards to active fault hazards.

CLOSURE

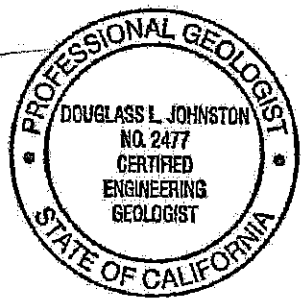
The conclusions and opinions contained in this report are based on the results of the described geologic evaluations and represent our professional judgment. The contents of this report are professional opinions and as such, are not to be considered a guaranty or warranty. The findings, conclusions and opinions contained in this report are to be considered tentative only and subject to confirmation by the undersigned during the construction process. Without this confirmation, this report is to be considered incomplete and Petra or the undersigned professionals assume no responsibility for its use.

The professional opinions contained herein have been derived in accordance with current geologic standards of practice and no warranty is expressed or implied. This report has not been prepared for use by parties or projects other than those named or described herein. This report may not contain sufficient information for other parties or other purposes.

This opportunity to be of service is greatly appreciated. Should you have any questions regarding this report, please do not hesitate to contact us.

Respectfully submitted,

PETRA GEOTECHNICAL, INC.



Douglass L. Johnston, CEG
Associate Geologist

DLJ/jma

Attachments: References
Figure 1 – Site Location Map
Figure 2 – Geologic Map
Figure 3 – Fault Trench Location Map
Plates 1 through 4 – Fault Trench Logs (T-1)
Plates 5 through 8 – Fault Trench Logs (T-2)

Distribution: (3) Addressee

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San Bernardino County, Official Land Use Plan, Geologic Hazard Overlay, Yucaipa Quadrangle, FH32C, 1:24,000 Scale.

Aerial Photographs Reviewed

Source/Agency	Date	Flight No.	Frame(s)
Continental Aerial Photo	5/25/49	AXL 11F	78, 79
Continental Aerial Photo	8/11/68	AXL 9JJ	56,57
Continental Aerial Photo	1/15/76	PC11	47, 48
Continental Aerial Photo	Jan 1980	SBD 15	37, 39
Continental Aerial Photo	12/30/86	F	86, 87
Continental Aerial Photo	5/25/90	C 81	9-3, 9-4
Continental Aerial Photo	7/11/95	C 115-27	94, 95
UC Santa Barbara	8/10/38	AXL-1938	79-95, 79-96
UC Santa Barbara	2/16/53	AXL-1953B	43k-32, 43k-31
UC Santa Barbara	8/11/68	AXL-1968	9JJ-46, 9JJ-47
Google Earth Imagery	10/1/95	N/A	N/A
Google Earth Imagery	5/28/02	N/A	N/A
Google Earth Imagery	10/5/05	N/A	N/A
Google Earth Imagery	4/12/07	N/A	N/A
Google Earth Imagery	6/19/09	N/A	N/A
Google Earth Imagery	3/9/11	N/A	N/A

FIGURES

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EXPLANATION

Approximate Boundary of Casa Blanca Ranch Site

Reference: Bing Maps

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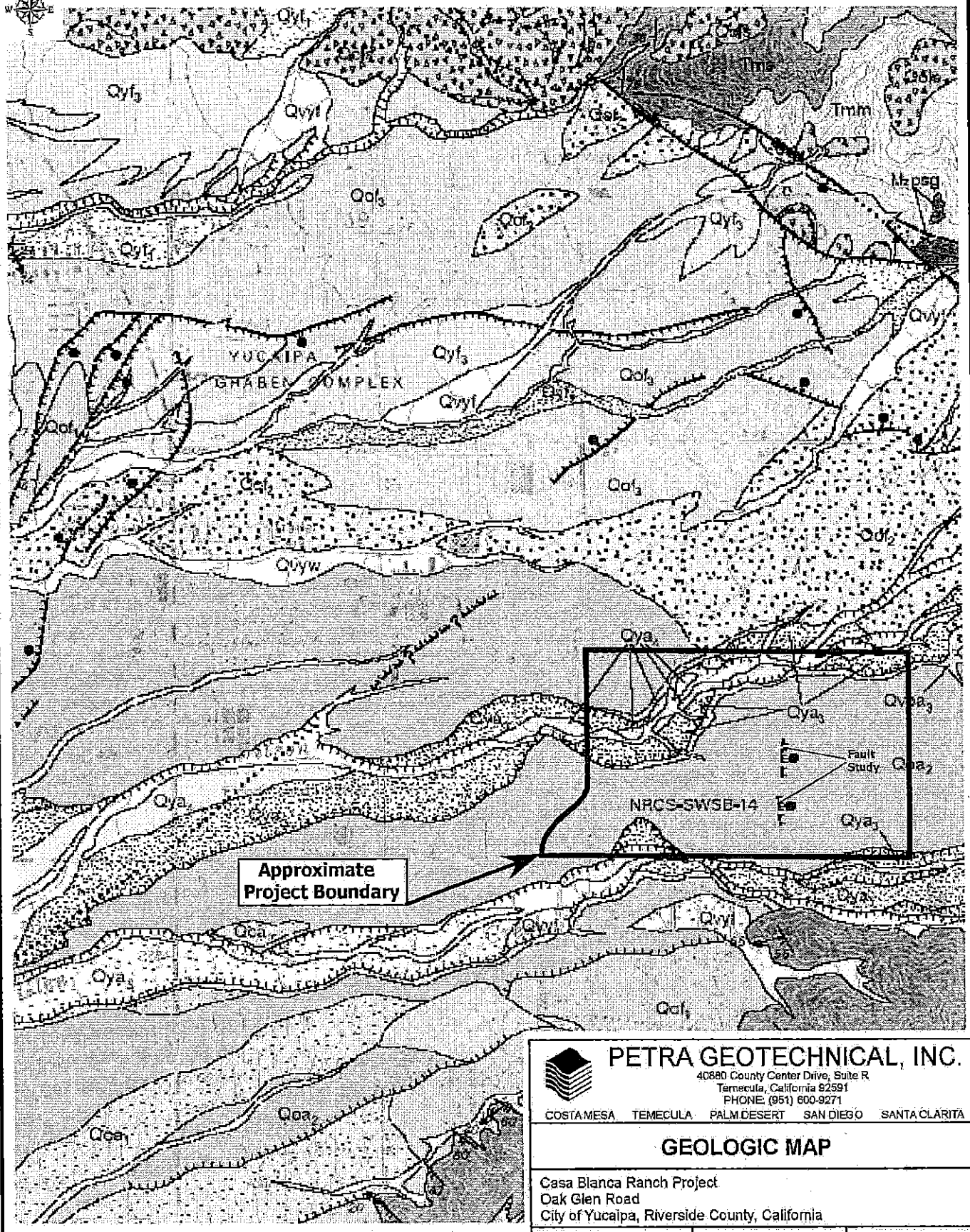
COSTA MESA TEMECULA PALM DESERT SAN DIEGO SANTA CLARITA

SITE LOCATION MAP

Casa Blanca Ranch Project
Oak Glen Road
City of Yucaipa, San Bernardino County, California

DATE: June 2013	J.N.: 12-291	**Figure 1**
DWG BY: DLJ	SCALE: N/A	



Reference: Matti et. al., 2003, Geologic Map of the Yucaipa 7.5' Quadrangle

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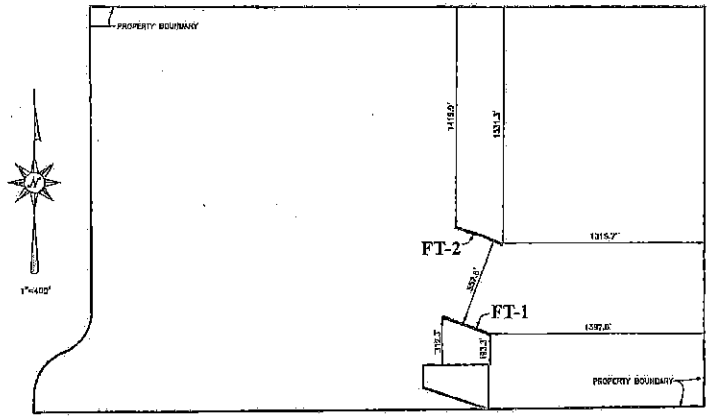
GEOLOGIC MAP

Casa Blanca Ranch Project
Oak Glen Road
City of Yucaipa, Riverside County, California

DATE: June 2013	J.N.: 12-291	Figure 2
DWG BY: DLJ	SCALE: None	

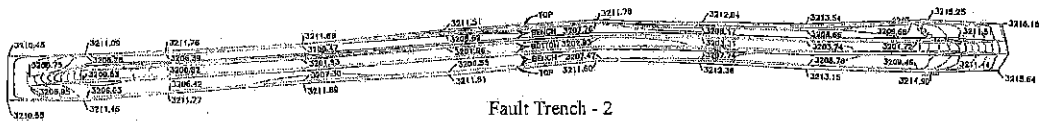


LOCATION MAP

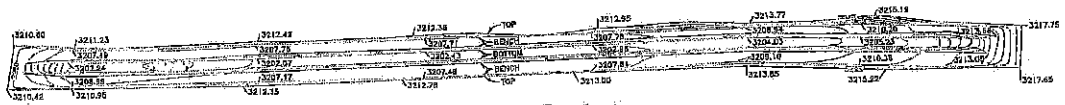
THIS MAP REPRESENTS A FIELD TOPOGRAPHY PERFORMED BY MYSELF OR UNDER MY DIRECTION COMPLETED ON MAY 30, 2013.

BRIAN T. MESS
PLS 8538

DATE



Fault Trench - 2



Fault Trench - 1

GRAPHIC SCALE 1"=20'

Reference: HDI, 2013, Casa Blanca Fault Trench Map

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COSTA MESA TEMECULA PALM DESERT SAN DIEGO SANTA CLARITA

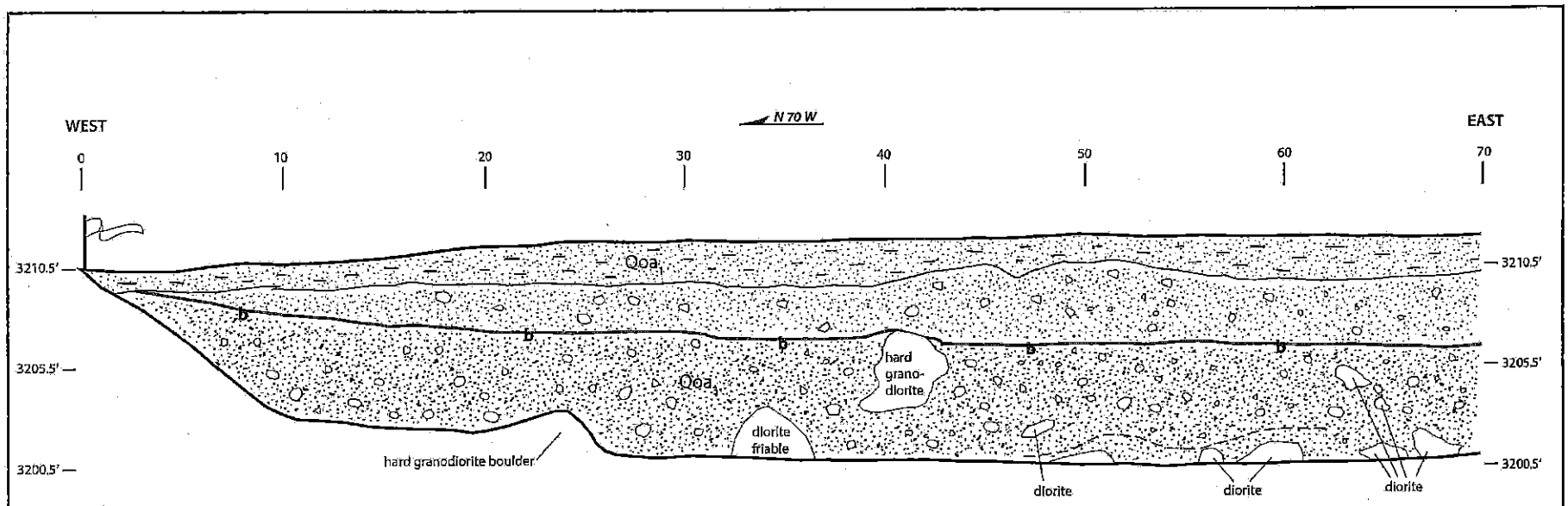
FAULT TRENCH LOCATION MAP

Casa Blanca Ranch Project
Oak Glen Road
City of Yucaipa, San Bernardino County, California

DATE: June 2013	J.N.: 12-291	**Figure 3**
DWG BY: DLJ	SCALE: N/A	

PLATES

PETRA



Horizontal and Vertical Scale: 1" = 5'

Approximate debris flow contact.

b Bench

Afu - Pipe backfill, from locally reworked Qoa_1.

Qoa_1 - Silty, very fine Sand with Clay, dark brown (10YR 3/2), bioturbated, organics present, porous, minor ped development. Disturbed heavily in upper 1-foot and locally to 3 feet below surface. Loose and easily excavated.

Qoa_2 - Silty medium to fine Sand with scattered gravels, red brown (7.5YR 5/4), slightly porous, more dense than Qoa_1.

Qoa_3 - Sandy Gravel to gravelly Sand Matrix, yellow brown (10YR 6/3 - upper matrix to 7.5YR 6/6 - lower matrix), mostly matrix supported but locally clast supported. Primary debris flow units (fanglomerate). Areas where matrix supported show bituminous secondary laminate. Pockets of Alluvium. Show locally continuous "bedding". Clast supported areas contain more boulders and are massive.

NOTE: Individual boulders are mostly well-grussified diorites and weathered granodiorites. Boulders > 1' diameter are logged, whereas cobbles < 1' diameter are schmetically portrayed.

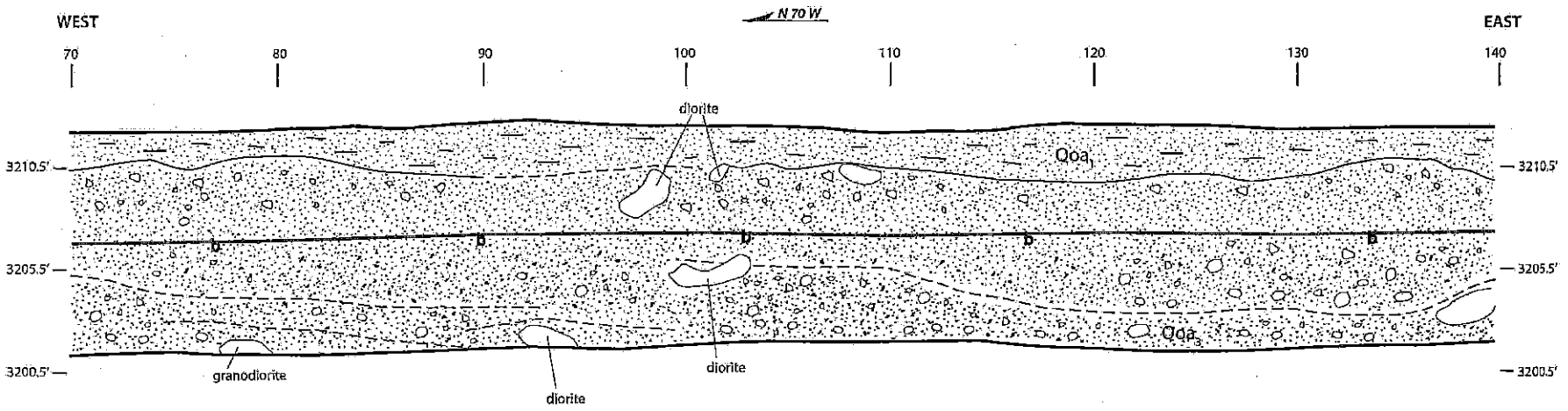
FAULT TRENCH 1

PETRA GEOTECHNICAL, INC.

JN 12-291 JUNE, 2013

Casa Blanca Ranch
City of Yucaipa

PLATE 1



Horizontal and Vertical Scale: 1"=5'

See Plate 1 for Explanation

FAULT TRENCH 1

PETRA GEOTECHNICAL, INC.

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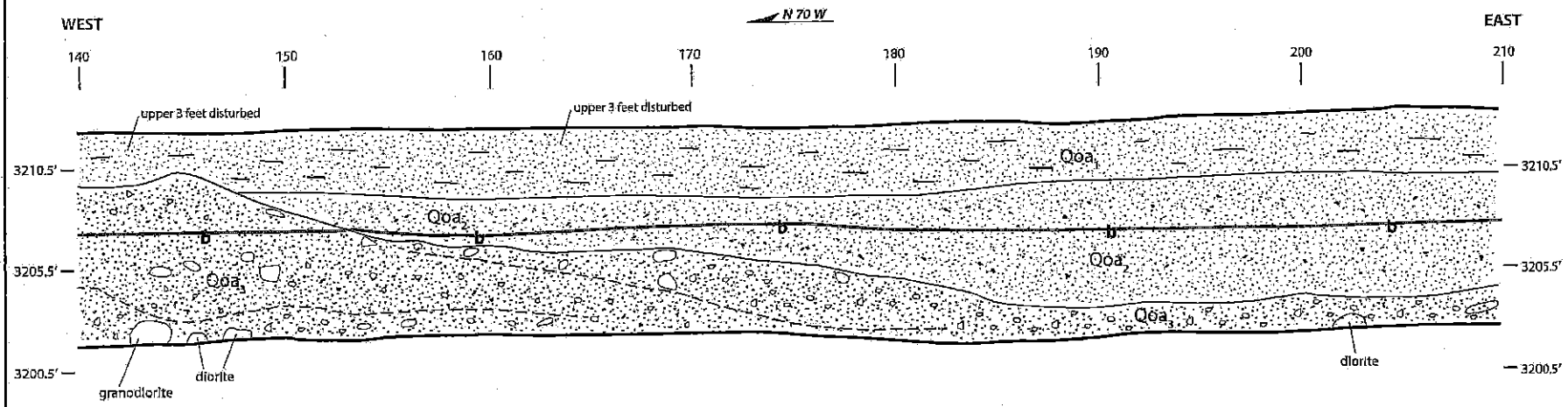
Casa Blanca Ranch
City of Yucaipa

PLATE 2



Horizontal and Vertical Scale: 1" = 5'

See Plate 1 for Explanation

FAULT TRENCH 1

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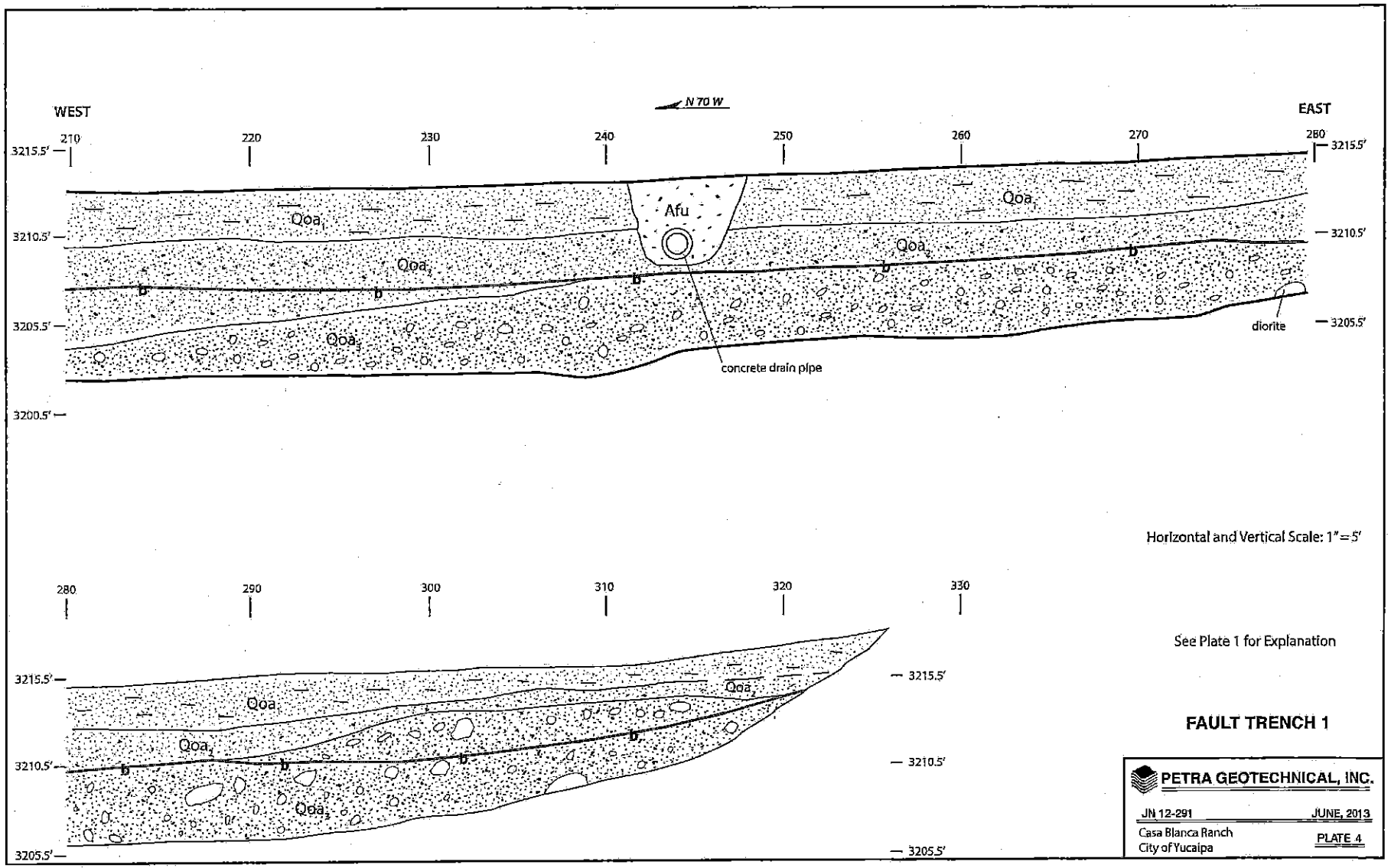
City of Yucaipa

PLATE 3



Horizontal and Vertical Scale: 1"=5'

See Plate 1 for Explanation

FAULT TRENCH 1

PETRA GEOTECHNICAL, INC.

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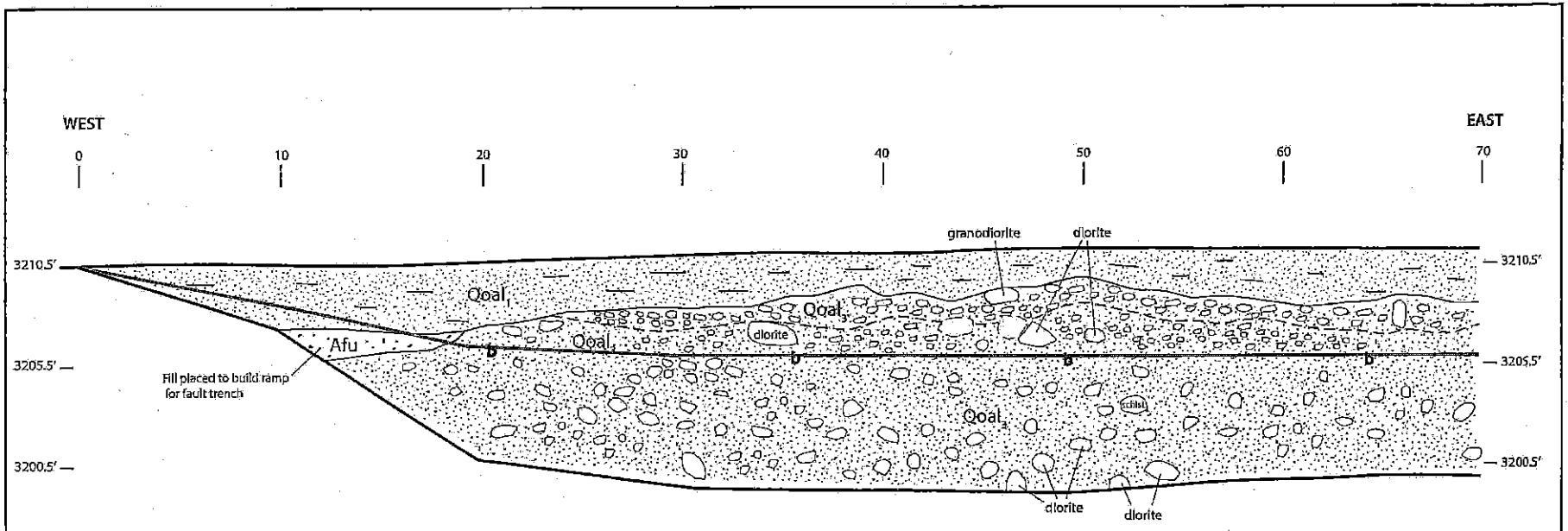
Casa Blanca Ranch
City of Yucaipa

PLATE 4



Horizontal and Vertical Scale: 1" = 5'

Approximate debris flow contact

b Bench

Afu - Ramp fill

$Qoal_1$ - Silty Sand with Clay and some Gravel. Dark grayish brown (10YR 5/4) to yellowish brown (10YR 3/2). Ocassional roots down to 4 feet. Porous and dry. Friable. Very coarse to no ped development.

$Qoal_2$ - Clayey Silty Sand, some Gravel, softer than Unit 1, more clay. Reddish brown (light) 7.5YR 5/4 to brown (7.5YR 3/3). No roots, porous, friable, softer than Unit 1. Dry, less porous than Unit 1.

$Qoal_3$ - Gravelly Sand, trace Silts. Secondary lamina structure (tiger strips). Softer than Unit 3, friable. Upper matrix (10YR 5/8) to brownish yellow (10YR 3/6). Lower matrix (7.5YR 6/6) to Reddish yellow (7.5YR 4/4). Cobble and boulder rich - large boulders 4'-6'. Debris flow origin.

NOTE: Individual boulders are mostly well-grussified diorites and weathered granodiorites. Boulders > 1' diameter are logged, whereas cobbles < 1' diameter are schmetically portrayed.

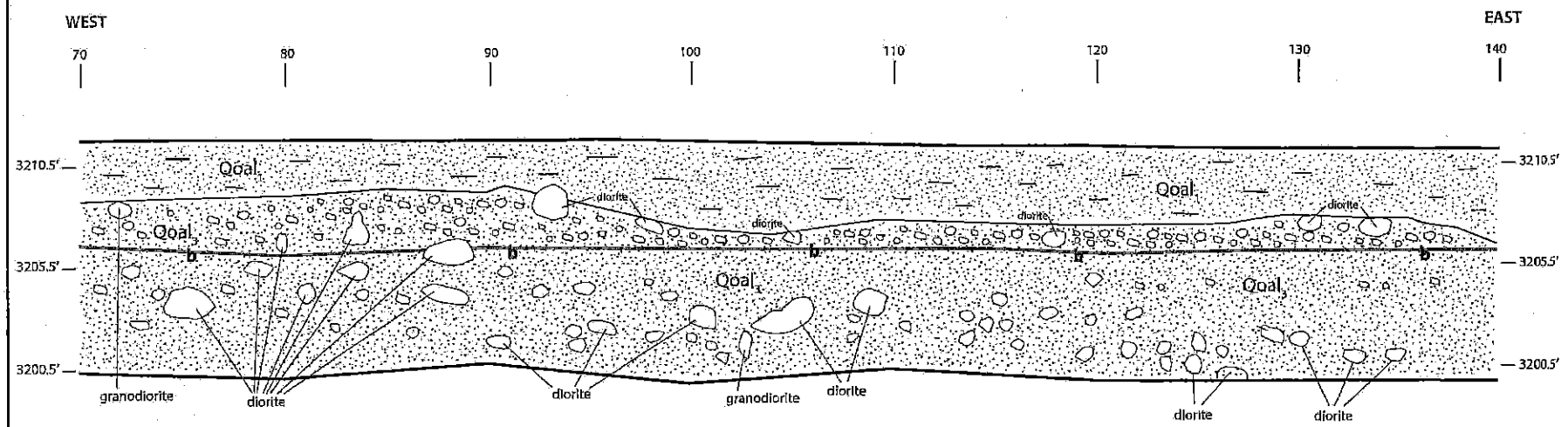
FAULT TRENCH 2

PETRA GEOTECHNICAL, INC.

JN 12-291 JUNE, 2013

Casa Blanca Ranch
City of Yucaipa

PLATE 5



Horizontal and Vertical Scale: 1" = 5'

See Plate 5 for Explanation

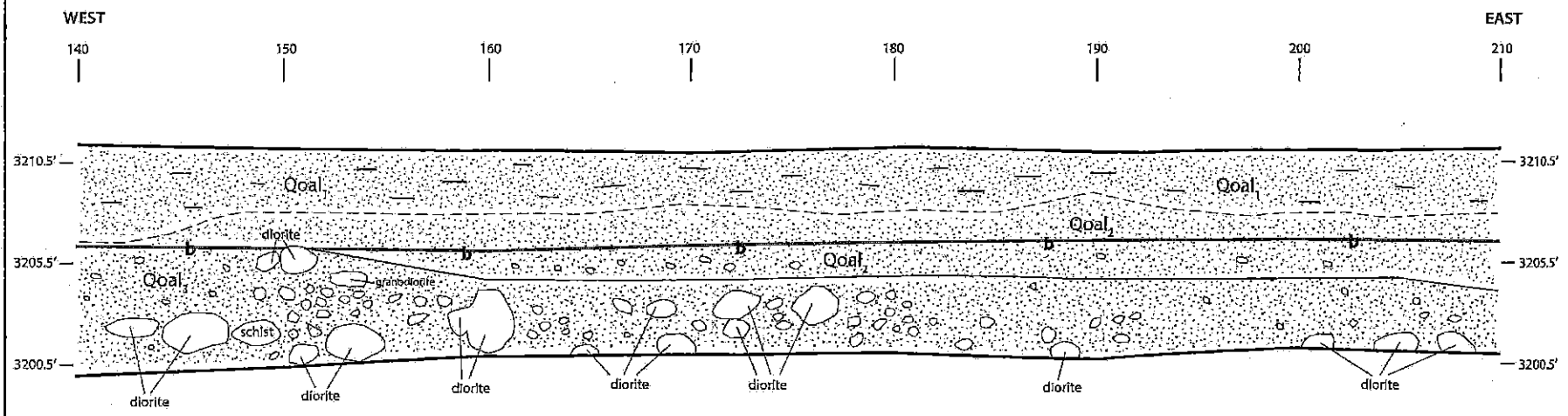
FAULT TRENCH 2

PETRA GEOTECHNICAL, INC.

JN 12-291 JUNE, 2013

Casa Blanca Ranch
City of Yucaipa

PLATE 6



Horizontal and Vertical Scale: 1" = 5'

See Plate 5 for Explanation

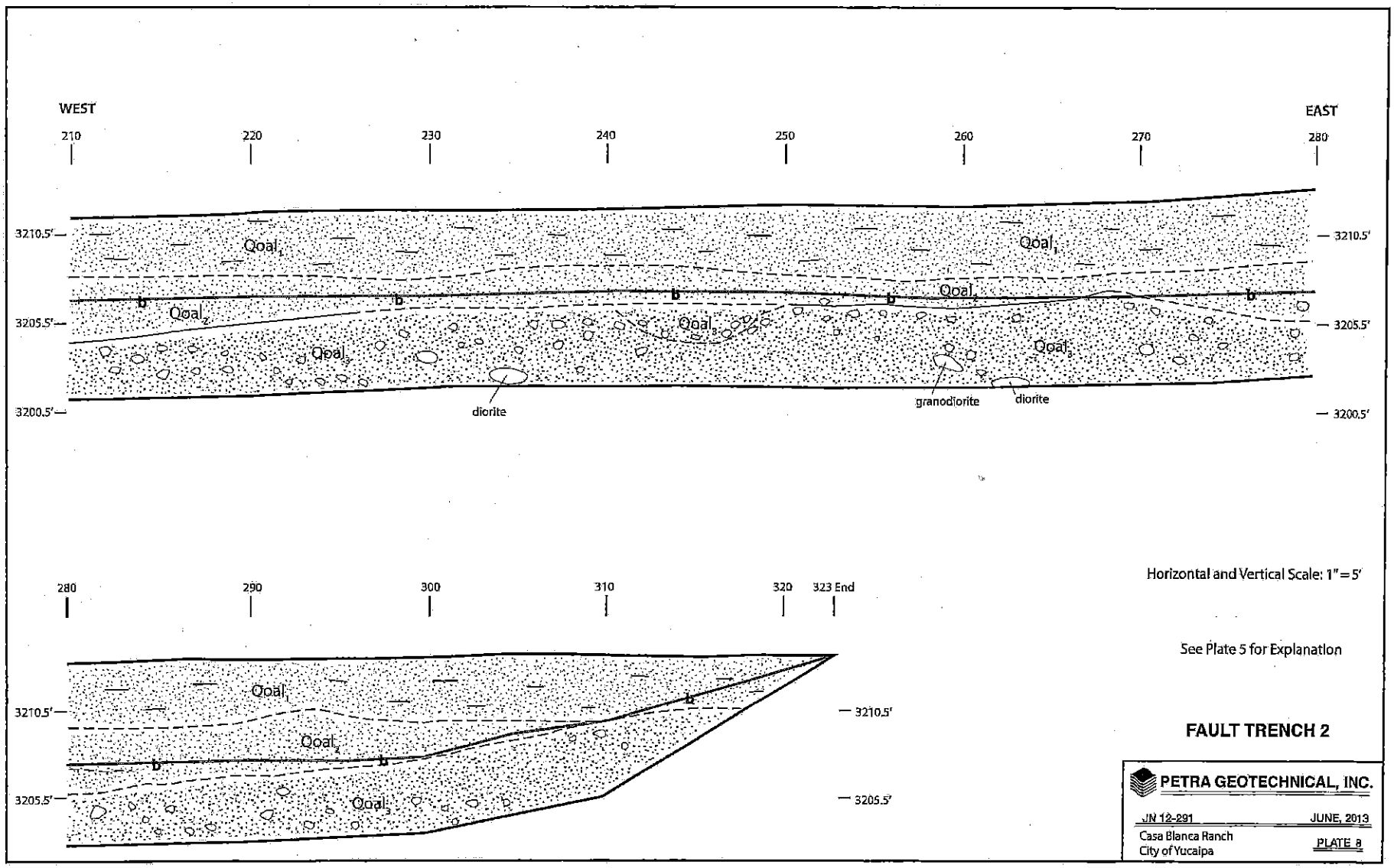
FAULT TRENCH 2

PETRA GEOTECHNICAL, INC.

JN 12-291 JUNE, 2013

Casa Blanca Ranch
City of Yucaipa

PLATE 7


WEST
EAST
210
220
230
240
250
260
270
280
3210.5'
3205.5'
3200.5'
Qoal1
Qoal2
Qoal3
b
diorite
granodiorite
diorite
280
290
300
310
320
323 End
Horizontal and Vertical Scale: 1"=5'
See Plate 5 for Explanation
FAULT TRENCH 2
PETRA GEOTECHNICAL, INC.
JN 12-291
JUNE, 2013
Casa Blanca Ranch
City of Yucaipa
PLATE 8