LGC GEO-ENVIRONMENTAL, INC.

SUPPLEMENTAL GEOLOGIC FAULT HAZARD STUDY OF THE RIVERSIDE COUNTY EARTHQUAKE ZONE, FOR THE PROPOSED RESIDENTIAL DEVELOPMENT, LOCATED AT 800 N. GIRARD STREET, CITY OF HEMET, RIVERSIDE COUNTY, CALIFORNIA.

Dated: September 10, 2018
Project No. G18-1647-10

Prepared For:

Shizao Zheng
c/o Sikand Engineering
1378 West Zhorgshan Road
Ningbo City, Zhejiang Province
China

27570 Commerce Center Drive, Suite. 128, Temecula, California 92590
Phone: 951.297.2450 I Fax: 951.719.2998 I www.lgcgeoenv.com

September 4, 2018 Project No. G18-1647-10

Shizao Zheng
c/o Sikand Engineering
1378 West Zhorgshan Road
Ningbo City, Zhejiang Province
China

Subject: Supplemental Geologic Fault Hazard Study of the Riverside County Earthquake Fault Zone, For the Proposed Residential Development, Located at 800 N. Girard Street, City of Hemet, Riverside County, California

LGC Geo-Environmental, Inc. (LGC) is pleased to submit herewith our supplemental geologic fault hazard study of the Riverside County earthquake fault zone, for the proposed residential development, located at 800 N. Girard Street, City of Hemet, Riverside County, California. This report presents the results of our field investigation, review of published geologic/geotechnical reports and/or maps, review of aerial photographs, previous on-site fault reporting, and our geologic judgment, opinions, conclusions, and recommendations pertaining to the geotechnical design aspects of the future development.

It has been a pleasure to be of service to you on this project. Should you have any questions regarding the content of this report or should you require additional information, please do not hesitate to contact this office at your earliest convenience.

Respectfully submitted,

LGC GEO-ENVIRONMENTAL, INC.

REGISTERED GEOLOGIST
ROBERT L. GREGOREK II
No. 1257
CERTIFIED ENGINEERING GEOLOGIST
Exp. 8/19
STATE OF CALIFORNIA

Robert L. Gregorek, II CEG
Certified Engineering Geologist

KRM/RLG

Distribution: (4) Addressee

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1.0 INTRODUCTION

1.1 Purpose and Scope of Services

The purpose of our investigation was to identify evidence of active faulting on the subject site, and to provide geotechnical recommendations and design criteria for mitigation of the potential hazard of surface displacement due to faulting, for the proposed residential development at the site. This report presents the results of our fault investigation for the proposed residential development. The results of our study should be incorporated into the future design of the proposed development within the site.

Our scope of services included:

- Background review of sequential stereoscopic aerial photographs, geologic reports and geologic maps pertinent to the site (Appendix A).
- Excavating and logging three (3) fault trenches approximately 9 feet to 14 feet deep, and ranging from approximately 80 feet to 200 feet in length. The approximate locations of the fault trenches are shown on the enclosed Geologic/Fault Location Map (Plate 1), and a descriptive log is presented on the Fault Trench Log (Plate 2).
- An evaluation of faulting as it pertains to the site and the proposed residential development.
- Delineation of a human occupancy setback zone due to active faulting.
- Geologic mapping of the site.
- Geologic analysis of the data with respect to the proposed residential development.
- Preparation of this report presenting our findings, conclusions, and preliminary geologic and geotechnical recommendations for the proposed residential development.

1.2 Location and Site Description

The subject site is irregular in shape and is located north of East Menlo Avenue and west of Park Avenue in the City of Hemet, Riverside County, California. The existing site elevations vary from approximately 1,640 feet above mean sea level (msl) on the northeast descending slope, to approximately 1,616 msl in the southwesterly section of the site. Local drainage is generally directed to the west and southwest portions of the site. The general location and configuration of the site is shown on the Site Location Map (Figure 1).

A site reconnaissance and aerial imagery shows the site is covered with a light to moderate growth of grass and shrubs, with a sparse growth of trees along the northern property boundary. There are several concrete foundations in the northern and central portions of the site. In addition, there is a storm water run-off drain pipe on the east property line. Aerial stereo photography dating back to 1949 reveals the site was previously used for what appears to be a plant nursery until about 1967. The structures were removed and the site has remained vacant since about 1967.

1.3 Proposed Development and Grading

The referenced 60-scale Preliminary Site Plan indicates that the proposed residential development will be comprised of 48 residential buildings, associated roadways, parking areas, a water quality detention basin, and landscape and hardscape areas. It is anticipated that the proposed structures will be constructed of wood and steel framing, with concrete footings and floor slabs constructed on-grade.

1.4 Previous Geologic Reports

A previous fault hazard investigation was conducted by Gary S. Rasmussen & Associates in 1988 (appendix A). The report was reviewed by LGC prior to our field investigation and pertinent data has been incorporated into this report. Rasmussen concluded there is active faulting onsite and identified what they believe to be the major active trace along the Casa Loma fault. A restricted use for human occupancy structures setback zone was identified for the major active trace (See Plate 1). Rasmussen stated, "surface ground rupture due to active faulting along Fault Zone 3 (See Plate 1) may occur during the lifetime of the proposed structures (Rasmussen, 1988)." Rasmussen also concluded, "the most significant amounts of subsidence are primarily restricted to the structural margins of the valley. The potential for subsidence affecting the site appears to be highest along the Casa Loma fault (Rasmussen, 1988)."

1.5 ***Aerial Photograph Review***

Aerial stereo photography of the subject site and vicinity, from 1949 through 1999, were reviewed and evaluated by this firm. The photographs were obtained from Continental Aerial Photo, Inc. Scales of the photographs reviewed varied. A summary table of the photos reviewed is presented in Appendix A. The photos were reviewed by a geologist from this firm to identify any apparent lineaments or other geomorphic features that may indicate faulting is present onsite. The lineaments located were then investigated by a geologist from this firm by trenching near perpendicular to the projected trend.

Based on our review of the stereo photographs, faint east-west trending geomorphic lineaments were interpreted to project across the site, particularly in aerial photos dated 2-5-77 and 10-15-97. In addition, the aforementioned lineament projects northwest across W. Girard St. and become strongly pronounced, including highly visible soil tonal variations and a linear drainage channel along a truncated fanglomerate. These lineaments coincide with known active fault splay projections, as mapped by Rasmussen & Associates in 1988 (Appendix A). These lineaments are also in concurrence with the general trend and approximate location provide by Riverside County GIS (RCIT-GIS, 2018).

1.6 ***Subsurface Exploration***

Our subsurface exploration was conducted by this firm in August of 2018. A track-mounted excavator was utilized to excavate and log three (3) fault trenches approximately 9 feet to 14 feet deep, and ranging from approximately 80 feet to 200 feet in length. The fault trench was excavated across and nearly perpendicular to the direction of the interpreted lineaments. During excavation of all three trenches and during geologic mapping a Certified Engineering Geologist from LGC, Mr. Duncan Walker (CEG 1395) was onsite to evaluate and interpret the geology associated with faulting.

Prior to the subsurface work, an underground utilities clearance was obtained from Underground Service Alert of Southern California. The approximate locations of the fault trenches are shown on Plate 1.

At the conclusion of the subsurface exploration, the fault trenches was backfilled with native spoil material and loosely compacted. Minor settlement of the backfill soils should be expected to occur over time. During any proposed site grading, and prior to the construction of any structure or site improvements, the loosely backfilled trenches should be re-excavated and compacted to 90 percent relative compaction or greater, at or near optimum water content.

FIGURE 1
SITE LOCATION MAP

Project Name	800 W. GIRARD ST.
Project No.	G18-1647-10
Geol./ Eng.	RG
Scale	NOT TO SCALE
Date	SEPTEMBER 2018

2.0 GEOTECHNICAL CONDITIONS AND FINDINGS

2.1 Regional Geologic Setting

Regionally, the site is located in the Peninsular Ranges Geomorphic Province of California. The Peninsular Ranges are characterized by steep, elongated valleys that trend west to northwest. The northwest-trending topography is controlled by the Elsinore fault zone, which extends from the San Gabriel River Valley southeasterly to the United States/Mexico border. The Santa Ana Mountains lie along the western side of the Elsinore fault zone, while the Perris Block is located along the eastern side of the fault zone. The mountainous regions are underlain by Pre-Cretaceous, metasedimentary and metavolcanic rocks and Cretaceous plutonic rocks of the Southern California Batholith. Tertiary and Quaternary rocks are generally comprised of non-marine sediments consisting of sandstone, mudstones, conglomerates, and occasional volcanic units. A map of the regional geology is presented on the Regional Geologic Map (Figure 2).

2.2 Local Geology and Soil Conditions

Based on our review of available geological and geotechnical literature, field mapping, and our subsurface exploration to investigate evidence of faulting at the site, it is our understanding that the site is primarily underlain by undocumented artificial fill, older alluvium and Bautista Formation bedrock. The subsurface geological contacts are described in greater detail below, and presented on the Fault Trench Log (Plate 2). The observed geologic units are depicted on the Fault Trench Map (Plate 1).

- **Undocumented Artificial Fill (Afu):** Artificial fill was encountered within all three fault trenches to a total depth of approximately 5.5 feet. This material is generally comprised of silty sand and sandy silt, and is characterized as being brown; dry; loose to medium dense and soft to stiff; fine grained; blocky; roots and rootlets; and some construction debris.

- **Older Alluvium (Qoal):** Pleistocene age older alluvium was encountered below the artificial fill, to an observed depth of about 15 feet. This soil is generally silty sand, and is characterized as being various shades of brown; very fine to medium grained; dry to damp; medium dense to dense; highly weathered granitic gravels and cobbles; and abundant caliche stringers and nodules.

- **Quaternary Bautista Formation (QTs)**: Pleistocene age Bautista Formation was encountered juxtaposed to older alluvium in FT-2 and FT-2 and below the artificial fill in FT-3, to an observed depth of about 15 feet. This bedrock is generally sandstone with some interbedded siltstone, and is characterized as being various shades of white and gray; dry to damp, moderately hard, fine to coarse grained; with some highly weathered granitic clasts, some fracturing,

2.3 Landslides

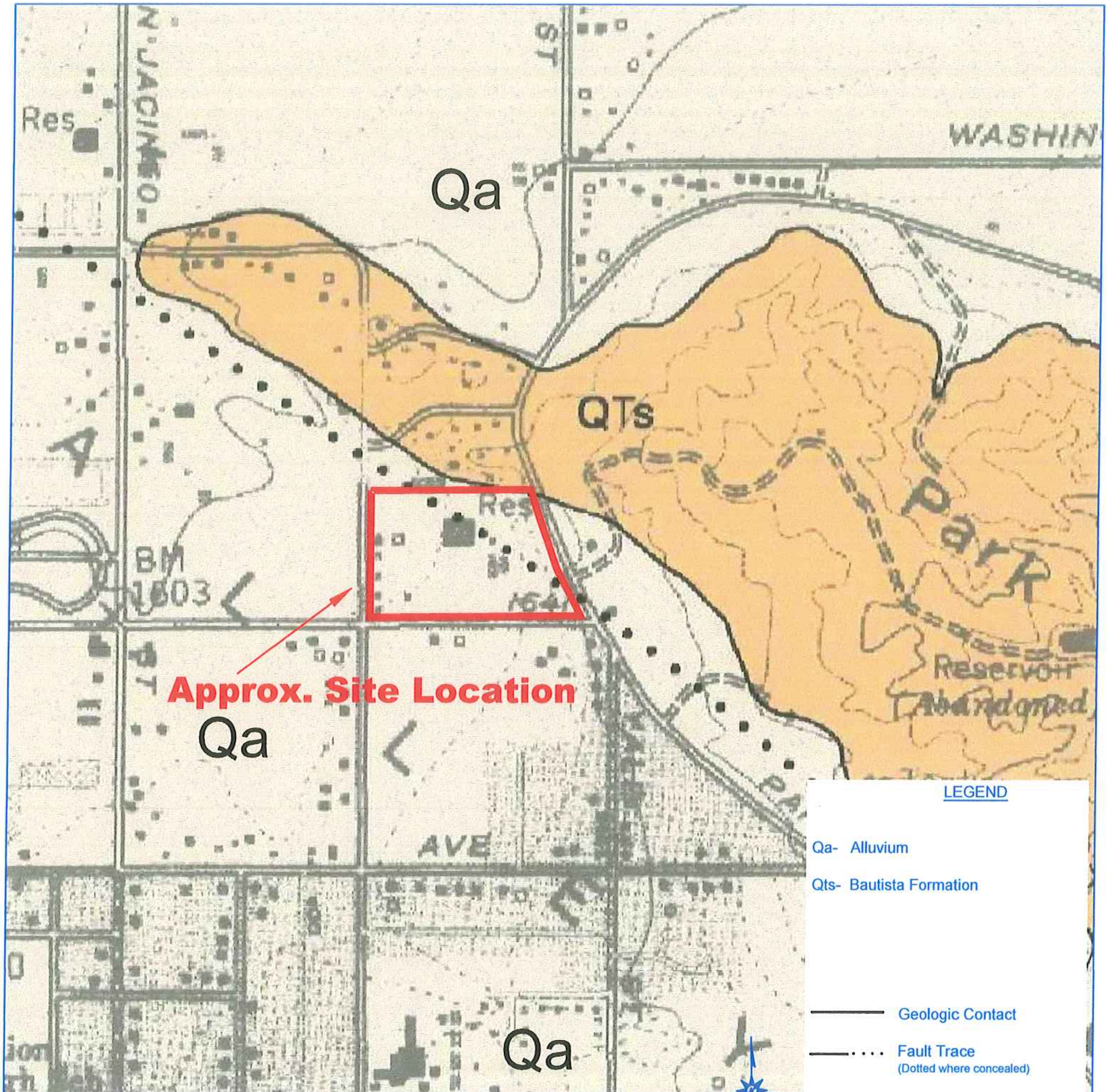
Landslides or surface failures were not observed at or directly adjacent to the site. As a result, the possibility of the site being affected by landsliding is not anticipated.

2.4 Groundwater

Groundwater was not encountered within the fault trench of this investigation, nor was it encountered during the subsurface exploration, for the previous investigation performed by Rasmussen in 1988. Groundwater data, acquired from the California Department of Water Resources', "Water Data Library", reveals past groundwater readings to depths of about 265 feet below the ground surface, at an observation well less than one mile from the site (Station 337574N1169698W001).

2.5 Surface Water

Based on our review of the referenced 60-scale preliminary grading plan, proposed on-site surface water flow is generally trending toward the west and northwest. A proposed stormwater infiltration device is located near the northerly property line and north of "A" Street. Surface water runoff relative to project design is the purview of the project civil engineer and should be designed to be directed away from the proposed structures and walls.



GEOLOGIC MAP OF THE SAN JACINTO QUADRANGLE RIVERSIDE COUNTY, CALIFORNIA
By Thomas W. Dibble, Jr.. 2003 Edited by John A. Minch

FIGURE 2
REGIONAL GEOLOGIC MAP

Project Name	800 W. GIRARD ST.
Project No.	G18-1647-10
Geol./ Eng.	RG
Scale	NOT TO SCALE
Date	SEPTEMBER 2018

2.6 ***Detailed Faulting Overview***

The geologic structure of the Southern California area is dominated mainly by northwest-trending faults associated with the San Andreas system. Faults such as the Newport-Inglewood, Whittier, Elsinore, San Jacinto and San Andreas are major faults in this system and are known to be active and may produce moderate to strong ground shaking during an earthquake. In addition, the San Andreas, Elsinore and San Jacinto faults are known to have ruptured the ground surface in historic times.

Faults (active, potentially active, or inactive) *are* known to project through the site. The subject site is located within a Riverside County Earthquake Fault Zone. During our investigation faulting associated with the Casa Loma were located trending northwest/southeast through the site in FT-1 and FT-2 (See Plate 1). In addition, Rasmussen concluded there is active faulting onsite and identified what they believe to be the major active trace along the Casa Loma fault (Rasmussen, 2018).

Stated in the CDMC Special Publication 42, "Fault-Rupture Hazard Zones in California", a fault is defined as, "a structure or zone of closely associated fractures along which rocks on one side have been displaced with respect to those on the other side. Most faults are the result of repeated displacement that may have taken place suddenly and/or by slow creep." The presence of numerous parallel and subparallel breaks showing Pleistocene-age Bautista Formation Bedrock juxtaposed against older alluvium as shown in FT-1 is indicative of faulting. The following provides a summary of the faulting directly observed during our fault investigation.

- **Fault Trench FT-1**

  Fault Trench FT-1 was excavated roughly perpendicular to the mapped trend of the Casa Loma Fault as indicated by previous reporting by Rasmussen (1988) and lineaments observed during aerial photo analysis. This trench was approximately 200 feet in length and to a maximum depth of approximately 15 feet below existing ground surface (see Plate 2). The majority of the trench generally exposed artificial fill and topsoil directly overlying older alluvium juxtaposed against Bautista Formation bedrock. Multiple fault breaks were mapped within the Bautista Formation and older alluvium (see Plate 2). Faulting showed evidence of slickensides and vertical displacement. The observed faulting coincided with both the aerial photo lineaments and the previous geotechnical reports by Rasmussen (1988). Lack of Holocene aged overlying soils was not observed within this trench do discern if this faulting is inactive or active. However Rasmussen concluded there is active faulting onsite and identified what they believe to be the major active trace along the Casa Loma fault. The mapped location of our observed faulting is similar with Rasmussen's in both general trend and location. Therefore, LGC conservatively concurs with Rasmussen that this is the major trace of the Casa Loma fault and is indeed active.

  LGC recommends a restricted use for human occupancy structures setback zone for the major active trace of the Casa Loma Fault (See Plate 1). Rasmussen stated, "surface ground rupture due to active faulting along Fault Zone 3 (See Plate 1) may occur during the lifetime of the proposed structures (Rasmussen, 1988)." A previous setback zone was provided by Rasmussen however we believe the most recent setback zone represents the most current evidence of faulting and should be incorporated into the proposed development.

- **Fault Trench FT-2**

  Fault Trench FT-2 was excavated northwest of FT-1 to relocate the active fault encountered in FT-1 transecting the site. This trench was approximately 80 feet in length, a maximum of approximately 14 feet deep, and exposed artificial fill over older alluvium and Bautista Formation Bedrock. The trench generally exposed artificial fill directly overlying older alluvium juxtaposed against Bautista Formation bedrock. Multiple fault breaks were mapped within the Bautista Formation and older alluvium (see Plate 2). Faulting showed evidence of slickensides, undiscernible displacement, dragged and brecciated fragments of Bautista Formation Bedrock. Additionally, the general location and orientation of the exposed faulting was identified in previous reporting by Rasmussen (1988).

- **Fault Trench FT-3**

  Fault Trench FT-3 was excavated approximately 80 feet in length and 9 feet in depth below ground surface (See Plate 2). This trench exposed artificial fill overlying Bautista Formation Bedrock. Although some minor fractures were mapped during our investigation no conclusive evidence of faulting was identified within the Bautista Formation Bedrock or artificial fill in FT-3 (see Plate 2).

Casa Loma Fault Within the San Jacinto Fault Zone Discission

The San Jacinto Basin is a northwest-trending, pull apart basin in the San Jacinto fault zone of the San Andreas Fault system in southern California. About 24 km long and 2 to 4 km wide, the basin sits on a graben bounded by two strands of the San Jacinto fault zone: the Claremont Fault on the northeast and the Casa Loma Fault on the southwest (USGS, 2018).

The Casa Loma fault is a right-lateral strike-slip fault within the San Jacinto Fault zone. The San Jacinto Fault zone is nearly 210 km in length with a slip rate typically between 7 to 17 mm/yr and a probable magnitudes of 6.5-7.5 Mw (SCEDC, 2018). The estimated interval between surface ruptures is between 100 and 300 years per segment (SCEDC, 2018). The most recent surface rupture on the San Jacinto Fault Zone was on April 9, 1968 on the Coyote Creek Segment with a Mw of 6.5 (SCEDC, 2018).

2.6.1 Secondary Seismic Effects

Secondary effects of seismic shaking resulting from large earthquakes on the major faults in the Southern California region, which may affect the site, include soil liquefaction and dynamic settlement. Other secondary seismic effects include shallow ground rupture, lateral spreading, seiches and tsunamis. In general, these secondary effects of seismic shaking are a possibility throughout the Southern California region and are dependent on the distance between the site and causative fault, and the onsite geology. An evaluation of these secondary seismic effects is included herein.

2.6.2 Liquefaction

Liquefaction is a seismic phenomenon in which loose, saturated, granular soils behave similarly to a fluid when subject to high-intensity ground shaking. Liquefaction occurs when three general conditions exist: 1) shallow groundwater; 2) low density non-cohesive (granular) soils; and 3) high-intensity ground motion. Studies indicate that saturated, loose to medium dense, near surface cohesionless soils exhibit the highest liquefaction potential, while dry, dense, cohesionless soils and cohesive soils exhibit low to negligible liquefaction potential.

Due to the relatively shallow hard bedrock and dense older alluvium and groundwater depth being greater than 50 feet the possibility of liquefaction is considered nil.

2.6.3 Shallow Ground Rupture

The potential for shallow ground rupture is considered probable on or near active faults on the site. Mitigation is recommended by use of a restricted use fault setback zone for active faulting. Cracking because of shaking from nearby or distant seismic events is not considered a significant hazard, although it is a possibility at any site.

2.6.4 Tsunamis and Seiches

Based on the elevation and location of the proposed development at the site with respect to sea level and its distance from large open bodies of water, the potential of seiches and/or tsunamis is considered nil.

2.7 Seismicity

The following seismic design parameters, presented in Table 1, were developed based on the CBC 2016 and should be used for the proposed structures. A site coordinate of 33.7594° N, 116.9525° W was used to derive the seismic parameters presented below.

TABLE 1
Seismic Design Soil Parameters

SEISMIC DESIGN SOIL PARAMETERS (2016 CBC Section 1613 and 2010 ASCE 7)	
Site Class Definition (ASCE 7; Chapter 20) [Table 20.3-1]	D
Mapped Spectral Response Acceleration Parameter S_s (for 0.2 second) [Table 1613.5.3(1)]	2.53
Mapped Spectral Response Acceleration Parameter, S_1 (for 1.0 second) [Table 1613.5.3(2)]	1.14
Site Coefficient F_a (short period) [Table 1613.3.3(1)]	1.00
Site Coefficient F_v (1-second period) [Table 1613.3.3(2)]	1.50
Adjusted Maximum Considered Earthquake (MCE) Spectral Response Acceleration Parameter S_{MS} (short period) [Eq. 16-37]	2.53
Adjusted Maximum Considered Earthquake (MCE) Spectral Response Acceleration Parameter S_{M1} (1-second period) [Eq. 16-38]	1.71
Design Spectral Response Acceleration Parameter, S_{DS} (short period) [Eq. 16-39]	1.69
Design Spectral Response Acceleration Parameter, S_{D1} (1-second period) [Eq. 16-40]	1.14
Mean Peak Ground Acceleration (PGA_m)	0.97

The following table is a list that is comprised of the significant seismic events within the general proximity of the subject site.

TABLE 2
Significant Seismic Events in Proximity of the Project Site

EARTHQUAKE NAME	MAGNITUDE (Mw)	DATE/TIME
San Jacinto Earthquake	6.8	April 21, 1918 / 2:32 pm
White Wash Earthquake	5.5	February 25, 1980 / 2:48 am
North San Jacinto Earthquake	6.3	July 22, 1923 / 11:28 pm
Elsinore Earthquake	6.0	May 15, 1910 / 7:47 am
Desert Hot Springs Earthquake	6.0	December 4, 1948 / 3:43 pm
Landers Earthquake	7.3	June 28, 1992 / 4:57 am
Hector Mine Earthquake	7.1	October 16, 1999 / 2:46 am
San Jacinto Fault (Terwilliger Valley) Earthquake	6.0	March 25, 1937 / 8:49 am

Source: http://scedc.caltech.edu/significant/index.html

The following table is comprised of a list of the significant faults located within 52 miles of the proposed project site. We have also included the Maximum Earthquake Magnitude predicted for each of these faults.

TABLE 3
Significant Faults in Proximity of the Project Site

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE (mi)	MAXIMUM EARTHQUAKE MAGNITUDE (Mw)
San Jacinto-San Jacinto Valley	1.9	6.9
San Jacinto-Anza	3.0	7.2
San Andreas - Southern	17.6	7.4
San Andreas - San Bernardino	17.6	7.3
Elsinore-Temecula	21.6	6.8
Elsinore-Glen Ivy	24.2	6.8
San Jacinto-San Bernardino	24.5	6.7
Pinto Mountain	24.5	7.0
Elsinore-Julian	26.7	7.1
San Andreas - Coachella	30.0	7.1
San Jacinto-Coyote Creek	33.1	6.8
North Frontal Fault Zone (West)	34.0	7.0
North Frontal Fault Zone (East)	34.5	6.7
Burnt Mtn.	35.5	6.4
Chino-Central Ave. (Elsinore)	36.4	6.7
Eureka Peak	38.3	6.4
Cleghorn	39.0	6.5
Whittier	39.9	6.8
Landers	41.6	7.3
Cucamonga	41.9	7.0
Helendale - S. Lockhardt	57.5	7.1
Earthquake Valley	54.3	6.5
Newport-Inglewood (Offshore)	25.6	6.9
San Jose	38.3	6.5
San Andreas - 1857 Rupture	47.5	7.8
San Andreas - Mojave	47.5	7.1
Rose Canyon	35.5	6.9
Sierra Madre	41.4	7.0
Elysian Park Thrust	36.1	6.7
Newport-Inglewood (L.A.Basin)	33.3	6.9
Compton Thrust	38.1	6.8
Clamshell-Sawpit	52.3	6.5

Source: EQFAULT for Windows Version 3.00b

3.0 CONCLUSIONS

Based on the results of our geologic fault hazard evaluation, it is our opinion that the proposed residential development is feasible from a geologic and geotechnical standpoint, provided the conclusions and recommendations contained within this fault hazard report are considered and incorporated into the project design process, and implemented during construction. The following is a summary of the primary geologic and geotechnical factors determined from our fault investigation.

- Based on our subsurface exploration and review of pertinent geologic maps and reports, the subject site is underlain by undocumented artificial fill, topsoil, Pleistocene age older alluvium and Pleistocene age Bautista Formation Bedrock.
- There are no identified landslides impacting the site.
- Groundwater is not considered a constraint for the proposed development.
- The site is located within a County of Riverside Earthquake Fault Zone.
- Active faulting is known to exist on the site.
- A fault hazard setback zone for human occupancy structures has been established for active faulting.
- The potential for liquefaction is considered nil.
- The potential for shallow ground rupture is considered probable on or near active faults on the site.
- The potential for lateral spreading is considered remote due to proposed engineered compacted artificial fill directly overlying dense older alluvium and the relatively flat on-site topography

4.0 RECOMMENDATIONS

4.1 Active Faulting

Based on the findings of this investigation and review of previous fault hazard reporting active faulting does exist on site and a fault hazard setback zone is recommended, as indicated on the geologic/fault Location Map (Plate 1).

4.2 Trench Backfill and Compaction

The approximate area of the fault trenches should be overexcavated to the full depth of the trench and replaced with properly compacted fill.

The onsite soils are generally suitable as trench backfill. During future grading operations, trench backfill should be compacted in uniform lifts (generally not exceeding 8 inches in compacted thickness) by mechanical means to at least 90 percent relative compaction (per ASTM Test Method D1557) and optimum water content.

A representative from this firm should be retained to provide observation and testing services during the overexcavation and backfill of the fault trench area, to verify compliance with the recommendations of this report.

4.3 Future Subsurface Investigation, Plan Reviews, & Construction Observation and Testing

This report has been prepared for the exclusive use of Shizao Zheng. This report presents a geological evaluation of faulting within the subject site. Throughout the design of the project, geological and geotechnical issues may become apparent and should be considered in the design, feasibility, and construction of the project. Future plan reviews are necessary to ensure that recommendations and conclusions from LGC's preliminary studies have been incorporated into the design. Modifications to the design may arise from our review, therefore our review should be performed as soon as practical. Such reviews should include, but are not limited to:

- Rough Grading Plans
- Foundation/Structural Plans
- Retaining Wall Plans
- Storm Drain/Sewer/Water Plans

Plans should be forwarded to the project geotechnical engineer and/or engineering geologist for review and comments, as deemed necessary.

The recommendations provided in this report are based on limited subsurface observations and geotechnical analysis, as well as review of previous pertinent reporting. The interpolated subsurface conditions should be checked in the field during construction by a representative of LGC.

Construction observation and testing should also be performed by the geotechnical consultant during future grading, excavations, backfill of utility trenches, preparation of pavement subgrade and placement of aggregate base, foundation or retaining wall construction or when an unusual soil condition is encountered at the site. Grading plans, foundation plans, and final project drawings should be reviewed by this office prior to construction.

5.0 LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report. The samples taken and submitted for laboratory testing, the observations made are believed representative of the entire project; however, soil and geologic conditions revealed by excavation may be different from our preliminary findings. If this occurs, the changed conditions must be evaluated by the project soils engineer and geologist and design(s) adjusted as required or alternate design(s) recommended.

This report is issued with the understanding that it is the responsibility of the owner, or of his/her representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and/or project engineer and incorporated into the plans, and the necessary steps are taken to see that the contractor and/or subcontractor properly implements the recommendations in the field. The contractor and/or subcontractor should notify the owner if they consider any of the recommendations presented herein to be unsafe.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can and do occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties.

In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control.

The opportunity to be of service is appreciated. Should you have any questions regarding the content of this report, or should you require additional information, please do not hesitate to contact this office at your earliest convenience.

APPENDIX A

REFERENCES

APPENDIX A

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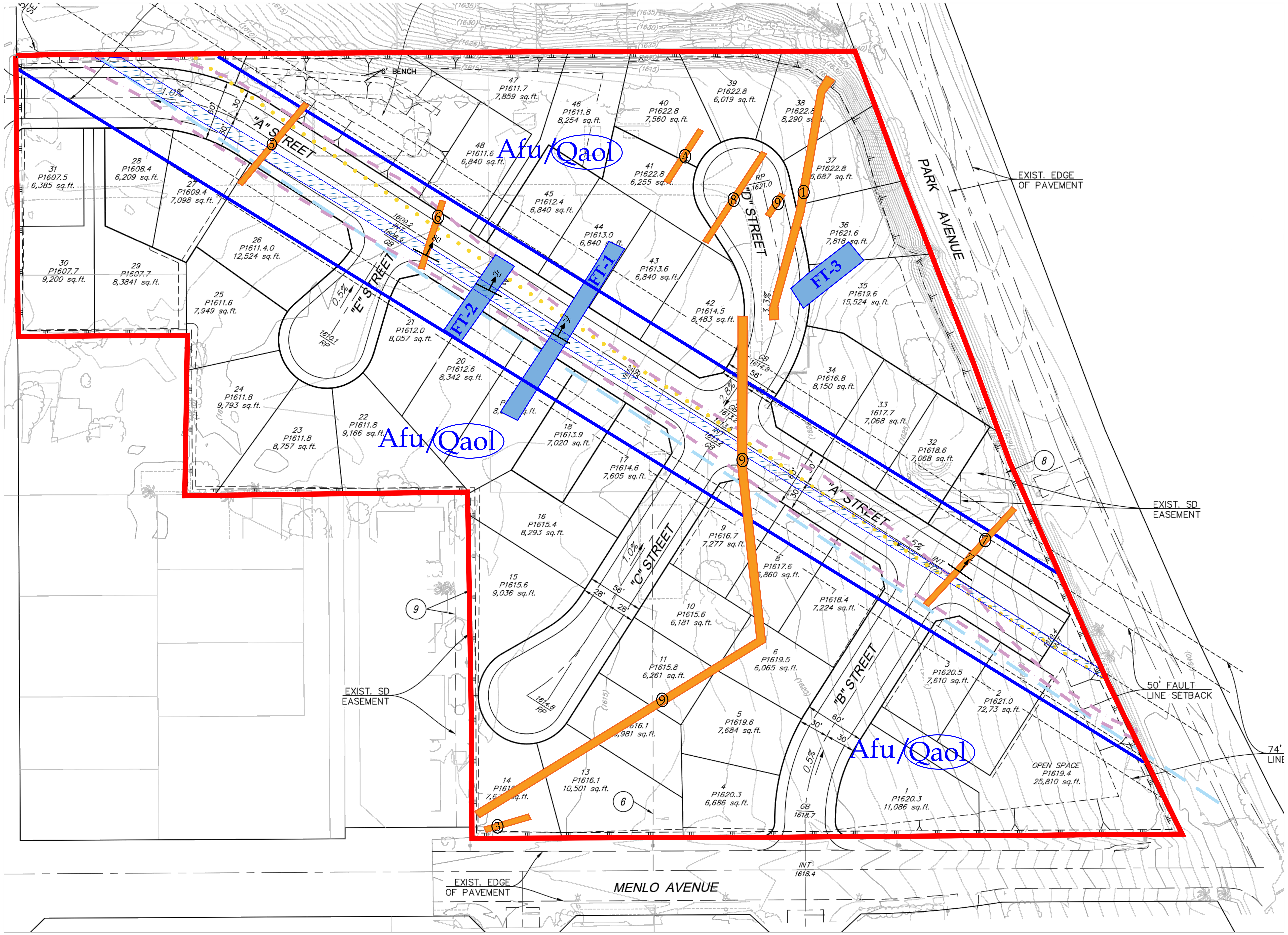
Aerial Photographs Reviewed

FLIGHT	FRAME(S)	FLIGHT DATE
C135-36	35-36	3/2/99
C117	187-188	10/15/97
CAP	92-93	10/4/95
C94	46-47	6/24/95
91130	20-23	8/21/91
86184	92-93	7/31/86
RIV-5	11-12	2/15/77
79274	124	12/14/79
IHH	228-229	5/9/67
12F	40-41	6/1/49

Photographs supplied by Continental Aerial Photo, Inc.



LEGEND
(Locations are Approximate)

Earth Units

Afu - Articial Fill, Undocumented

Qoal - Quaternary Older Alluvium
(Circled Where Buried)

Symbols

- Limits of this Report
- FT-3 -Fault Trench Location
- 9 -Fault Trench Location (Rasmussen, 1988)
- Limits of Structural Setback Zone Per This Report
- Fault Zone (Casa Loma Fault)
- Limits of Riverside County Faults
- -Concealed Fault (Dibble, 2003)
- -Aerial Photo-Lineament
- 80 -Fault Attitude

0 50' 100'

LOGICAL GEOTECHNICAL CONSULTANTS
GEOTECHNICAL • ENVIRONMENTAL • MATERIALS TESTING • SWPPP
27570 COMMERCE CENTER DR., #128, TEMECULA, CA 92590
PHONE: 951.297.2450 FAX: 951.719.2998
WWW.LGCGEOENV.COM

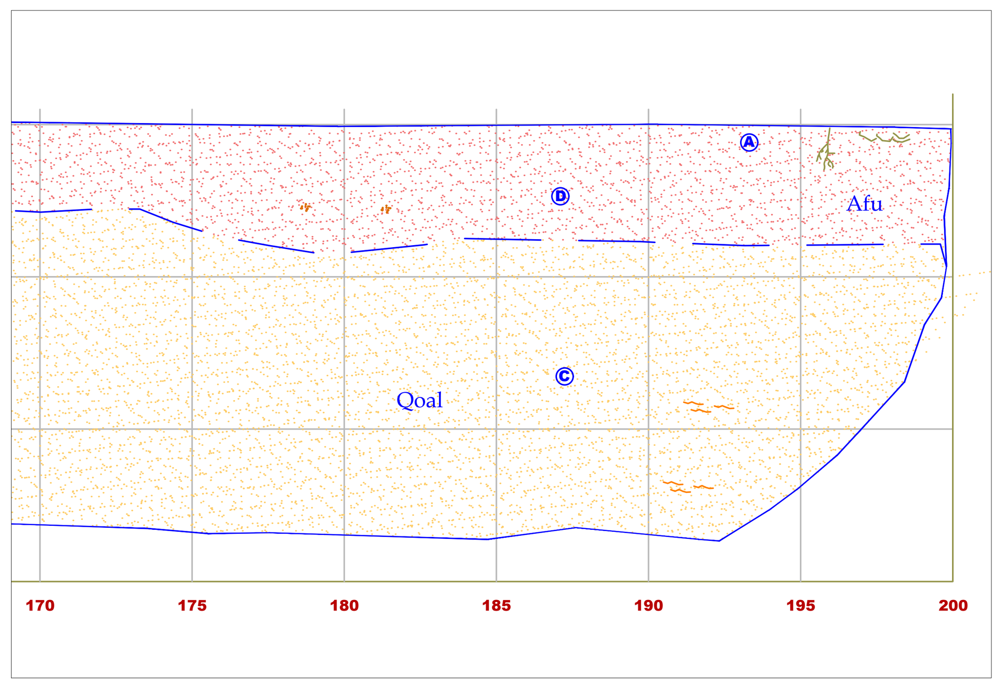
Robert L. Gregorek, II
Engineering Geologist

GEOLOGIC/FAULT LOCATION MAP
800 W. GIRARD ST.
CITY OF HEMET, RIVERSIDE COUNTY, CALIFORNIA

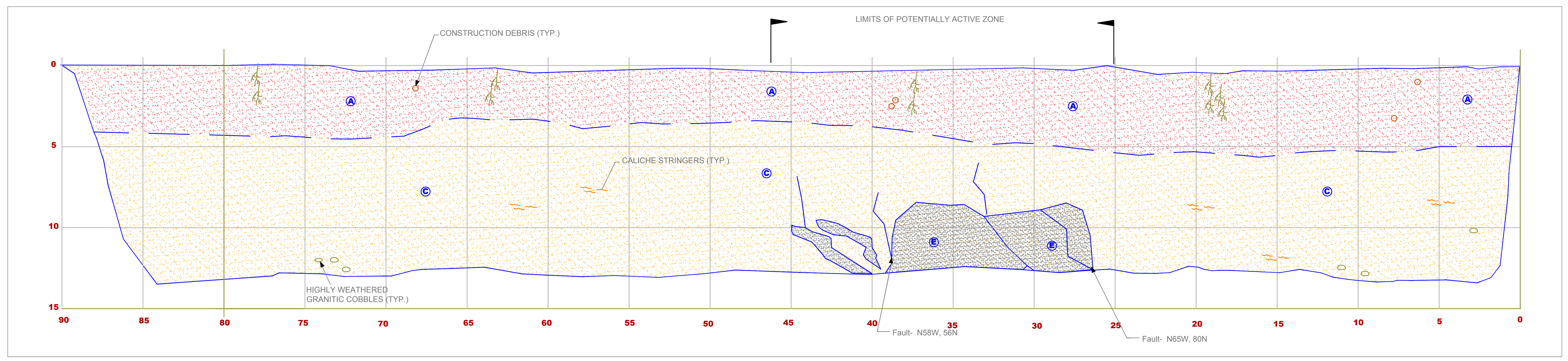
Name:	800 W. GIRARD ST.
Project No.	G18-1647-10
Client:	SHIZAO ZHENG
Scale:	1" = 50'
Date:	SEPTEMBER 2018
Reference:	SIKAND ENGINEERING, PRELIMINARY SITE PLAN, SHEET 1, SALE 1" = 60', NOT DATED
Plate No.	1 OF 2

FT-1, TREND: N33E, PART 1 OF 2

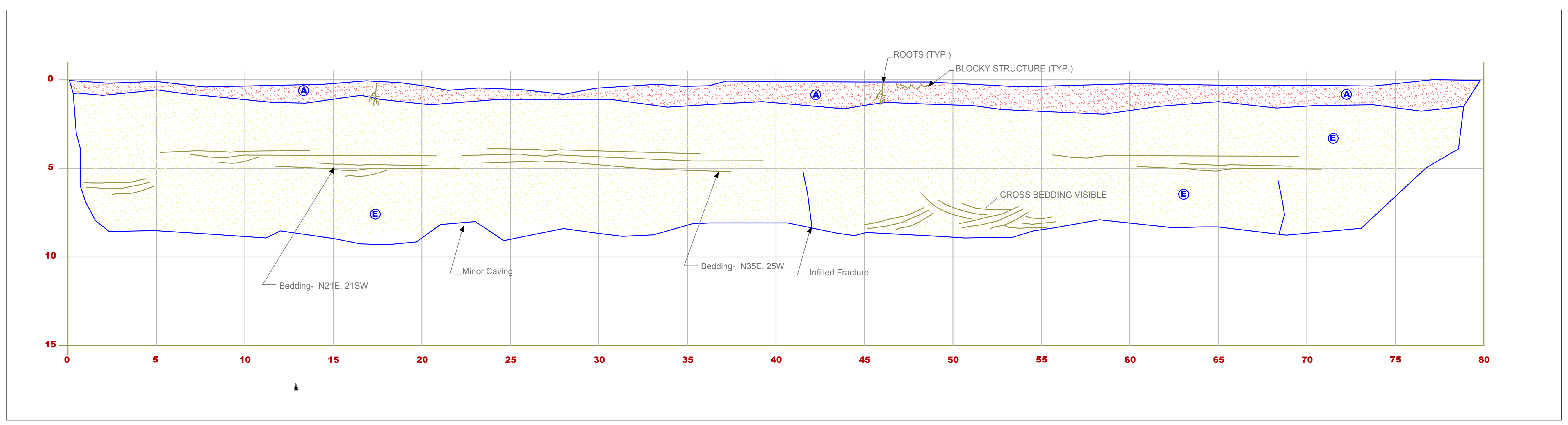
FT-1, TREND: N33E, PART 2 OF 2



FT-2, TREND: N35E, PART 1 OF 1



FT-3, TREND: N55E, PART 1 OF 1



ARTIFICIAL FILL, UNDOCUMENTED (Afu):

A - Silty SAND/Sandy SILT (SM/ML); pale brown, olive-brown/light brown, dry, loose to medium dense/soft to stiff, fine grained, blocky, roots and rootlets, some construction debris.

OLDER ALLUVIUM (Qoal):

B - Silty SAND (SM); dark brown to brown, dry, medium dense to dense, very fine to medium grained with occasional coarse grains, pores and pinhole pores, trace highly weathered fine gravel, krotovina

C- Silty SAND (SM); dark brown to brown, dry to damp, medium dense to dense, very fine to medium grained, pores and pinhole pores, some caliche nodules and stringers, trace highly weathered fine gravel

QUATERNARY BAUTISTA FORMATION (QTs):

E - SANDSTONE/SILTSTONE; offwhite to gray, dry to damp, moderately hard, fine to very coarse grained, some highly weathered granitic clasts, some fracturing, abundant caliche along fractures, minor bedding

LEGEND
(Locations are Approximate)

Earth Units

Afu - Artificial Fill, Undocumented
Qoal - Older Alluvium
Qts - Bautista Formation

Symbols

-Fault Splay or Fracture
-Geologic Contact
-Typical Blocky Structure
-Typical Gravels/caliche nodules
-Typical Caliche Stringers

0 5' 10'

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Phone: 951.297.2450Fax: 951.719.2998
www.lgcgeoenv.com

Robert L. Gregorek, II
Engineering Geologist

FAULT TRENCH LOG FT-1, FT-2 & FT-3

800 N. GIRARD ST.
CITY OF HEMET, RIVERSIDE COUNTY, CALIFORNIA

Name:	800 N. GIRARD ST.
Project No.	G18-1647-10
Client:	SHIZAO ZHENG
Scale:	1" = 5'
Date:	SEPTEMBER 2018
Reference:	
Plate No.	2 OF 2