

**REPORT OF LIMITED FAULT HAZARD
EVALUATION
PROPOSED CONVENIENCE STORE AND FUEL
CANOPIES
APN 0601-543-01
AVALON AVENUE
YUCCA VALLEY
SAN BERNARDINO COUNTY
CALIFORNIA**

PROJECT NO.: 1664-01
REPORT NO.: 1

AUGUST 22, 2024

SUBMITTED TO:

MOORE TWINING ASSOCIATES, INC.
2527 FRESNO STREET
FRESNO, CA 93721

PREPARED BY:

HILLTOP GEOTECHNICAL, INC.
786 SOUTH GIFFORD AVENUE
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August 22, 2024

Moore Twining Associates, Inc.
2527 Fresno Street
Fresno, CA 93721

Project No.: 1664-01
Report No.: 1

Attention: Mr. Read Andersen

Subject: **Report of a Limited Fault Hazard Evaluation, Proposed Convenience Store and Fuel Canopies, APN 0601-543-01, Avalon Avenue, Yucca Valley, California.**

- References:
1. **Greenberg Farrow**, October 16, 2023, *Site Plan, NWC 29 Palms Highway & Avalon Avenue, Yucca Valley, Sheet Number CSP 6.0W, Project Number 20221223.0.*
 2. Technical References – See Appendix ‘B.’

Gentleman:

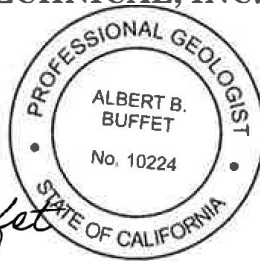
According to your request, we have completed a limited fault hazard evaluation for design and construction of the proposed convenience store and fuel canopies at the subject site. The purpose of this investigation was to evaluate the potential hazard for fault related ground rupture within the project site located within the A-P Earthquake Fault Zone. We are presenting, herein, our findings and recommendations.

Per our review of applicable geologic reports and faulting literature, analysis of aerial photographs, geologic reconnaissance, excavation of two exploratory fault trenches to depths of up to approximately 12 feet, and evaluation and geologic

logging of all exploratory fault trenches, no fault trace evidence was found at area of the proposed convenience store including 50-foot setbacks from both ends of the proposed convenience store, the proposed convenience store at the project area is considered feasible.

If you have any questions after reviewing the findings and recommendations contained in the attached report, please do not hesitate to contact this office. This opportunity to be of professional service is sincerely appreciated.

Respectfully Submitted,
HILLTOP GEOTECHNICAL, INC.



Albert Buffet

Albert Buffet, P.G. 10224
Professional Geologist



S. Mack Chen

S. Mack Chen, C.E.G. 2688
Principal Geologist

Distribution: (1) Addressee
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Mr. Read Andersen ReadA@mooretwinning.com

HILLTOP GEOTECHNICAL, INC.

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**REPORT OF LIMITED FAULT HAZARD EVALUATION
PROPOSED CONVENIENCE STORE AND FUEL CANOPIES
APN 0601-543-01, AVALON AVENUE
YUCCA VALLEY
SAN BERNARDINO COUNTY
CALIFORNIA**

AUGUST 22, 2024

INTRODUCTION

This report presents results of a limited fault hazard evaluation conducted on the subject site for the proposed convenience store and fuel canopies to be located at APN 0601-543-01, northwest corner of 29 Palms Highway & Avalon Avenue in the Yucca Valley area of San Bernardino County, CA 92284. The general location of the subject site is indicated on the 'Site Location Map' Figure No. 1.

Authorization to perform this study was in the form of a signed agreement and proposal from **Hilltop Geotechnical, Inc. (HGI)** (Geotechnical / Geologic Consultant) to **Moore Twining Associates, Inc.** (Client), dated June 28, 2024 and January 15, 2024, Proposal No.: P23001R.

PURPOSE AND SCOPE OF STUDY

The purpose of this investigation was to evaluate the potential hazard for fault related ground rupture within the project site located within the A-P Earthquake Fault Zone. The scope of work performed for this study was to evaluate fault hazard in the vicinity of the proposed convenience store on the subject site with respect to potential fault hazard that may affect the proposed development of the site. The scope of work included the following:

- a) Meet or discuss with representatives of pertinent personnel and determine the trench locations prior to trench excavation.
- b) Research available pertinent geologic literature, geologic reports, and aerial photographs.

HILLTOP GEOTECHNICAL, INC.

- c) Excavate up to approximately 213 feet of exploratory trench with a backhoe or excavator.
- d) Log all subsurface excavations.
- e) Walk through with the City's consulting geologist in the field to confirm fault hazard investigation trenches.
- f) Backfill the trenches and perform observation and compaction test. Backfilled soil will be compacted to a minimum of 90 percent of the maximum dry density. A compaction report for backfilling the fault trench will be prepared.
- g) Establish reservoir setback zones, if needed.
- h) Present our professional opinions in a report that will include, in addition to our conclusions and recommendations, a plot plan and trench logs.

The scope of work performed for this report did not include any testing of earth materials or groundwater for environmental purposes, an environmental assessment of the property, or opinions relating to the possibility of surface or subsurface contamination by hazardous or toxic substances.

This study was prepared for the exclusive use of Moore Twining Associates, Inc. and its clients for specific application to the development of the proposed convenience store and canopies in accordance with generally accepted standards of the geotechnical and geologic professions and generally accepted geologic principles and practices at the time this report was prepared. Other warranties, implied or expressed, are not made. Although reasonable effort has been made to obtain information regarding geologic conditions of the site, limitations exist with respect to knowledge of unknown regional or localized off-site conditions which may have an impact at the site. The conclusions presented in this report are valid as of the date of this report. However, changes in conditions of a property can

occur with passage of time, whether they are due to natural processes or to works of man on this and/or adjacent properties.

If conditions are observed or information becomes available during the design and construction process which are not reflected in this report, **HGI**, as Geological Engineering Consultant of record for the project, should be notified so that supplemental evaluations can be performed and conclusions and recommendations presented in this report can be verified or modified in writing, as necessary. Changes in applicable or appropriate standards of care in the geological professions occur, whether they result from legislation or the broadening of knowledge and experience. Accordingly, the conclusions and recommendations presented in this report may be invalidated, wholly or in part, by changes outside the influence of the project Geologic Engineering Consultant which will occur in the future.

PREVIOUS SITE STUDIES

No previous geotechnical and/or geological studies for the subject site are known to have been performed or were made available for review at the time of this study, if any had been performed. However, A fault investigation was conducted by Sladden Engineering (Cohrt et al, 2017) for a proposed retail center at APN: 0601-201-41, NWC Avalon Avenue and Palisade Drive, Yucca Valley, which is located immediately south of 29 Palms Highway right opposite to the subject site over 29 Palms Highway. This report was referenced to characterize soil stratigraphy in our fault study trenches.

SITE DESCRIPTION

The subject site comprises approximately 6.32 acres and was irregular in shape, which is bounded by Twentynine Palms Highway to the southeast, by Avalon Avenue to the east, by Paxton Road to the north, by Diadem Drive to the west, and by a vacant lot to the southwest. At the time of our field exploration, the

subject site was a vacant lot with scattered Joshua or Yucca trees. The site was relatively flat. In general, the existing ground surface is regionally sloping towards the north.

Utilities consisting of electric, telephone, gas, sewer, water, as well as other unknown underground lines, were observed to be present along Twentynine Palms Highway.

REGIONAL GEOLOGIC SETTING

The site is located at the eastern Transverse Ranges Physiographic Province of California and within the central portion of Yucca Valley. Yucca Valley is located in the Mojave Desert region of the California high desert. The Pinto Mountain fault, which is located to the north and west of the site, forms the boundary between the eastern Transverse Ranges and the Mojave Desert Physiographic provinces. The eastern Transverse Ranges Physiographic province consists of elevated masses of mainly Mesozoic plutonic rocks, Paleozoic metasedimentary rocks and Precambrian gneiss. Such mountains are transected by roughly east-west trending, convergent (north-south compressional) deformational structures. The convergent deformational features of the eastern Transverse Ranges are a result of north-south crustal shorting due to plate tectonic movement that locally folds and uplifts the Little San Bernardino Mountains and lowers the intervening valleys, along with propagation of thrust faults (including blind thrusts) and infilling of valley basins with sediments (Cohrt, et al, 2017).

LOCAL GEOLOGIC SETTING

The project site is located to the east of the San Bernardino Mountains. Per the Dibblee geologic map (1967), the geologic units at the project site consist of recent Quaternary alluvial deposits (Qa) and older Quaternary alluvial deposits (Qoa). The geologic units observed within the San Bernardino Mountains, to the northwest and north of the site, consist of intrusive Miocene quartz monzonite

(qm) and older granitic rocks leucocratic quartz monzonite (lqm).

REGIONAL FAULTING

Significant active faults that cross the eastern Transverse Ranges and the Mojave Desert Physiographic provinces and have been defined by California Geologic Survey (CGS) as Earthquake Fault Zones in the vicinity of the project site are the Eureka Peak fault, the Johnson Valley fault, and the Pinto Mountain fault. The east-west trending Pinto Mountain fault is located between Eureka Peak and the Johnson Valley faults. The north to northwest trending Eureka Peak and Johnson Valley faults have generated damaging earthquakes, including the June 28, 1992 Moment Magnitude (M_w) 7.5 Landers earthquake. During the Landers earthquake event, earthquake activity extended across the Holocene-active Pinto Mountain fault (Cohrt et al, 2017).

The Eureka Peak fault is located approximately 0.6 miles southwest of the site per Earthquake Zone of Required Investigation (**Figure 3**). The Eureka Peak fault is included in an Alquist-Priolo Earthquake Fault Zone, designated by CGS, as a result of the Landers Earthquake. Investigations by Rasmussen & Associates documented up to 8 inches of right-lateral, strike-slip offset along the Eureka Peak fault associated with the Landers earthquake (Rasmussen, 1992).

The Johnson Valley fault is located about 2 miles north of the site. Ground surface rupture for the M_w7.5 Landers earthquake initiated along the Johnson Valley fault and propagated to the north-northwest along the northwest trending Homestead Vally, Emerson and Camp Rock faults, as well as numerous, previously unidentified, north to northeast trending faults (Rasmussen, 1992).

The Pinto Mountain fault is a major east-west trending fault, located approximately 0.3 miles north-northwest of the site per Dibblee Geologic Map of Joshua Tree Quadrangle (1967). The Pinto Mountain fault extends from at least

the Mission Creek fault (north branch of the San Andreas fault) west of Morongo Valley to the Turtle Mountains, 30 miles east of Twentynine Palms (Bader and Moyle, 1960; Dibblee, 1967, 1970; Bortugno and Spittler, 1986). The Pinto Mountain fault is a left-lateral, strike-slip fault generally considered to represent the southern structural boundary of the Mojave Block (Dibblee, 1968).

A well-defined zone of cracks, located near Avalon Avenue and 29 Palms Highway, was originally mapped by Rasmussen & Associates (1992) subsequent to the June 28, 1992 Landers Earthquake and later zoned by CGS (Treiman, 1993). Treiman (1993) indicates that although this short northwest trending fracture set is isolated and is not clearly related to any of the better defined 1992 fault rupture, the distinct left-stepping pattern is strongly suggestive of right-lateral shear (Cohrt et al, 2017). Per California Geological Survey Fault Activity Map of California <https://maps.conservation.ca.gov/cgs/fam/>, the well-defined zone of cracks is an unnamed fault within Eureka Peak fault zone, which is considered as a splay of Eureka Peak fault. This unnamed fault is also designated as a Special Studies Zone (**Figures 3 & 4**). Since this unnamed fault is close to Avalon Avenue, here we tentatively name this fault as Avalon Avenue Splay fault.

REGIONAL SEISMICITY

An area of triggered slip was observed during the 1992 Landers earthquake on the Pinto Mountain fault approximately 0.3 miles north and northwest of the site. Minor left-lateral cracks were observed on the ground surface (Bryant, 1992). Some other minor cracks were observed at the ground surface after the 1992 Landers earthquake (Bryant, 1992). The Mw 7.5 Landers earthquake occurred on June 28, 1992, and involved ground surface along the Johnson valley, Kickapoo, Homestead Valley, Emerson, Camp Rock, Eureka Peak and Burnt Mountain faults. The epicenter of Landers earthquake is located approximately 5 miles north of the site. The Mw 6.2 Joshua Tree earthquake occurred on April 22, 1992,

and is considered to be a foreshock of the Landers earthquake (Hauksson, et al., 1992).

Several earthquakes with Richter magnitudes between 4.0 and 5.0 have occurred along the Pinto Mountain fault between Yucca Valley and Twentynine Palms during historic time. This fault has been documented as disrupting Holocene material in the Joshua Tree and Twentynine Palms (Rasmussen, 1977, 1990) and impedes the flow of ground water in alluvial materials in Twentynine Palms. It also forms prominent scarps in older alluvium. The largest historic earthquake that may have been associated with the Pinto Mountain fault was M5.9 and was located east of Twentynine Palms.

Significant earthquakes affecting the site may occur on the Eureka Peak, Pinto Mountain, Johnson Valley faults during the lifetime of the proposed development. Due to the proximity of the site to the Eureka Peak, Pinto Mountain, Johnson Valley faults, near-field effects from strong ground motion associated with a large earthquake may occur at the site.

GROUNDWATER CONDITIONS

Per the DWR (2004), the subject site is located within the Colorado River Hydrologic Region and within the Warren Valley Groundwater Basin. Groundwater bearing formations in the basin have been reported to consist of continental deposits of Miocene to Quaternary age (DWR, 2004). Water-bearing geologic units are reported to occur in unconsolidated alluvium deposits that consist of gravels, conglomerates, and silts. The alluvial deposits are interpreted regionally to exceed a thickness of 2,000 feet. Groundwater flow near the site vicinity has a northward direction from the Little San Bernardino Mountains towards the Pinto Mountain fault (Cohrt et al, 2017).

Groundwater was not encountered to 12 feet bgs during our field trenching at the subject site. Per California Department of Water Resources Website: <https://wdl.water.ca.gov/waterdatalibrary/Map.aspx>, data from an observation well (State Well No. 01N06E29N001S) is located approximately 1,000 feet to the northeast of the subject site and is approximately 3192.7 feet above Mean Sea Level (MSL), which is about 20 feet lower than the subject site. The depth to groundwater in this well was 294 feet bgs measured on November 22, 1967. The groundwater at the subject site is not considered an important factor for the proposed development.

AERIAL PHOTOGRAPHIC REVIEW

HGI conducted a lineament analysis for the site by reviewing aerial photographs in Google Earth database. The following aerial photographs, which show the subject site and its vicinity, were reviewed: aerial photos date July 1989, October 1995, September 2003, June 2009, and June 2021.

Tonal, geomorphic, and vegetative lineaments were evaluated. No lineaments to be considered relevant to fault traces were found in the immediate vicinity of the subject site.

EXPLORATORY FAULT TRENCH INVESTIGATION

HGI's fault trench investigation of the site was conducted during July 2024. Two northeast trending exploratory trenches totaling approximately 218 feet in length were excavated across the building pad of the proposed convenience store to perpendicularly intercept the designated northwest trending Avalon Avenue Splay fault trace. The excavation contractor Norfolk, Inc. was retained to conduct trench excavation.

Prior to commencing the trench excavation, four corners of the proposed building were surveyed and staked by a surveyor, which was hired by the client. DigAlert was also notified prior to the trench excavation. A John Deere 85G equipped with

a 4-foot-wide bucket was utilized by Norfolk Inc to excavate exploratory trenches. The contractor performed the trench excavation under the direction and monitoring of HGI's field geologist. Following Cal OSHA criteria, the exploratory fault trenches were excavated utilizing symmetrical 3-foot-high step benches. The exploratory trenches were excavated to approximately 30 feet in width. Since a Joshua or Yucca Tree was located at the northeast end of the major trench T-1, a second minor trench T-2 paralleling to the major trench and continuing the major trench was excavated to meet a minimum of 50 feet of setback from the proposed building. The excavated trenches were re-surveyed to confirm the exploratory trenches meet the Code requirement after the completion of the trench excavation.

The exploratory trenches were excavated to expose the near surface soil to dismantle any fault traces or offset of the soil profile indicative of surface rupture. After two exploratory trenches were excavated, the trench side walls were brushed and scraped. The existing soil smears, debris and slough were removed. The trench walls were placed with field stationing marks every 20 feet on the horizontal. A thorough initial inspection of each trench was conducted and followed with detailed measurements and recording of observations. The profile of the logged sidewall, total length, and total depth were graphically drawn on a trench log. For elevation readings, a peep sight was used along with a tape measure and fiberglass level. The geologic logging was conducted by HGI's professional geologist. The trench wall soil profiles were logged at a scale of 1 inch equals 5 feet, which are shown in Plate Nos 2a through 2c. Exploratory trenching and geologic logging of the exploratory trenches were directed by HGI's field geologist under supervision of a California Certified Engineering Geologist.

Age of Subsurface Materials

Soil age can be determined using absolute and relative age dating methods. Absolute age dating can be conducted using radiometric age dating method on

carbon bearing samples such as charcoal, shell, bone fragments or wood that is encountered in certain soil stratum. Relative ages can be conducted by soil stratigraphy studies including dry color, moist color, moist content, texture, structure, consistency, cementation, calcium carbonate stage level, etc. No datable materials were encountered in sufficient quantities to allow a direct determination of the age of the sediments. However, a qualitative estimate of the age of the sediments can be determined by referencing to the fault investigation report for adjacent site (Cohrt et al, 2017). The subsurface materials encountered in the exploratory trenches can be roughly classified as follows.

Quaternary Younger Alluvium Materials (Qal and Qal2) range from 2,000 to 8,000 years old in Holocene age:

Qal-Silty Sand with some gravel; yellowish brown to olive brown, dry, silty fine to coarse grained sand, some angular gravels, abundant rootlets.

Qal2-Silty Sand; yellowish brown, dry, silty, mostly fine-medium grained sand, scatter angular gravels and some coarse-grained sand existing in some sections.

Quaternary Older Alluvium (Qoa, Qoa3, and Qoa7) range from 13,200 to 90,000 years old in Pleistocene age:

Qoa-Gravelly Sand; light yellowish brown to yellowish brown, dry, fine-to coarse-grained sand, angular to subangular granitic gravel.

Qoa3-Silty Sand; yellow to yellowish brown; dry, thinly inter-bedded/laminated, some scoured gravel.

Qoa7-Silty Sand; yellowish brown, silty fine-grained sand.

On August 1, 2024, Yucca Valley City consulting geologist Mr. Mathew Cohrt arrived the site to walk the trench along with HGI geologists and Allen Harker with Moore Twining Associates, Inc. for additional input and observations. We discussed our findings and further analyzed trench observations, as necessary. After the exploratory trenches were walked through, the trenches were backfilled with soil cuttings. The backfilled soil cuttings were compacted to a minimum of

90 percent of the maximum dry density as determined by ASTM D1557 and tested by HGI technician. The test results are included in our compaction report in a separate report.

CONCLUSIONS AND RECOMMENDATIONS

Per our aerial photo review, no lineaments which can be interpreted as potential fault ruptures were observed in the immediate vicinity of the subject site. Two exploratory trenches were excavated to a depth of 12 feet and 218 feet in length, which meet the San Bernardino County fault study criteria. The relative soil ages indicate that Holocene and Pleistocene age earth materials were exposed within the exploratory fault trenches. Fault trenching results indicate that there is no fault trace encountered within the investigated area.

Based on our document research, field reconnaissance, review of aerial photographs, and lineament analysis, the potential for surface fault rupture on the investigated area is considered low. But any potential fault trace beyond the fault study area cannot be excluded. Therefore, the proposed building should be limited to the investigated area, which is shown on Plate No. 1.

LIMITATIONS

UNIFORMITY OF CONDITIONS

The recommendations and opinions expressed in this report reflect our understanding of the project requirements based on an evaluation of subsurface earth material conditions encountered at the subsurface exploration locations and the assumption that earth material conditions do not deviate appreciably from those encountered. Any unusual conditions not covered in this report that may be encountered during site development should be brought to the attention of **HGI** so that we may make modifications, if necessary.

CHANGE IN SCOPE

HGI should be advised of any changes in the project scope of proposed site grading so that it may be determined if recommendations contained herein are valid. This should be verified in writing or modified by a written addendum.

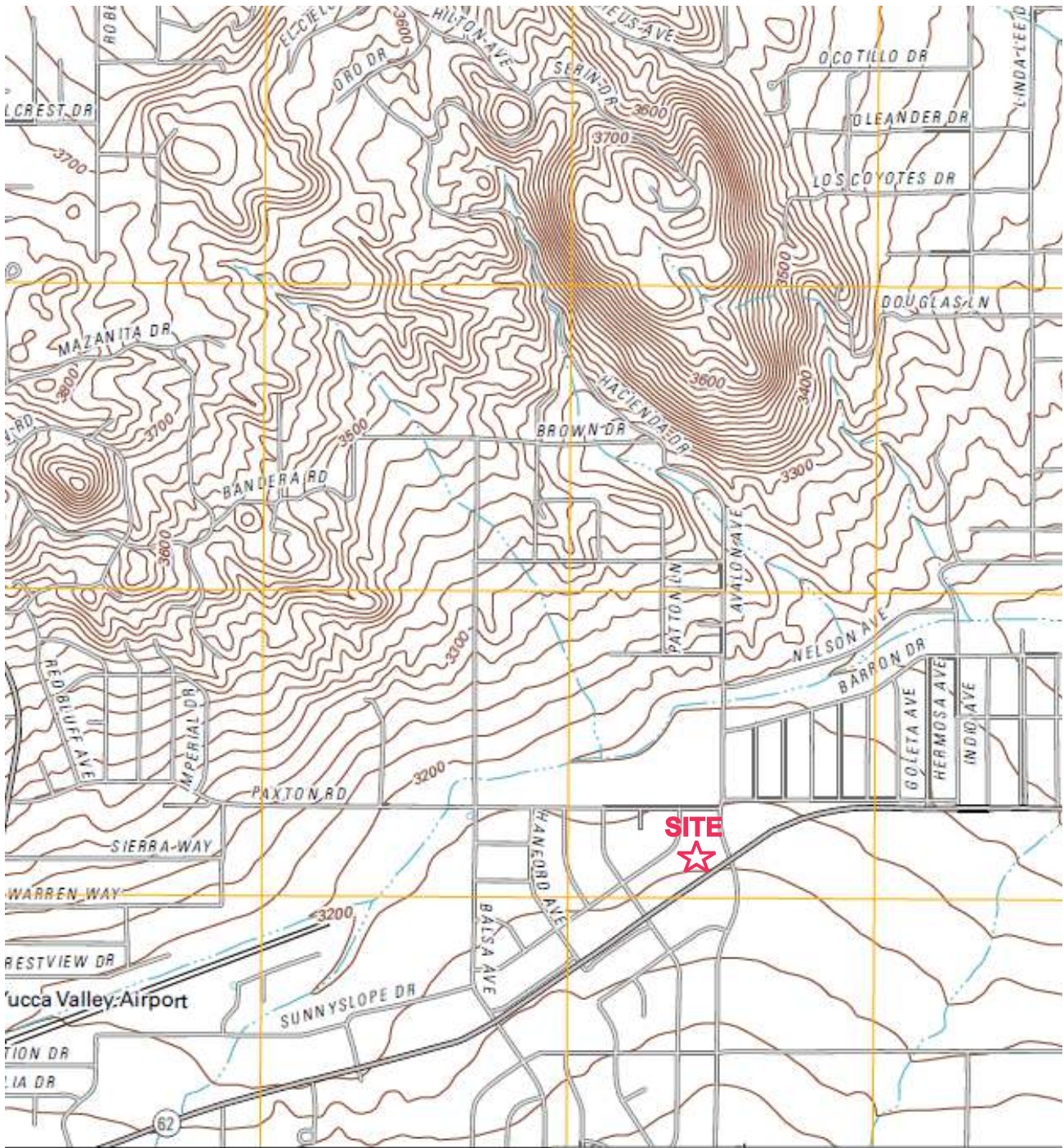
TIME LIMITATIONS

The findings of this report are valid as of this date. Changes in the condition of a property can, however, occur with the passage of time, whether they be due to natural processes or the work of man on this or adjacent properties. In addition, changes in the State-of-the-Art and/or government codes may occur. Due to such changes, the findings of this report may be invalidated wholly or in part by changes beyond our control. Therefore, this report should not be relied upon after a period of two (2) years without a review by **HGI** verifying the validity of the conclusions and recommendations.

PROFESSIONAL STANDARD

In the performance of our professional services, we comply with the standard of care and skill ordinarily exercised under similar circumstances by members of the geologic professions currently practicing under similar conditions and in the same locality. The client recognizes that subsurface conditions may vary from those encountered at the locations where our surveys and exploratory excavations were made, and that our data, interpretations, and recommendations are based solely on information obtained by us. We will be responsible for those data, interpretations, and recommendations, but should not be responsible for interpretations by others of the information presented and/or developed. Our services consist of professional consultation and observation only, and other warranties, expressed or implied, are not made or intended in connection with work performed by **HGI** or by the proposal for consulting or other services or by the furnishing of oral or written reports or findings.

FIGURES & PLATES



SCALE 1:24 000



Source: Copied from USGS Topo Map-
Yucca Valley North Quadrangle 2012



SITE LOCATION MAP

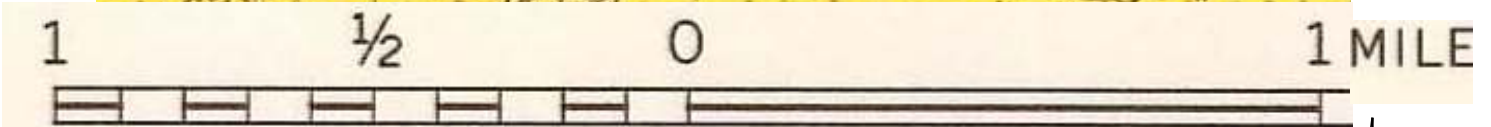
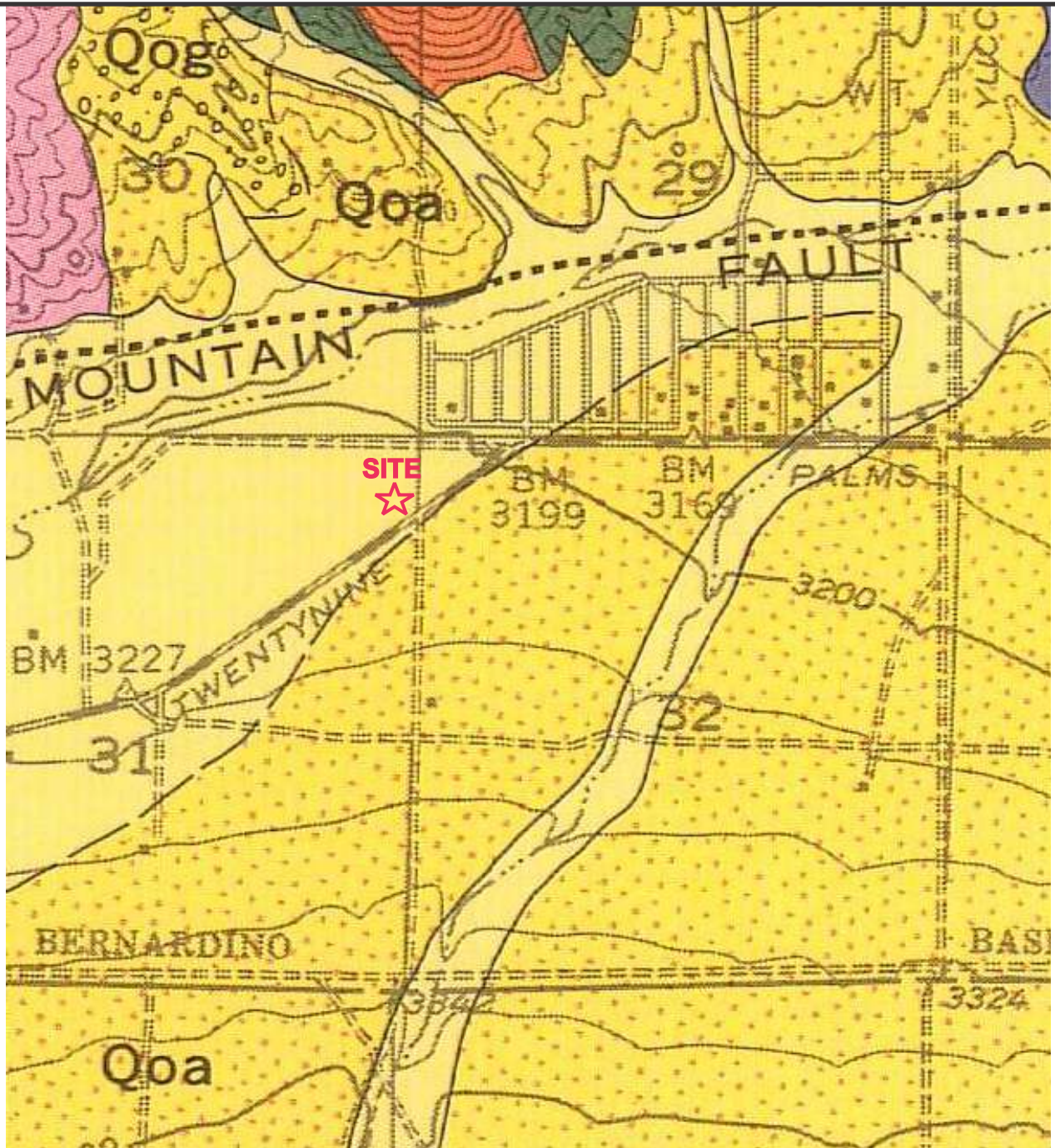
APN 0601-543-01, Avalon Avenue, Yucca Valley

By: MC

Date: 8/2024

Project No.: 1664-01.1

Figure 1



Legend

- Qa Qa, *alluvium*
- Qoa Qoa, *older alluvium*



Source: excerpt from Geologic Map of Joshua Tree Quadrangle, San Bernadino and Riverside Counties, California by T. W. Dibblee, Jr. 1967



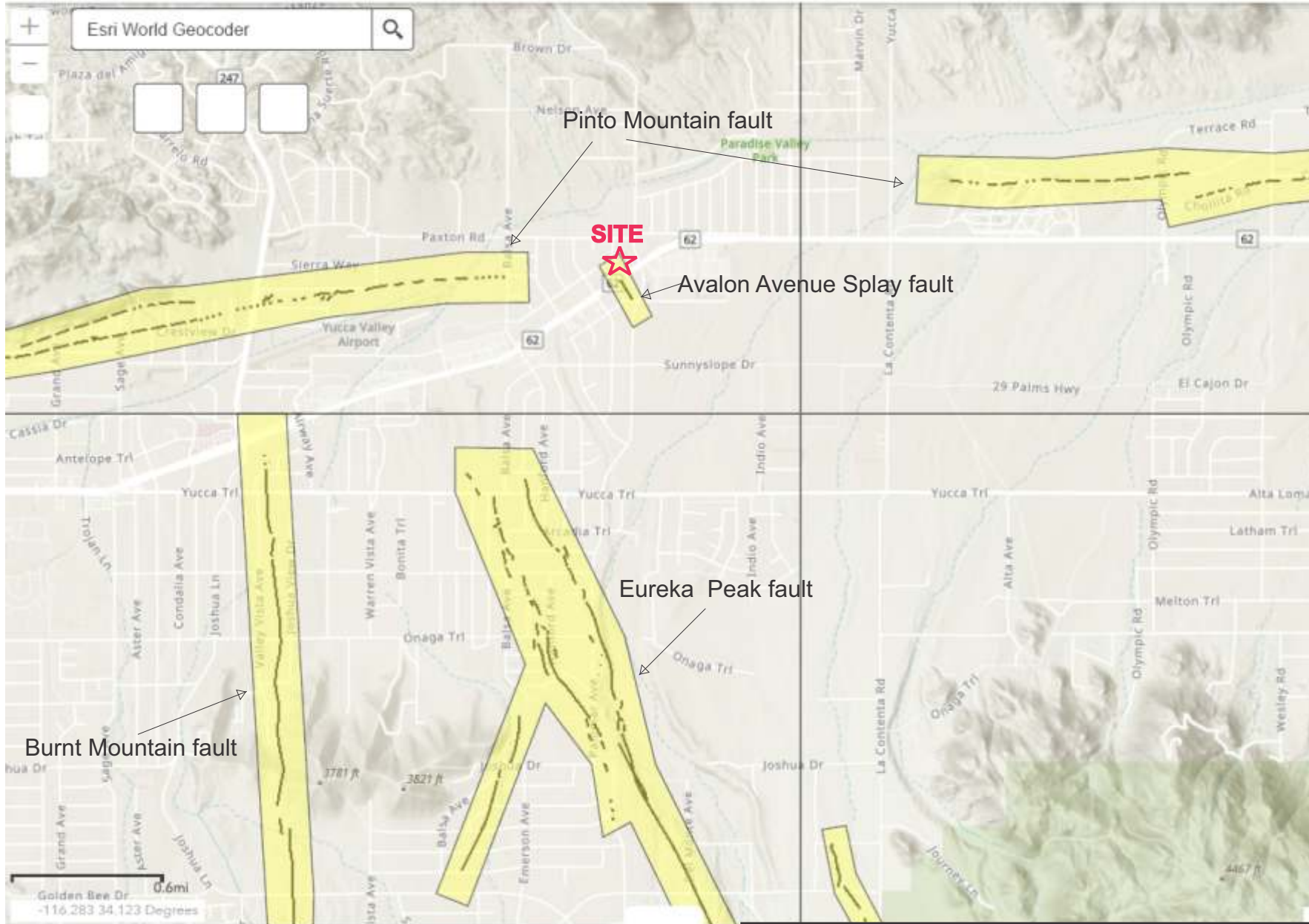
REGIONAL GEOLOGIC MAP
 APN 0601-543-01, Avalon Avenue, Yucca Valley

By: MC Date: 8/2024

Project No.: 1664-01.1 **Figure 2**

Earthquake Zones of Required Investigation

CGS Homepage



Legend

 required fault study zone



Earthquake Zone of Required Investigation

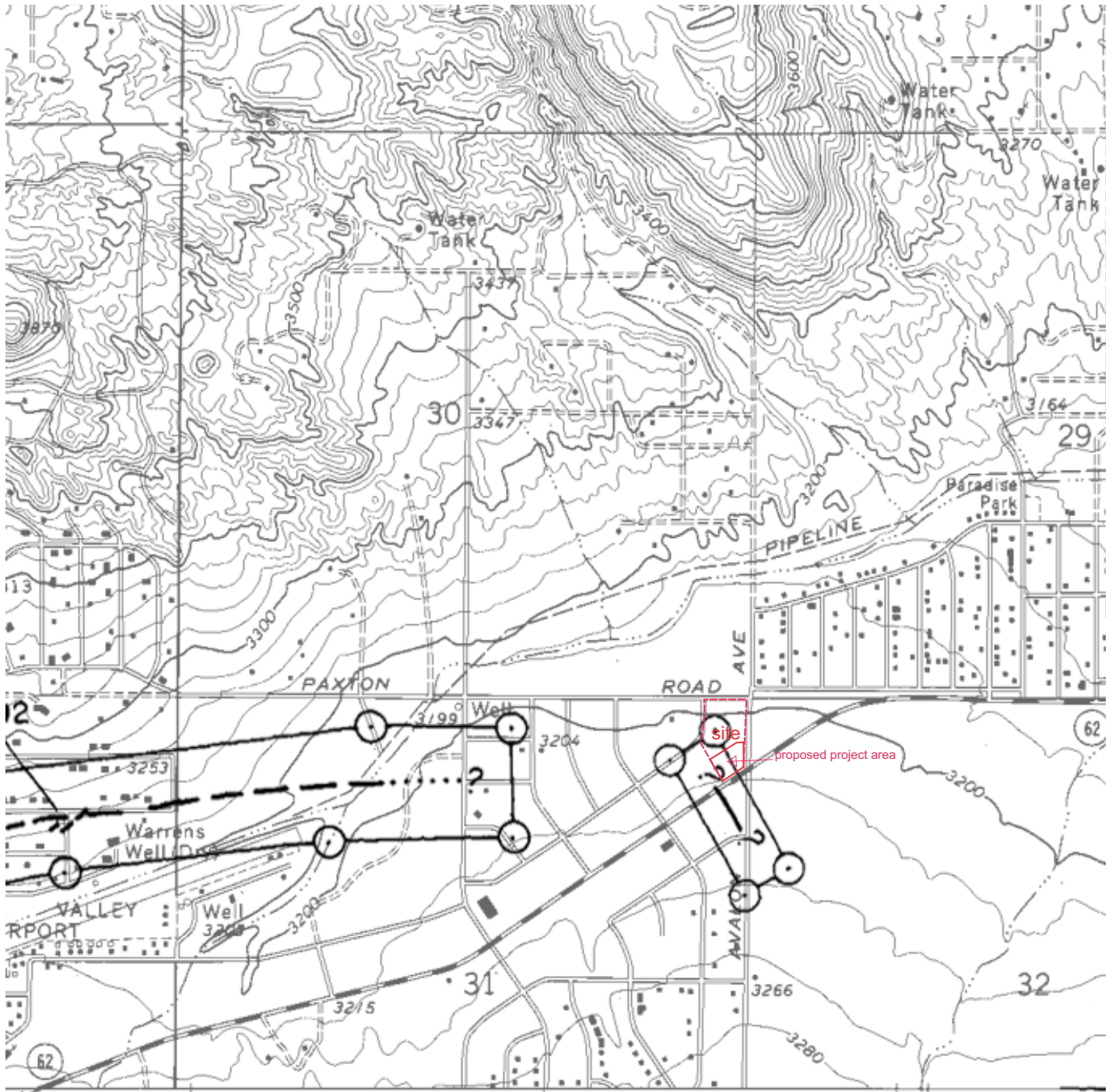
APN 0601-543-01, Avalon Avenue, Yucca Valley

By: MC

Date: 8/2024

Project No.: 1664-01.1

Figure 3



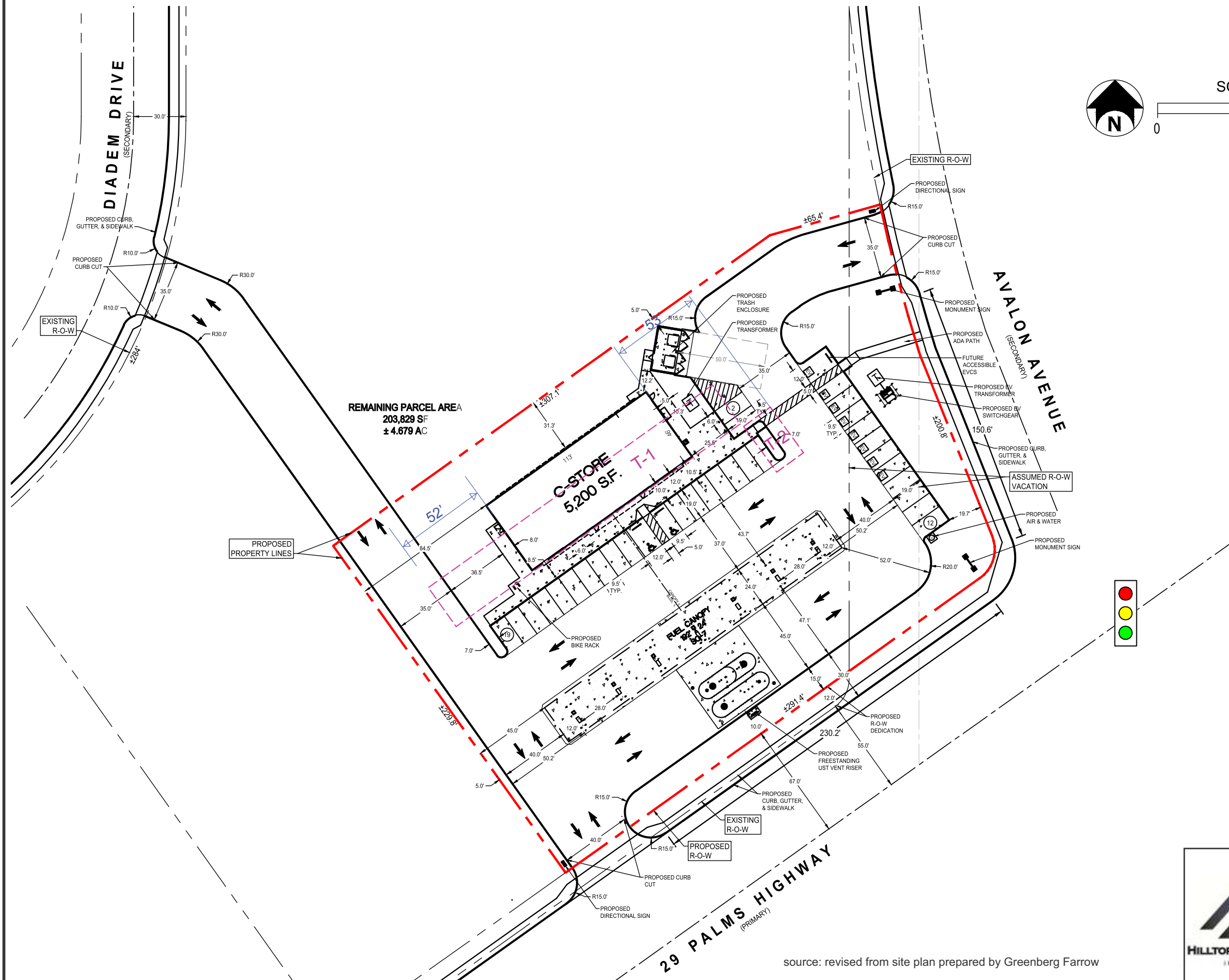
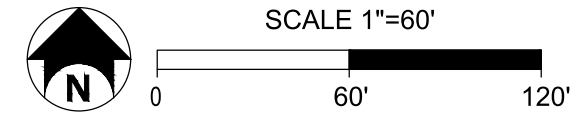
0 1 KILOMETER

Source: excerpt for Special Studies Zones-Yucca Valley North Quadrangle-Revised Official Map Effective: July 1, 1993.




AP Fault Special Studies Zones	
APN 0601-543-01, Avalon Avenue, Yucca Valley	
By: MC	Date: 8/2024
Project No.: 1664-01.1	Figure 4

**CIRCLE K STORE
SITE PLAN**
NWC 29 PALMS & AVALON AVENUE, YUCCA VALLEY, CA



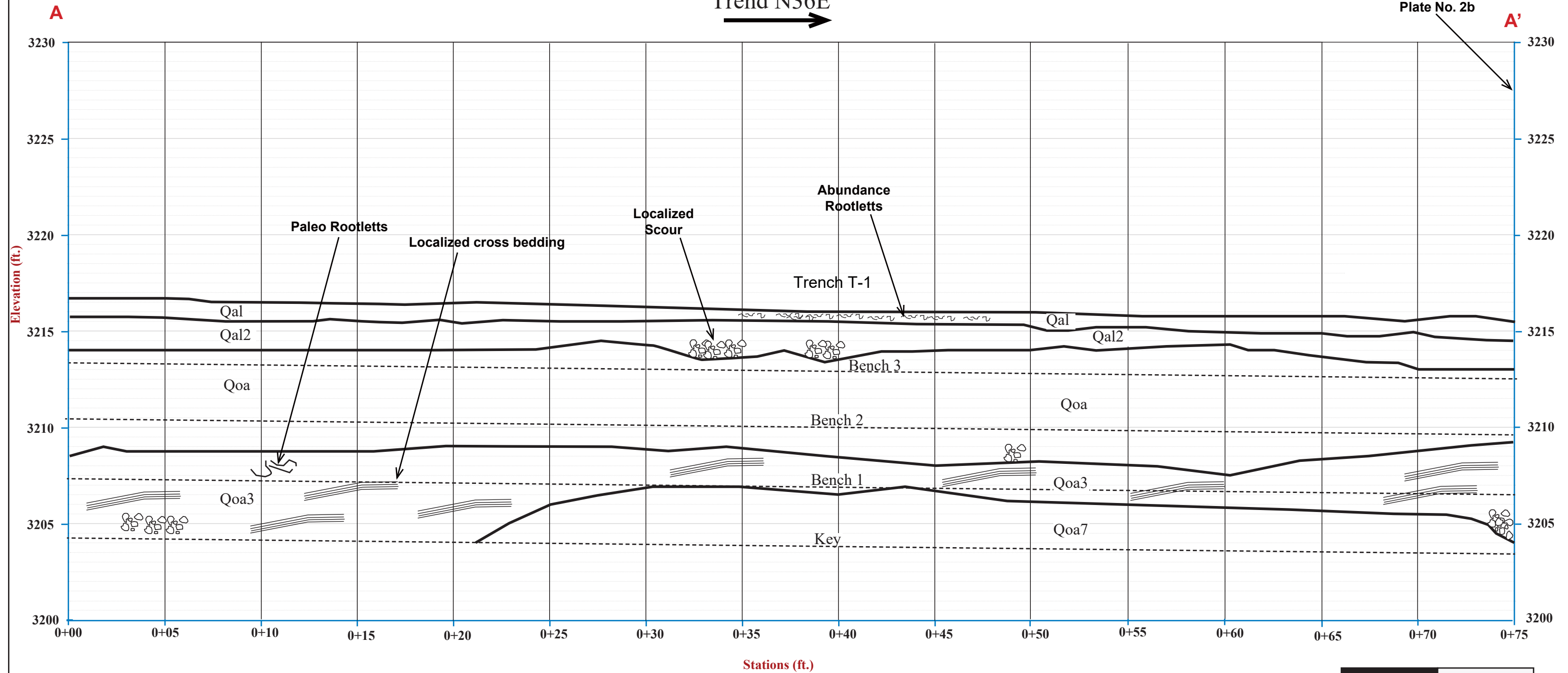
T-1 Exploratory Trench Location

	Site Plan and Exploratory Trench Locations	
	APN 0601-543-01, Avalon Avenue, Yucca Valley	
	By: MC	Date: 8/2024
	Project No.: 1664-01.1	Plate No. 1

source: revised from site plan prepared by Greenberg Farrow

Trench Log 1 of 3
Trend N36E

Matchline
Plate No. 2b

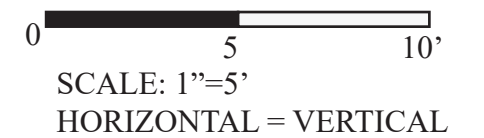


Legend

- Approximate Soil Stratigraphy Contacts
- - - Trench Benching

- Qal Young Alluvium
- Qal2 Young Alluvium Unit 2
- Qoa Old Alluvium
- Qoa3 Old Alluvium Unit 3
- Qoa7 Old Alluvium Unit 7

Note: Elevations are approximate and based on data obtained by plan sheets provided by client.
(for illustration purpose only).



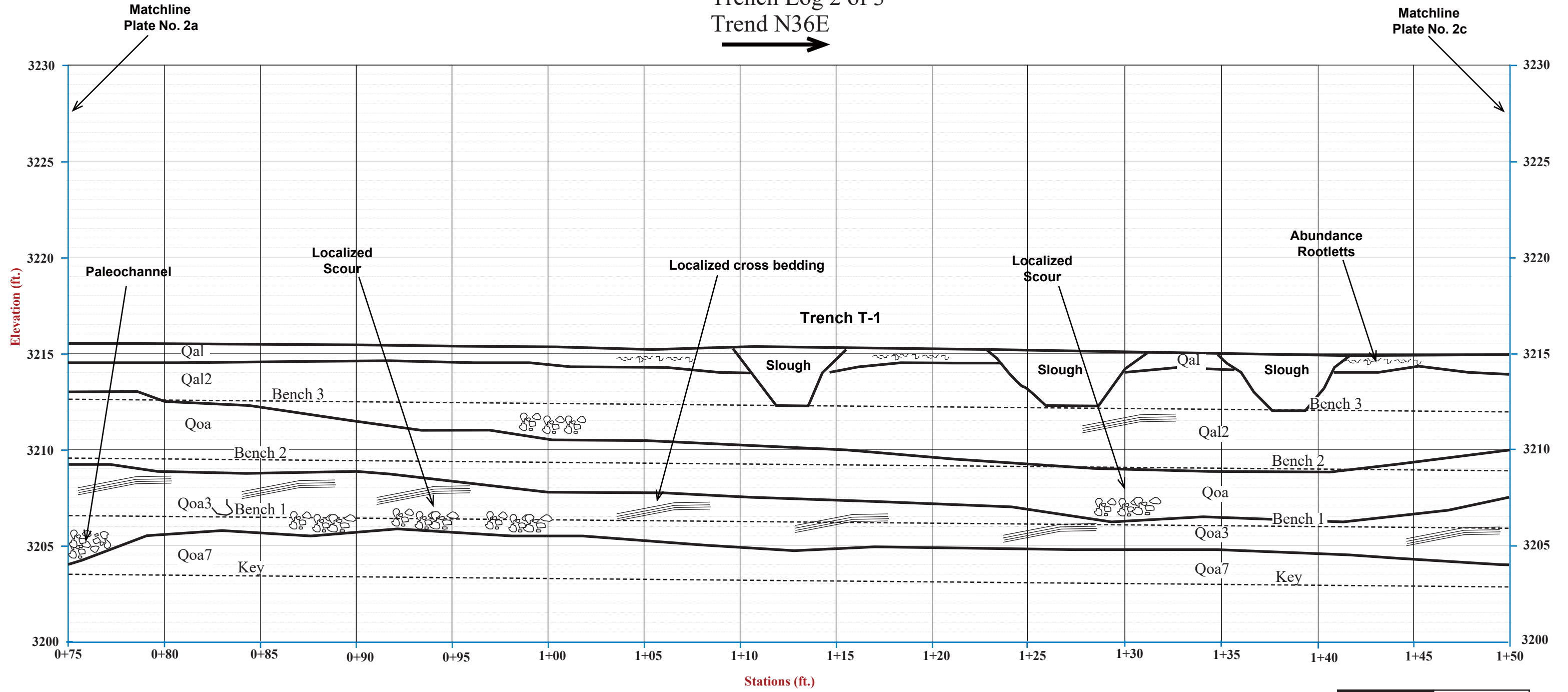
Project Name:
**Avalon Avenue
Yucca Valley Fault Study**

Project No.: **1664-01**
Date: **August 2024**

Drawing Title:
Trench Log 1 of 3

Plate No.:
2a

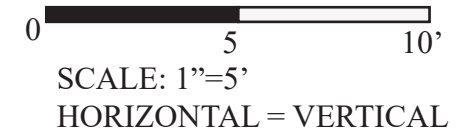
Trench Log 2 of 3
Trend N36E



Legend

—	Approximate Soil Stratigraphy Contacts	Qal	Young Alluvium	Qoa3	Old Alluvium Unit 3
- - -	Trench Benching	Qal2	Young Alluvium Unit 2	Qoa7	Old Alluvium Unit 7
		Qoa	Old Alluvium		

Note: Elevations are approximate and based on data obtained by plan sheets provided by client. (for illustration purpose only).



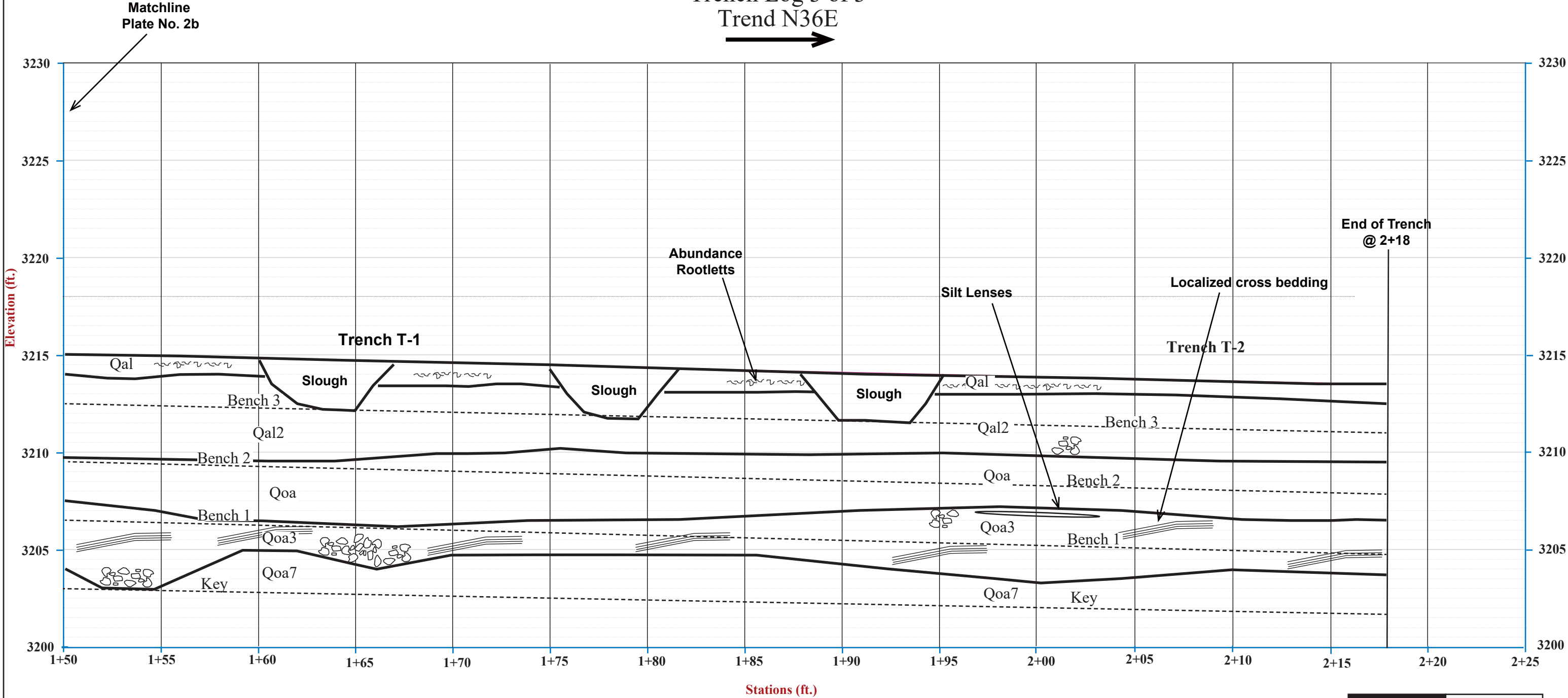
Project Name:
Avalon Avenue
Yucca Valley Fault Study

Project No.: 1664-01
Date: August 2024

Drawing Title:
Trench Log 2 of 3

Plate No.
2b

Trench Log 3 of 3
Trend N36E

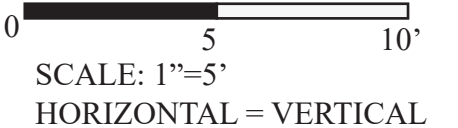


End of Trench
@ 2+18

Legend

—	Approximate Soil Stratigraphy Contacts	Qal	Young Alluvium	Qoa3	Old Alluvium Unit 3
- - -	Trench Benching	Qal2	Young Alluvium Unit 2	Qoa7	Old Alluvium Unit 7
		Qoa	Old Alluvium		

Note: Elevations are approximate and based on data obtained by plan sheets provided by client. (for illustration purpose only).



Project Name:
**Avalon Avenue
Yucca Valley Fault Study**

Project No.: **1664-01**
Date: **August 2024**

Drawing Title:
Trench Log 3 of 3

Plate No.:
2c

APPENDIX A TECHNICAL REFERENCES

Bader, J.S. and Moyle, W.R., Jr., 1960, *Data on water wells and springs in the Yucca Valley-Twenty-nine Palms Area, San Bernardino and Riverside Counties, California: California Department of Water Resources Bulletin 91-2.*

Bryant, W. A., 1992, *Fault Evaluation Report FER-234, Surface Rupture along the Johnson Valley, Homestead Valley, and Related Faults Associated with the Mw 7.5 28 June 1992 Landers Earthquake; California Division of Mines and Geology. Scale 1:24,000.*

California Department of Water Resources, 2004, *California's Groundwater Bulletin 118, Colorado River Hydrologic Region, Warren Valley Groundwater Basin, Groundwater Basin Number 7-12.*

Cohrt, M. J. and Anderson, B. L., January 20, 2017, *Fault Investigation, Proposed Retail Center, NWC Avalon Avenue and Palisade Drive, APN 601-201-41, Yucca Valley, California.*

Dibblee, T. W., 1967, *Geologic Map of the Joshua Tree quadrangle, San Bernardino and Riverside Counties, California: U. S. Geological Survey Miscellaneous Geologic Investigations Map I-516, Scale 1:62,500.*

Dibblee, T.W., Jr., 1968, *Evidence of major lateral displacement on the Pinto Mountain fault, southeastern California: Geological Society of America Special Paper 115, p. 322.*

GoogleEarth.com, 2024, *Historical Aerial Photograph for the Yucca Valley Area, Variable Scale. Reviewed at googleearth.com.*

Hauksson, E., Hutton, K., and Jones, L.M., 1992, *Preliminary report on the 1992 Landers earthquake sequence in southern California, in Landers earthquake of June 28, 1992, San Bernardino County, California, Field Trip Guidebook: Southern California Section of the Association of Engineering Geologists, p.23-31.*

Rasmussen, G. S., November 1, 1977, *Engineering geology investigation of Sunset Village, Joshua Tree, California, Project No. 1265.*

Rasmussen, G. S., October 2, 1990, *Subsurface engineering geology investigation of approximately 120 acres, northwest of Gorgonio Drive and Canyon Road, Twenty-nine Palms, California, Project No. 2930.*

Rasmussen, G. S., 1992, *M7.5 Landers Earthquake, in Ebersold, D. B. (ed.), Landers Earthquake of June 28, 1992, San Bernardino County, California:*

Association of Engineering Geologists Annual Meeting, Field Trip Guidebook, p. 11-14.

Treiman, J.A., 1992, *Eureka Peak and Burnt Mountain faults - two "new" faults in Yucca Valley, San Bernardino County, California, in Landers earthquake of June 28, 1992, San Bernardino County, California, Field Trip Guidebook: Southern California Section of the Association of Engineering Geologists, p. 19-22.*

Treiman, J.A., 1992, *Fault Evaluation Report 230, Eureka Peak and Related Faults, Joshua Tree South and Yucca Valley South Quadrangles, San Bernardino and Riverside Counties, California Division of Mines and Geology, December 15, 1992.*

Treiman, J.A., 1993, *Fault Evaluation Report 230, Supplement No. 1, Eureka Peak and Related Faults, San Bernardino and Riverside Counties, California Division of Mines and Geology, May 20, 1993.*