CAMPBELL · GEO, INC.
ENGINEERING AND ENVIRONMENTAL GEOSCIENCE

EVALUATION OF FAULT LOCATION AND SURFACE RUPTURE HAZARD - UPDATE

5885 Carpinteria Avenue
Carpinteria, California

March 22, 2021

Prepared for:

Mila Co. II, LLC
c/o Plus Development
743 Seward Street, Suite 100
Los Angeles, CA 90038

Attention: Mr. Mick Unwin, Senior Director

Prepared by:

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ENGINEERING AND ENVIRONMENTAL GEOSCIENCE

March 22, 2021

Mila Co II, LLC
c/o Plus Development
743 Seward St, Suite 100,
Los Angeles, CA 90038

Attention: Mr. Mike Unwin, Senior Director

Subject: Update of Fault Location Report
5885 Carpinteria Avenue Property
(APN 01-170-13)
Carpinteria, California

Dear Mr. Unwin:

INTRODUCTION

This Fault Investigation Report update provides Campbell·Geo's geologic evaluation of the previously identified trace of the Carpinteria Fault at the above-referenced property in Carpinteria, California. Please see the project location on the attached Plate 1 – Regional Geologic Map. This report provides a description of field work, analyses and conclusions provided to the O. Rhyan Group in December 2018. It is our understanding that commercial or mixed use development concepts are under consideration. A 2018 site topographic map (Waters Cardenas Land Surveying) was provided to Campbell Geo to facilitate the field work. The fault features exposed, the excavated trench, and separate short trench described below were located by the surveyor and plotted as shown on Plate 2-Geologic Map, attached to this report. The fault traces mapped in 1982 by Hoover and Associates is shown approximately on the 1982 map appended to this 2018 report. No exact survey of the fault traces or of the setback zones recommended in 1982 was made at that time.

The purpose of the 2018 fault investigation was to re-expose the fault features, to coordinate the recordation of those features by the licensed land surveyor and to evaluate the age of the geologic units unaffected by the fault features to establish the risk of future ground surface rupture by fault movement.

GEOLOGY

Regional Setting

The Carpinteria Valley is located in the Transverse Range geomorphic province of California. The transverse ranges are characterized by generally east-west trending geologic structures, including the Santa Ynez Mountain range, the offshore Channel Islands, the nearby Red Mountain Fault, the Rincon Creek Fault, and the offshore Pitas Point/North Channel Slope Fault. The Carpinteria Fault and other nearby fault structures onsite appear to be related to the Red Mountain Fault, based on regional mapping by various geologists who have conducted offsite investigations.

The project area, generally referred to as part of the Carpinteria Bluffs, is an elevated, gently sloping marine terrace roughly 60 to 75 feet above sea level. The low cut slope north of the Union Pacific Railroad (UPRR) track is gentle to moderately steep. The coastal bluff south of the railroad tracks is steep to nearly vertical.

Site Geology: Lithology

The geologic formations encountered in boreholes or exposed on the site are, from oldest to youngest, the Monterey formation (Tm), the Santa Barbara formation (Qsb), the Marine Terrace (Qt), alluvium (Qa), and artificial fill (Qaf), as shown on illustrations prepared for this report: Plate 1 – Regional Geologic Map, Plate 2 - Geologic Map, Plates 3 and 4 – Exploratory Trench Logs, and Plate 5- Geologic Cross-Section.

Monterey Formation (Tm)

The Tertiary-age Monterey formation (Tm) is a thinly bedded fractured marine mudstone and siltstone that varies in color from light brown to white. The Monterey is considered to be Miocene-age. The Monterey is not exposed on the surface in the investigation area near the golf driving range but is exposed in the seacliff south of the UPRR tracks.

Santa Barbara Formation

The Santa Barbara formation is an early to mid-Pleistocene age marine sandstone. It typically exhibits colors of blue to gray (unweathered) and tan (weathered). It is weakly indurated and frequently laden with shells. Although this unit was not exposed in the 2018 trench effort, boring logs from the Hoover report (see Appendix A of this report) indicate the Santa Barbara formation (Qsb) was encountered at depth of approximately 30 feet on the north side of the property closest to Carpinteria Avenue.

Marine Terrace (Qt)

The bluffs are underlain by a surface deposit of the Pleistocene age marine terrace (Qt), which varies from a brown to reddish brown relatively soft, fine to coarse grain sand to a sandy/silty clay. Gravel and cobbles are found near the base of the marine terrace. The marine terrace in this general area is no older than the Pleistocene epoch, which dates from 11,000 to 1.6 million years before present (per CGS, 2007). Nearby marine terraces at Punta Gorda in Ventura County near La Conchita have been age-dated to be 45,000 years old (Wehmiller, *et al*., 1978). These terraces may be geomorphically related to the Carpinteria Bluff terraces; however, that is not confirmed. The Carpinteria Bluff terraces have been dated to be approximately 28,000 years old based on age dating conducted in various samples on adjacent properties east and west of the site (Fredrickson, 2016). This age is similar to the 36,000 year old age of the marine terrace sample collected onsite in 2018 (described below). Younger marine terraces (age-dated to 4,500 years old) in Ventura County are not considered to be geomorphically related to the Carpinteria Bluff terraces.

Alluvium (Qa)

Alluvium is typically characterized as unconsolidated flood plain deposits of silt, sand and gravel. The alluvium is a younger unit, typically less than 11,000 years old. A thin surface deposit overlying the marine terrace was interpreted to be alluvium.

Artificial Fill (Qaf)

Material in a grass-covered area at the golf driving range that has obviously been graded is considered to be artificial fill. That material was likely generated from grading of alluvium and terrace materials. Artificial fill was also found in varying thicknesses of 2 to 3 feet in the exploratory excavations in May 2018, as shown on the logs.

Site Geologic Structure

The Quaternary units are unconsolidated sedimentary materials that exhibit no bedding planes in outcrops at the project site or in the trenches.

In some areas, a layer of pebbles and cobbles is found at the bottom of the terrace deposit, interpreted to be a wave cut platform (Jackson, 1980). Hoover (1982) reports a maximum thickness of 30 feet for the marine terrace from deep borings at the 5885 Carpinteria Avenue site.

Onsite faults are evident in exploratory trenches where the contact between the marine terrace and Monterey units are vertically offset and where there are highly fractured/gouged zones in the Monterey.

PREVIOUS WORK

Regional Geologic Maps (Dibblee, 1987; Gurrola, 2006; Jennings and Bryant, 2010 and Minor, et al. 2009 and 2015) and additional maps (Jackson, 1980; and Lian, 1954) were reviewed during the course of this investigation. We also reviewed the 1982 Hoover and Associates geologic report for the subject "Bluffs Area I" site, the western portion of which is now known as the 5885 Carpinteria Avenue property. Separate Hoover and Associates reportsfor other properties located east of Bailard Avenue were also reviewed.

FAULT SURFACE RUPTURE HAZARD

A geologic fault is a fracture(s) in the crust of the earth along which rocks on one side have moved relative to rocks on the other side. In an earthquake, rupture surfaces typically follow pre-existing faults or fault zones and sometimes will be limited to deeply buried rocks. When a fault rupture extends to the surface of the earth, a potential hazard exists in which buildings located on or in close proximity to that rupture can be structurally compromised by differential earth movement to the extent that catastrophic damage or building collapse can occur. Seismic shaking is a separate hazard that is far more likely to affect a given site, since it can originate from the release of energy on the faults far removed from the site. Mitigation for seismic shaking is addressed by the structural design of buildings and their foundations.

Inactive geologic faults are those with no evidence of movement within the last 2.6 million years, prior to the start of the Pleistocene epoch. The State of California (Alquist-Priolo Earthquake Fault Zoning Act, 1972 and CGS Special Publication 42) defines Holocene-active faults as those where rupture within the last 11,700 years (the Holocene epoch) can be demonstrated. The 1972 A-P Act prohibits development over faults that are "sufficiently active" and are “well-defined,” *i.e*., that can be traced at or just below ground surface. The A-P Act states "unless proven otherwise, the area within 50 feet of an active fault is presumed to be underlain by active branches of the fault." The fault structures at the Carpinteria Bluffs are considered to be possibly related to the Red Mountain Fault, which is identified as active by the state (see below). The Carpinteria Fault is considered to be "late Quaternary" by the State of California (Jennings and Bryant, 2010). Late Quaternary means that the most recent fault movement might possibly have occurred in the last 11,700 years old, but that the fault has not been proven to be that young.

Where the shallow geologic units overlying a fault trace can be mapped and shown to be unaffected by fault movement, then age-dating of those un-faulted units can establish if the most recent fault activity is older than 11,700 years, known as “pre-Holocene.”

The nearest active fault mapped in accordance with the 1972 A-P Act is the Red Mountain Fault in the Pitas Point Quadrangle in Ventura County. The fault surface expression shown on the State of California Special Studies Zone Map (1991) is located roughly 5 miles east of the project site, but the map does not show the trace of the fault offshore where the fault trends to the west towards the Carpinteria area. The north branch of the Red Mountain Fault is shown to be approximately 2,500 feet south of the subject site on Jackson's 1980 regional geologic map.

Although the Red Mountain Fault is recognized as Holocene-active, it is a fault system typical of most significant faults that does not consist of one single line of rupture but instead is a complex web of fractures and zones, many of which are less active than the main trace of the fault and which have not moved in the last 11,700 years. Therefore, although a splay fault may branch from the Holocene-active Red Mountain Fault system, including possibly the Carpinteria Fault, that splay fault may not necessarily display Holocene activity (within the last 11,700 years) and therefore, it is possible that a ground surface rupture hazard does not exist on a splay fault branching from the Red Mountain Fault.

REVIEW OF GEOLOGIC REPORTS

Bluffs Area I

The geologic investigation of this site in 1982 by Hoover & Associates included the subject 5885 Carpinteria Avenue site on the western side of a much larger area that was referred to as Bluffs Area I. A soils engineering report prepared by Buena Engineers, Inc. was appended to the 1982 Hoover report for Bluffs I.

Hoover’s work included several thousand feet of seismic exploration lines, sixteen (16) borings and seventeen (17) trenches and test pits. Four east-to-west trending fault traces were found in exploratory trenches excavated on the east side of the Bluffs I study area. Those trenches were located east of Bailard Avenue. These faults were labeled the "Carpinteria Fault,” the “Railroad Fault”, the "Channel Fault" and the "Carpinteria Minor Fault". As shown on Hoover’s Plate 3 appended to this report, all of these structures trend west toward the subject parcel. However, the Carpinteria Minor, the Channel and the Railroad Faults were not found in trenches excavated slightly west of Bailard Avenue. On the 5885 Carpinteria Avenue property, the area extending north of the railroad tracks a distance of approximately 800 feet, was found to contain no apparent fault features by the seismic survey, trenches and borings, including the data projected from the east. The two fault features found at the 5885 Carpinteria Avenue site in Hoover's Trench 1 and Trench 15 were consistent with the dip and relative offset of what we have labelled "Fault 1" and "Fault 2" in the 2018 Trench CG-1 (described further below). Hoover described these features as the Carpinteria Fault. The angular unconformity between the Santa Barbara and Monterey formations further to the north was too deep to expose by trenching but was described by Hoover as a depositional contact rather than a fault structure.

However, an outcrop of Santa Barbara formation in contact with the Monterey formation exposed in the US 101 highway cut slope near Highway 150 is recognized as a fault contact rather than a depositional contact (Minor and Brandt, 2015). The fault exposed in the highway cut is parallel to but a short distance south of the Carpinteria Fault. Therefore, for the same Santa Barbara to Monterey formation contact found in the 1982 borings at 5885 Carpinteria Avenue, we have labelled that feature near the north side of the site as the inferred Carpinteria Fault. In our opinion, the two Fault 1 and Fault 2 features, showing only small vertical offsets, are not the main trace of the Carpinteria Fault.

Commonly, fault structures are not continuous across long horizontal distances, indicative of the branching and *en echelon* nature of the faults. That structural phenomenon is evident in reported fault traces located on other properties east of the Bluffs I area. Although many of the minor faults diminish or disappear in the westerly direction, the Carpinteria Fault is inferred to carry through to the area of the 5885 Carpinteria Avenue property.

Nearsite Investigations

We also reviewed the 1988 and 1989 studies conducted by Hoover and Associates at 6175, 6185 and 6267 Carpinteria Avenue, as well as the 1981 Bluffs Area III investigation, and a 1984 report by Woodward-Clyde Consultants. These sites are located between 1/2 mile and one mile east of the 5885 Carpinteria Avenue site. In addition, Campbell Geo performed a fault investigation at 6175 Carpinteria Avenue in 2020. The 2020 report and addendum for the development proposed at or near two fault traces concluded that there was no Holocene- age movement of those faults. That report and addendum were submitted to and approved by the City of Carpinteria.

SITE CONDITIONS

In March 2021, the site is occupied by the Tee Time golf driving range in the area extending south approximately 750 feet from Carpinteria Avenue. The southern part of the parcel is occupied by a farmed field and by an ornamental rock storage yard. The topography is flat to gently sloping with low to sparse vegetation. A trailer office is used by Tee Time, and various fences mark edges of the driving range. A 2018 survey map has been prepared by Waters Cardenas Land Surveying, Inc.

INVESTIGATION

Review of Aerial Photographs

We reviewed stereo pair aerial photographs from 1956 (Hurd Flight No. HA-AN, frames 6-22, 6-23, and 6-24) and from 1975 (Hurd Flight No. HB-XQ, frames 134, 135, and 136). Although the photographs show some general lineations roughly parallel to US Highway 101 at the site, there is no definitive fault trace visible. The south-side up fault offset is topographically expressed on the property east of the subject 5885 Carpinteria Avenue parcel.

Subsurface Exploration - 2018 Trenching

In May 2018, Campbell·Geo established locations and supervised the excavation of 450 lineal feet of trench on the west side of the parcel and a shorter exploratory test pit near the southern edge of the golf driving range. The locations of the two exploratory excavations are shown on Plate 2 – Geologic Map. Trench logs are presented on Plates 3 and 4. The

trenches were excavated as deep as 19 feet. The materials encountered were consistent with the Pleistocene-age terrace deposits and older Monterey formation described above. The trench locations and some exposed utilities were surveyed by Waters Cardenas, Inc. and plotted in the locations shown on Plate 2. After logging was complete, the trench was backfilled, but the material was loosely compacted, and was not engineered for support of overlying structures.

Each of the geologic units described above were exposed in the 450 foot long trench, except the Santa Barbara formation at the reported depth of 30 feet. Two relatively minor faults (Fault 1 and Fault 2) were evident, as shown on Plates 2 and 3, where the Miocene age Monterey formation was juxtaposed against Pleistocene Marine Terrace deposits. The Monterey was offset at both faults, where the south side blocks of each fault were vertically lifted by 1 to 3 feet relative to the north side of the fault. The Marine Terrace was mapped in great detail as seven (7) different subunits, distinguishable by texture, color, grain size and other lithologic characteristics. As shown on the trench log (Plate 3), only the lower or oldest portions of the Marine Terrace were offset by the two faults exposed in the trench.

The marine terrace exposed as deep as 12 feet over the inferred main Carpinteria Fault, closer to Carpinteria Avenue, was laterally continuous and did not exhibit any fault related offsets in the trench.

Age Dating of the Marine Terrace

In order to verify the age of the marine terrace overlying and unaffected by fault movement, and thereby establish the approximate number of years before present that the most recent fault rupture has occurred, an undisturbed geologic sample was collected for analysis by the Optically Stimulated Luminescence (OSL) method. Due to the absence of carbon in the trench materials, the radiocarbon dating method was not used for this site investigation. The sample was collected by hand augering into marine terrace deposits at a depth of approximately 6 feet below existing grade, where the material has been undisturbed and unexposed to sunlight since the time it was deposited many tens of thousands of years ago. A steel sleeve was driven into the terrace material to collect the undisturbed sample. The sleeve was recovered and, by carefully extracting the sample into a sealed light proof bag, the light sensitive physical properties were preserved. The photo protected sample and a bulk sample were submitted to Dr. Lewis Owen, director of the geochronology laboratory, at the University of Cincinnati Department of Geology. A bulk sample was also submitted and usedto measure moisture content and the local dose rate.

The age dating method known as Optically Stimulated Luminescence (OSL) is based on the measurement of the accumulated charge, or luminescence, within quartz and feldspar minerals contained within buried geologic units. The charge accumulates at a known rate due to the decay of trace amounts of radioisotopes within the mineral structure that, upon burial, are no longer exposed to sunlight. By recovering a buried sample and carefully preparing the sample to minimize or eliminate exposure to sunlight, the sample can then be processed in a laboratory to release the accumulated charge and measure the emission of photons (stimulated luminescence). The laboratory can then determine the number of years since the soil was deposited since the buildup of the charge (or luminescence) within the mineral occurs at a known constant rate.

The laboratory report (Appendix C) contains a greater level of detail and background information. The laboratory report indicates an approximate depositional age of 36,600 years (plus or minus 2,500 years) for the sample of the un-faulted strata in the Marine Terrace in the 2018 Campbell·Geo Trench CG-1. That age indicates that the most recent fault movement occurred tens of thousands of years prior the beginning of the current Holocene geologic epoch that began 11,700 years ago. The lab confirmed the sample was pre-Holocene age (written communications with Dr. Owen, December 19, 2018).

California Geologic Survey Guidelines (2018)

The California Geologic Survey (CGS) publishes guidelines for geologic hazard evaluations. The CGS document “Earthquake Fault Zones, Special Publications 42” was revised in 2018 and is to be used as “a guide for government agencies, property owner/developers, and geoscience practitioners for assessing fault rupture hazards in California.”

In this document, the CGS provides definitions of 3 fault classifications based on the age of the most recent fault movement. They are:

- Holocene-active Faults, defines as those that have moved within the past 11,700 years

- Pre-Holocene Faults, defined as not having moved in the past 11,700 years

- Age-undetermined Faults, defined as faults where the age of fault movement has not been determined due to the absence of deposits suitable for age-dating that have not been offset by fault movement, or other data constraints

The CGS guideline confirms that to mitigate the hazard from fault rupture at the ground surface, development of structures for human occupancy shall be setback from a Holocene-active fault, per the State of California Alquist-Priolo Act. Conversely, faults that are confirmed by detailed site specific studies to be Pre-Holocene do not constrain development. The ability to develop at or over Pre-Holocene faults at other project sites in Southern California has been confirmed by lead agencies such as the City of Los Angeles based on our communications with the California Geologic Survey (Brian Olson, CEG). Local lead agencies (such as the City of Carpinteria) are responsible for determining whether a project lies within an earthquake fault zone, typically with input from CGS, from licensed geologists on the lead agency staff, or from licensed geologists contracted by the lead agency.

CONCLUSIONS AND RECOMMENDATIONS

General

Based on the results of our fault rupture hazard evaluation, site development is considered feasible from a geologic standpoint. The conclusions and recommendations presented in this report should be reviewed along with the development plans as they become available.

Fault Rupture

No faults exhibiting recent (Holocene) rupture have been identified to trend through referenced parcel, based on the extensive exploratory trenching conducted in 1982 and in

2018.

The 5885 Carpinteria Avenue property has been previously identified to contain the east to west trending Carpinteria Fault based on seismic surveys, borings and exploratory trenching conducted by Hoover in 1982. The fault is likely to be less than 2.6 million years old, but age-dating of sediments indicates the fault has not ruptured within the last 11,700 years.

Construction of buildings for human habitation over the fault(s) found to be older than 11,700 years will still likely be subject to City of Carpinteria policies/approval after what we anticipate would be a technical peer review of an environmental planning document (EIR or related).

Other geologic hazards (tsunamis, landslides, high groundwater) were found not to be present or insignificant in the 1982 Hoover report for the Bluffs Area I site. Hoover did identify the potential for liquefaction in shallow soils, recommended additional investigation but also considered the hazard, if present, to be mitigatable.

Seismic shaking should be evaluated in accordance with the current building code procedures (California Building Code, 2019). Geotechnical conditions to establish foundation design criteria and grading plan design should be evaluated by a licensed geotechnical engineer. Prior to site development, during construction, the trenches should be restaked by the surveyor and then recompacted under the supervision of a licensed geotechnical engineer to support structures or hardscapes.

Please contact us if you have any questions or if we can be of further assistance.

Sincerely,
Campbell-Geo, Inc.

Steven H. Campbell
Professional Geologist
State of California, #5576
Certified Engineering Geologist
State of California, #1729
Certified Hydrogeologist
State of California, #82

SHC
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Attachments: Plates (5)
Appendices

REFERENCES CITED

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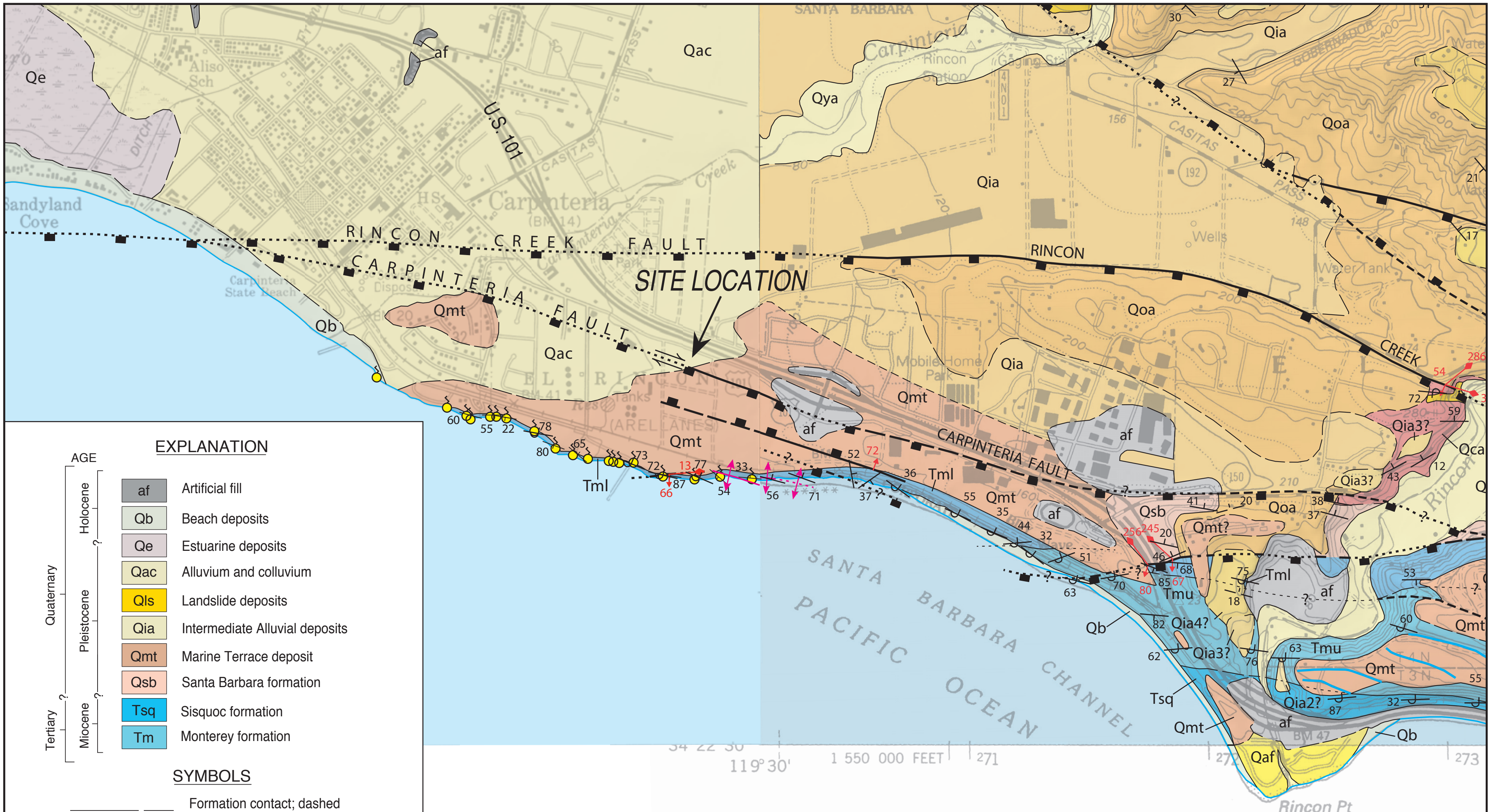
By DAS Date 12-18-18



EXPLANATION

AGE

Age			
Quaternary	Holocene	af	Artificial fill
		Qb	Beach deposits
		Qe	Estuarine deposits
	Pleistocene	Qac	Alluvium and colluvium
		Qls	Landslide deposits
		Qia	Intermediate Alluvial deposits
		Qmt	Marine Terrace deposit
		Qsb	Santa Barbara formation
Tertiary	Miocene	Tsq	Sisquoc formation
		Tm	Monterey formation

SYMBOLS

Formation contact; dashed where inferred

Fault; red arrow shows direction and angle of dip; dashed where approximate; dotted where concealed

Reverse fault with rectangles on upthrown side; short-dashed where inferred; dotted where concealed

20 Strike and Dip

Horizontal Bedding

Tar Seep

Geology reproduced from "Geologic Map of the Santa Barbara Coastal Plain Area, Santa Barbara County, California", by Minor, S., et.al, 2009 and "Geologic Map of the Southern White Ledge Peak and Matilija Quadrangles", by Minor, S., and Brandt, T., 2015.

SITE LOCATION AND REGIONAL GEOLOGIC MAP

5885 Carpinteria Avenue
Carpinteria, California

SCALE IN FEET

0 2,000 4,000

N

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Plate 1

LEGEND
SYMBOLS
Formation Contact; dashed where approximate; queried where unconfirmed
Fault Location; dashed where approximate; queried where unconfirmed
0 100
Seismic Survey Line (1982)
B-2
Approximate Boring Location (Hoover, 1982)
A A'
Line of Geologic Cross-Section
T-9
Approximate Trench Location (Hoover, 1982)
Trench Location (Campbell•Geo, 2018); surveyed by Waters Cardenas
AGE
EXPLANATION
Quaternary
Pleistocene Holocene
Qaf
Artificial Fill
Qt
Marine Terrace deposits
CARPINTERIA AVENUE
CARPINTERIA FAULT
(approximate, inferred)
EXPLORATORY TRENCH CG-1
(May, 2018; located as shown by Waters Cardenas Land Surveying)
67.53'
MAG AB A 1
MAGNETIC ANOMALY A-1
(Spectrum Geophysics, April, 2018; evaluated by test excavation November, 2018)
68.06'
PIPE
TP-1
B-1
B-15
B-14
B-13
B-12
B-2
B-16
T-9
T-15
T-1
T-2
59.25'
SD LINE
(stormdrain)
59.23'
SD LINE
57.01'
CG-01-OSL-1 (Location of age-dated Marine Terrace sample)
60.23'
57.06'
TRENCH 1
61.24'
FAULT 2 6 OS
62.46'
FAULT 1 6 OS CGI
62.53'
64.08'
TRENCH 1 3 OS CGI
63.93'
TRENCH 1
57.99'
TRENCH 1
58.12'
TRENCH 1
ZONE OF "FAULT 2" – EXPOSED IN TRENCH; LOCATED BY SURVEY (2018)
ZONE OF "FAULT 1" – EXPOSED IN TRENCH; LOCATED BY SURVEY (2018)
APPROXIMATE LOCATION OF OIL PIPELINE PER PROVIDED REPORT PREPARED BY DUDEK. NO INDICATIONS OF PIPELINE REPORTED BY GPR, INC. (2015) OR BY SPECTRUM GEOPHYSICS (APRIL, 2018)
CG TP+1
(2018)
NO PIPE FOUND IN 7 FOOT DEEP TRENCH AT THIS LOCATION (CAMPBELL-GEO,INC., 05/09/2018)
69.26'
CG TP 1
70.29'
CG TP 1
Qaf
Qt
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
PARCEL TWO
PORTION OF TRACT "H"
APN 001-170-13
5885 CARPENTERIA AVENUE
GEOLOGIC MAP
5885 Carpinteria Avenue
Carpinteria, California
December 2018
Basemap – Waters Cardenas Land Surveying, May 7, 2018
SCALE IN FEET
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SYMBOLS

C-1 ⊕ Location of Sample Possibly Containing Carbon (not analyzed)

CG-1-OSC-1 ⊕ Sample Location Age-Dated by OSL Method

Shoring

0 5 10 horizontal

0 5 10 vertical

SCALE IN FEET

VERTICAL = HORIZONTAL

EXPLANATION

Qaf/Top Soil – Artificial Fill or graded material; clayey sand and gravelly, sandy silt; some cobbles

Qal – Alluvium
1 Silty sand with some clay; dark brown; erosional basal contact; extensive root casts

Qt – Marine Terrace
2 Aeolian (beach) deposit; very fine sandy silt and silt; pale brown; soft
3 Sandy, clayey silt; pale orangish brown
4 Silty clay; reddish brown; grades aterally to north into a hard silty, clayey sand
5 Silty clay to locally sandy/ silty clay and fat clay; dark brown; stiff; unit has been dated at 36,000 years old by OSL method
5a 5c Brown sand, silt, clay, gravel, and small cobbles; differentiated by varying color and grain size percentages
5b Sandy, silty gravel, pale olive white; moderately indurated
6 Silty, sandy clay; some clayey silt and some fine gravel; brown and orange/brown
7 Silty clay and clay; brown; very stiff; occasional gravel and sand lenses
8 Sand and gravel; orange brown to pale olive; occasional shells and cobbles

Tm – Monterey Formation
9 Tm1 - Shale; pale olive, orange brown, and white; diatomaceous in places; highly to moderately weathered; occasional cherty or siliceous shale
10 Tm2 - Shale; very pale red; moderately to highly weathered

By DAS Date 12-19-18

EXPLORATORY TRENCH LOG
TRENCH CG-1
5885 Carpinteria Avenue
Carpinteria, California
December 2018

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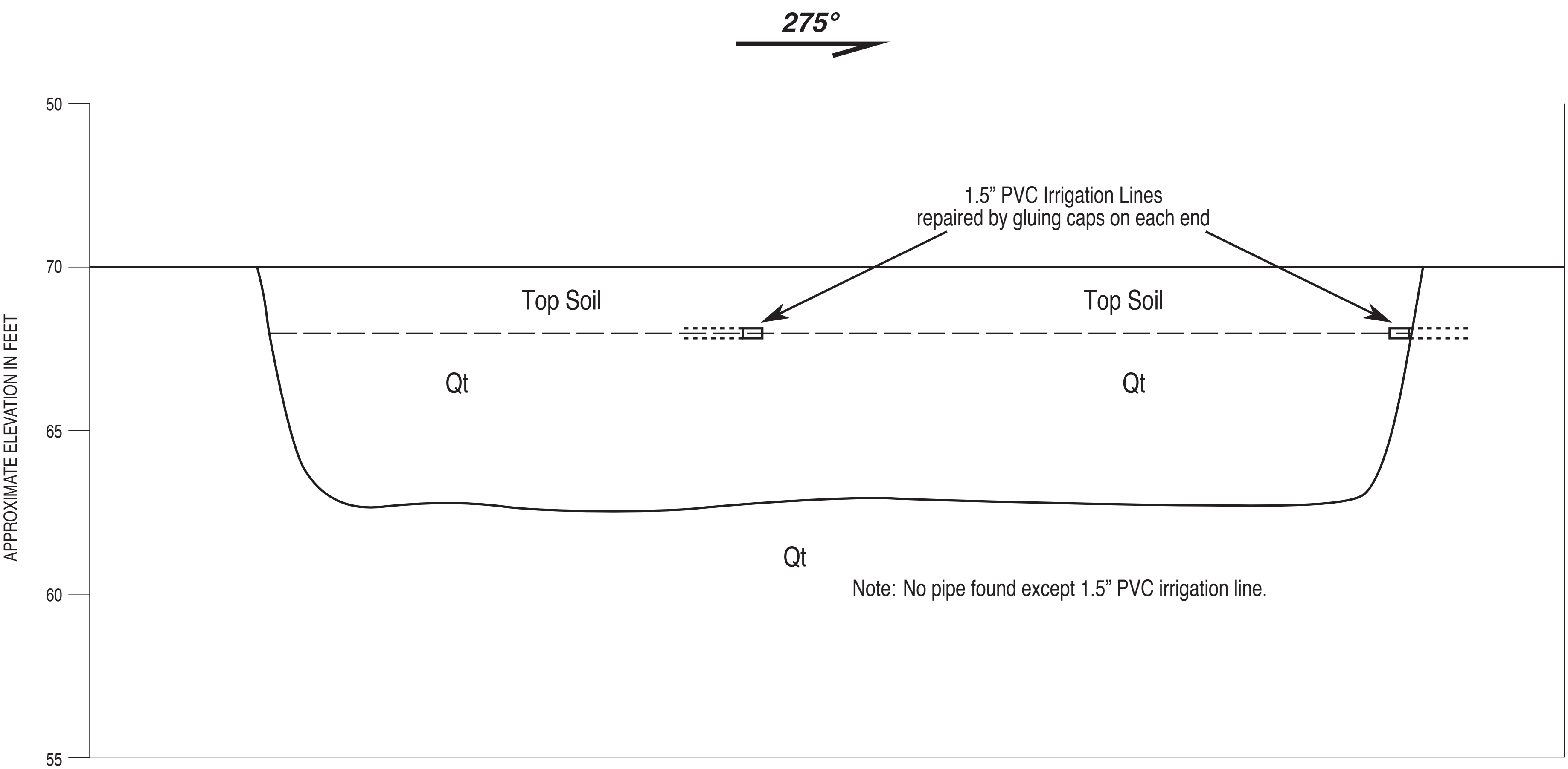
Engineering and Environmental Geoscience

Plate 3

By DAS Date 12-18-18



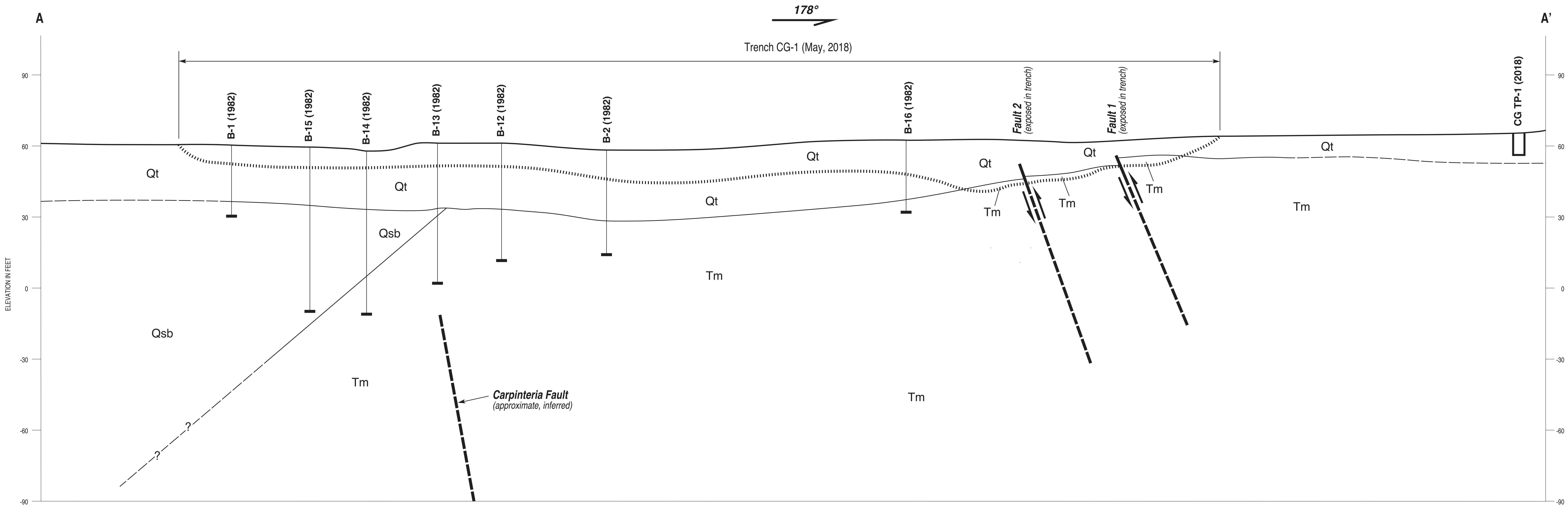
Qt – Clayey silt with sand (CL/SC); brown to red brown; dry to moist; stiff; moderately dense to dense

SCALE IN FEET

VERTICAL = HORIZONTAL

TEST PIT LOG
CG TP-1
5885 Carpinteria Avenue
Carpinteria, California
December 2018

CAMPBELL•GEO, INC.
ENGINEERING AND ENVIRONMENTAL GEOSCIENCE



SYMBOLS

B-1 Boring Location (Hoover, 1982)

Formation Contact; dashed where approximate, queried where unconfirmed

Fault Location showing relative offset

Trace of Bottom of Trench CG-1 (2018)

AGE EXPLANATION

Quaternary

Qt Marine Terrace

Qsb Santa Barbara Formation

Tertiary

Tm Monterey Formation

GEOLOGIC CROSS-SECTION A – A'

5885 Carpinteria Avenue
Carpinteria, California
December 2018

0 30 60 horizontal

0 30 60 vertical

SCALE IN FEET

VERTICAL = HORIZONTAL

CAMPBELL•GEO, INC.
ENGINEERING AND ENVIRONMENTAL GEOSCIENCE

By DAS Date 12-18-18

APPENDICES

APPENDIX A

Boring Logs and Geologic Map from Hoover, 1982

GEOLOGIC MAP

CARPINTERIA BLUFFS AREA I

HOOVER & ASSOCIATES, INC.
Geologists – Hydrologist

Plate 3

BORING LOG

BORING NO. B-1

LOCATION:

SPT Blows/ft.	Geol. Desig.	DEPTH IN FEET	DESCRIPTION
15/ft @ 1 ft	Qt	0 - 1	Dark brown silty sand
17/ft @ 3 ft	Qt	1 - 4	Light brown silty sand
33/ft @ 5 ft 45/ft @ 10 ft 32/ft @ 15 ft	Qt	4 - 16	Reddish-brown clayey silt with shale chips
	Qt	16 - 19	$CaCo_3$-rich, recemented silty clay
67/ft @ 21 ft	Qt	19 - 23	Light brown fine to medium grained sand Cobbles @ 20'
60/ft @ 30 ft	Qsb	23 - 30	Blue-gray sand with silt lenses

TD-30'

By ______ Date ______ File ______

BORING LOG

BORING NO. B-2

LOCATION:

Blows/ft.	Geol. Desig.	DEPTH IN FEET	DESCRIPTION
	Qt	0 - 3	Brown top soil
	Qt	3 - 14	Brown silty clay
	Qt	14 - 19	Light brown carbonate-rich silty clay with shale chips
	Qt	19 - 21	Brown cemented sand with cobbles
	Qt	21 - 23	Soft brown sand
	Qt	23 - 30	Gray clay and brown silty clay with pebbles
	Tm	30 - 42	Dense dark brown clay, highly fractured with secondary mineralization 30-35'
	Tm	42 - 45	Black shale

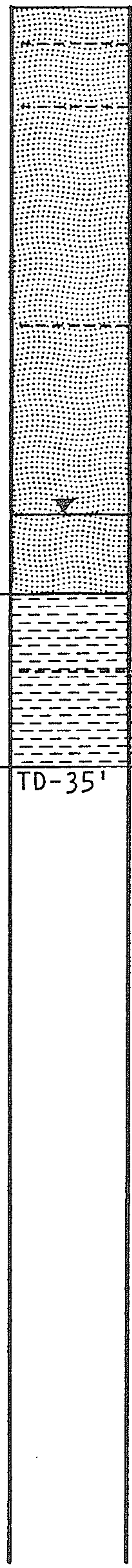
TD-45'

By ______ Date ______ File ______

BORING LOG

BORING NO. B-3

LOCATION:



SPT Blows/ft.	Geol. Desig.	DEPTH IN FEET	DESCRIPTION
10/ft @ 1 ft	Qt	0 - 1	Loose brown silty sand
33/ft @ 3 ft	Qt	1 - 3	Loose brown sand
40/ft @ 5 ft 52/ft @ 10 ft	Qt	3 - 15	Loose brown sand with clay lenses
40/ft @ 15 ft 300/ft @ 20 ft	Qt	15 - 27	Brown sand with pebbles and cobbles
	Tm	27 - 32	Brown and green clay
	Tm	32 - 35	Black weathered shale

By ____ Date ____ File ____

BORING LOG

BORING NO. B-4

LOCATION:

SPT Blows/ft.	Geol. Desig.	DEPTH IN FEET	DESCRIPTION
5/ft @ 1 ft; 8/ft @ 3 ft; 17/ft @ 5 ft	Qt	0 - 10	Loose light brown silty sand
60/ft @ 11 ft		10 - 13	Brown sand
		13 - 14	Cobbles and sand
	Tm	14 - 15	Weathered shale
36/ft @ 15 ft		15 - 16	Beige silty shale

By ______ Date ______ File ______

BORING LOG

BORING NO. B-5

LOCATION:

SPT Blows/ft.	Geol. Desig.	DEPTH IN FEET	DESCRIPTION
13/ft @ 2 ft	Qt	0 - 5	Brown silty sand with lenses of clay
26/ft @ 5 ft	Qt	5 - 8	Brown sand
72 /ft @ 10 ft	Qt	8 - 12	Sand and cobbles
24/ft @ 15 ft	Tm	12 - 15	Beige to gray clay

By ______ Date ______ File ______

BORING LOG

BORING NO. B-6

LOCATION:

SPT Blows/ft.	Geol. Desig.	DEPTH IN FEET	DESCRIPTION
90/ft @ 1 ft	Qt	0 - 1	Brown silty sand
23/ft @ 3 ft 28/ft @ 4 ft	Qt	1 - 7	Brown clayey sand
	Qt	7 - 8	Cobbles
36/ft @ 9 ft	Tm	8 - 9	Bentonitic weathered shale
	Tm	9 - 14	Weathered shale
30/ft @ 15 ft	Tm	14 - 15	Fractured shale

TD-15'

By ______ Date ______ File ______

BORING LOG

BORING NO. 7

LOCATION:

SPT Blows/ft.	Geol. Desig.	DEPTH IN FEET	DESCRIPTION
23/ft @ 1 ft	Qt	0 - 2	Dark brown silty sand
40/ft @ 5 ft	Qt	2 - 10	Red-brown silty sand
90/ft @ 10 ft	Qt	10 - 12	Dark brown clayey sand
52/ft @ 15 ft	Tm	12 - 16	Gray-brown silty clay

TD-16'

By ______ Date ______ File ______

BORING LOG

BORING NO. 8

LOCATION:

SPT Blows/ft.	Geol. Desig.	DEPTH IN FEET	DESCRIPTION
12/ft @ 1 ft	Qt	0 - 3	Dark brown silty sand
30/ft @ 3 ft		3 - 4	Dark brown silty sand with gravel
40/ft @ 5 ft		4 - 7	Beige recemented sand
60/ft @ 10 ft		7 - 12	Dark brown silty sand with gravel
60/ft @ 15 ft	Tm	12 - 16	Gray-brown silty clay

TD-16'

By ______ Date ______ File ______

BORING LOG

BORING NO. B-9

LOCATION:

SPT Blows/ft.	Geol. Desig.	DEPTH IN FEET	DESCRIPTION
17/ft @ 2 ft 23/ft @ 5 ft	Qt	0 - 6	Brown to reddish-brown sandy clay
52/ft @ 10 ft	Qt	6 - 12	Interbedded brown sand and clay
	Qt	12 - 14	Gray clayey sand
	Qt	14 - 17	Brown sand with pebbles
	Qt	17 - 20	Gray sand
	Qt	20 - 22	Brown sand with small cobbles
	Qt	22 - 28	Gray sand with pebbles
	Qsb	28 - 35	Black sulfurous clay and sand
	Qsb	35 - 40	Black sand

By ______ Date ______ File ______

BORING LOG

BORING NO. 10

LOCATION:

SPT Blows/ft.	Geol. Desig.	DEPTH IN FEET	DESCRIPTION
45/ft @ 2 ft	Qt	0 - 5	Red-brown sandy clay
22/ft @ 5 ft		5 - 8	Beige recemented sand
		8 - 15	Red-brown silty sand with gravel

TD-15'

By ______ Date ______ File ______

BORING LOG

BORING NO. 11

LOCATION:

SPT Blows/ft.	Geol. Desig.	DEPTH IN FEET	DESCRIPTION
14/ft @ 2 ft	Qt	0 - 4	Dark brown silty sand
36/ft @ 5 ft		4 - 8	Red-brown sandy clay
24/ft @ 10 ft		8 - 13	Beige silty sand
120/ft @ 15 ft		13 - 16	Red-brown silty sand

TD-16'

By ____ Date ____ File ____

BORING LOG

BORING NO. B-12

LOCATION:

SPT Blows/ft.	Geol. Desig.	DEPTH IN FEET	DESCRIPTION
		0 - 2	Dark brown to black sandy silt (Q)
		2 - 4	Light brown sandy silt
		4 - 8	Brown sandy clayey silt
		8 - 16	Dark reddish-brown silty clay
		16 - 18	Light-brown silty clay w/$CaCo_3$ mineralizatio
		18 - 19	Coarse gravel
		19 - 20	Brown sandy clay
		20 - 21	Cobbles H_2O @ 20'
		21 - 22	Coarse brown sand
	Qt	22 - 24	Cobbles
		24 - 26	Coarse brown sand
		26 - 27	Yellow-brown silty clay
		27 - 30	Mottled gray and brown silty clay (weathered Tm)
	Tm	30 - 42	Dark gray-green silty clay w/shale chips (weathered Tm) Firm below 35'
		42 - 50	Dark gray/brown shale (Tm)

TD - 50'

By ____ Date ____ File ____

BORING LOG

BORING NO. B-13

LOCATION:

SPT Blows/ft.	Geol. Desig.	DEPTH IN FEET	DESCRIPTION
		0 - 2	Dark brown sandy silt
		2 - 6	Light brown sandy silt
		6 - 12	Dark reddish-brown silty clay
		12 - 14	Brown silty clay
		14 - 16	Reddish-brown silty clay
		16 - 18	Light reddish-brown silty clay w/$CaCo_3$ mineralization
		18 - 20	Cobbles and pebbles
		20 - 21	Brown sand
	Qt	21 - 23	Cobbles
	Qsb	23 - 25	Blue sand
	Tm	25 - 35	Dark brown-green silty clay w/shale chips (wxed Tm)
		35 - 60	Dark brown shale (Tm)

TD - 60'

By ______ Date ______ File ______

BORING LOG

BORING NO. B-14

LOCATION:

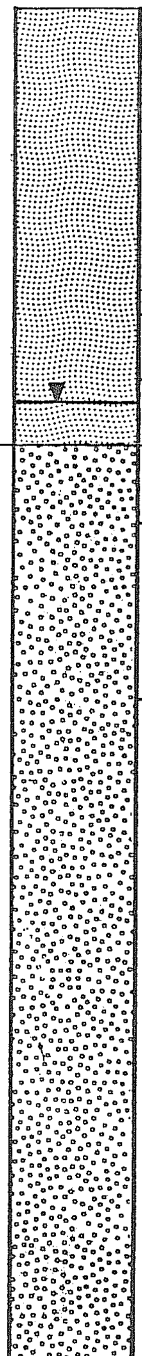
SPT Blows/ft.	Geol. Desig.	DEPTH IN FEET	DESCRIPTION
	Qt	0 - 2	Dark brown sandy silt
	Qt	2 - 4	Light brown sandy silt
	Qt	4 - 7	Orange-brown silty clay
	Qt	7 - 10	Red-brown clayey sand
	Qt	10 - 16	Red-brown silty clay
	Qt	16 - 19	Light red-brown silty clay w/CO_3 mineralization
	Qt	19 - 20	Gravels
	Qt	20 - 21	Blue sand
	Qt	21 - 25	Cobbles in blue sand
	Qsb	25 - 33	Blue sand & sandstone
	Qsb	33 - 45 (?)	Dark brown petroliferous sand, semi-consolidated
	Qsb	45 (?) - 53 (?)	Dark brown sand, very firm
	Tm	53 - 70	Dark brown shale (Tm)
			TD - 70'

By ______ Date ______ File ______

BORING LOG

BORING NO. B-15

LOCATION:



Blows/ft.	Geol. Desig.	DEPTH IN FEET	DESCRIPTION
	Qt	0 - 2	Dark brown silty sand
		2 - 6	Light brown silty sand
		6 - 16	Red-brown silty clay
		16 - 19	Light reddish-brown silty clay w/Co_3 mineralization
		19 - 22	Cobbles in coarse brown sand
	Qsb	22 - 27	Blue sand w/pebbles
		27 - 35	Brown petroliferous sand w/pebbles
		35 - 70	Brown petroliferous sand w/locally abundant seashells

TD - 70'

By ______ Date ______ File ______

BORING LOG

BORING NO. B-16

LOCATION:

Blows/ft.	Geol. Desig.	DEPTH IN FEET	DESCRIPTION
		0 - 3	Brown silty sand
		3 - 18	Reddish-brown silty clay
		18 - 21	Light reddish-brown silty clay
	Qt	21 - 26	Light brown fine sand w/occasional pebbles
	Tm	26 - 30	Brown shale
			TD - 30'

By ______ Date ______ File ______

APPENDIX B

City of Carpinteria Trenching Permit

Site Photographs

PERMIT NO. 6254

City of Carpinteria, California

DEPARTMENT OF PUBLIC WORKS

Engineering Permit Application

Select all boxes that apply to your project

☐ GRADING
Type ____________

☒ EXCAVATION
Type geologic trenching

☐ CONSTRUCTION
Type ____________

☐ ENCROACHMENT
Type ____________

☐ OTHER
Type ____________

City Staff

Date of Permit Application 3/20/18

Date of Permit Issuance 4/6/18 Date of Permit Expiration 6/6/18

List of Attachments Standard Indemnification and Insurance Agreement, Site plan, Receipt

Required Bond Amount N/A City Account Number N/A

Engineering ☒ Deposit ☐ Fee 1,300 City Account Number 6254

Applicant Information

Full Name Campbell Geo, Inc.

Mailing Address 327-A East Haley Street, Santa Barbara CA 93013

Phone 805-965-5003 Alt. Phone 805-689-4123

Contact Person Steve Campbell Email steve@campbellgeo.com

Applying on behalf of 5876 Farm Road LLC

Location of Work 5885 Carpinteria Avenue (Next to Tee Time driving range)

Project Duration 10 to 14 days

Approximate Value of Work Items Listed $ 18,000

Description of Work geologic exploration trench, approximately 450 feet long, (cont')

10 to 15 feet deep; trench sides will be stepped and shored; locked temporary chain link fencing will enclose the work area;

after logging the trench features, the trench will be backfilled and mounded then surveyed for location; no engineered compaction planned

Property Owner Information

Full Name O.Rhyan Capital Management, LLC

Mailing Address 823 N Harbor Blvd Fullerton, CA 92832

Phone 714.784.4770 x 210 Alt. Phone

Contact Person Mr. Craig Potter Email cpotter@orhyan.com

Property Address 5885 Carpinteria Avenue

Assessor's Parcel No. (APN) 01-170-13

Contractor Information

▣ Same as Applicant

Company Name

Mailing Address

Phone Alt. Phone

Contact Person Email

License Type Gen Eng A License No. 790426

Bonding Company Bond Amount

Workers Compensation Policy No. 4-30856136 Carrier Valley Forge Ins Co Exempt ☐

Insurance Type Carrier Policy No.

Standard Conditions

1. Permittee/s agree to uphold all Standard Conditions and attached Special Conditions listed or incorporated herein, deviation from any condition listed may result in revocation of this permit at the discretion of the Public Works Director/designee.
2. All work described at the designated locations is subject to the provisions required by the latest revisions of the Carpinteria Municipal Code.
3. Permittee/s hereby acknowledge that the fee deposit set for this permit is an estimate only, and that if the City's cost exceeds the deposit, the applicant shall make additional payments as necessary to maintain a positive account balance.
4. Permittee/s shall defend, indemnify and save harmless the CITY, its officers, agents and employees from any and all claims, demands, damages, costs, expenses (including attorney's fees), judgments or liabilities arising out of this Agreement or occasioned by the performance or attempted performance of

the provisions hereof; including, but not limited to, any act or omission to act on the part of the or his agents or employees or other independent directly responsible to him; except those claims, demands, damages, costs, expenses (including attorney's fees), judgments or liabilities resulting solely from the negligence or willful misconduct of the CITY.

5. Permittee/s shall name the City as additional insured on a separate endorsement (ISO form CG 2012 or equivalent) in an amount not less than $1,000,000 per occurrence for vehicular and bodily injury claims with an insurance company having a Best's rating of "B+" or better, and a 30 day cancelation notification policy.
6. Permittee/s shall notify the City immediately in the event of any accident or injury arising out of or in connection with this permit.
7. Permittee/s shall be responsible for Public Convenience and Public Safety in accordance with Section 7-1.08-09 of the most current edition of the Caltrans Standard Specifications for Public Works Construction, and traffic control as set forth in accordance with the provisions of the California MUTCD, unless otherwise directed by the City Engineer or further detailed in attached special conditions.
8. All improvements constructed under this permit shall be guaranteed for a period of one (1) year from the permit clearance date.
9. Work done in the public right of way shall be inspected before concealed, unless written permission is granted by the City Engineer/designee. Work that is not inspected is subject to removal at the cost of the Permittee/s.
10. Per Section 4216/4217 of the California Government Code, the Contractor is required to contact "Underground Service Alert" to obtain a "Dig Alert Identification Number" no less than two working days prior to any excavation activities. Call TOLL FREE 1-800-422-4133. This permit is not valid without a Dig Alert Identification Number.
11. The local Sheriff and Fire Departments shall be notified by Permittee/s 24 hours prior to the start of hauling operations or street closures at Sheriff (805) 684-4561 / Fire (805) 684-4591.
12. Permittee/s shall be responsible for protecting all survey monuments in place and resetting of any disturbed monuments by a licensed land surveyor as required by state law.
13. Excavation permits only grants permission to excavate in specified areas, installation and connection to underground facilities may require separate permits from corresponding utility companies.
14. **Permittee/s must notify City Inspector at (805) 684-5405 ext. 445 at least twenty-four (24) hours before commencing any work activities under this permit. Failure to notify is cause for revocation of this permit.**
15. A copy of this permit must be kept onsite at all times, and be available for review, if for any reason a copy of this permit cannot be presented to a City official or its agent, work may be suspended until such a time that a valid permit can be verified.
16. The Permittee/s shall cease work in the vicinity of any archaeological resources that are revealed. The City Engineer shall be notified immediately. A qualified archaeologist, retained by the Permittee, will evaluate the situation and make recommendations to the City Engineer concerning the continuation of the work.
17. Issuance of this permit does not, in any way, constitute approval for work not related to this permit as shown on the referenced plan, and/or work which requires issuance of a separate permit by other departments or agencies prior to the commencement of such work.
18. The Permittee/s shall be responsible for protecting all existing City infrastructure or improvements and shall replace or repair, at their own expense, any improvements damaged during the course of construction.

19. Dust control shall be in accordance with the Santa Barbara Air Pollution Control District rules and regulations. Watering shall be provided during and after grading to control dust, and continued on a daily basis or as required by the City Engineer.
20. For grading operations, all soils removal and replacement, placement, backfill and compaction operations shall be performed under the supervision of a Registered Soils Engineer. The Soils Engineer will be required to submit a final report on all backfill operations including all soils tests and observations to the City Engineer for review and approval, prior to the issuance of a building permit.
21. All open trenches within the improved area shall be backfilled and compacted, or protected with steel plating prior to the end of the working day. All work areas must provide a smooth consistent walking or driving surface between scheduled work periods.
22. The Permittee/s shall be responsible for maintaining and controlling all drainage to and from the site. Control of surface waters shall be such that existing drainage patterns are not disturbed or altered to increase the amount and/or intensity of runoff water and silt to adjacent private properties, City right-of-way and existing drainage structures. Maintenance of drainage facilities which directly serve the site are the responsibility of the permittee until such time as all engineering improvements are in place and approved by the City.
23. Working hours shall be between 7:00 a.m. and 5:00 p.m. Monday through Friday. Except Lane closures shall only be permitted with proper traffic control and public noticing between 9 a.m. and 4p.m. Monday through Friday, unless otherwise indicated herein. Weekend and/or holiday work shall require prior approval.
24. Import/Export of all materials for the project shall follow a specific haul route and operate between the hours of 9:00 a.m. and 4:00 p.m. Monday through Friday. The Contractor shall submit a plan indicating the intended haul route from the place of origin, including the number and types of trucks to be used. The City Engineer shall review and approve the haul route prior to the start of any hauling operations. All loads must be covered to mitigate dust generation.
25. Grading permits shall expire and become null and void if the work authorized under such permit has not commenced within one hundred twenty days, been completed within one year of the date of issue, or otherwise extended by the Public Works Director/designee.
26. All work is to be completed in accordance with, and as applicable to the latest revision of Santa Barbara County's Engineering Design Standards or as specified by the Public Works Director or his/her designee.
27. Prior to final clearance of this permit, any outstanding plan check and inspection fees shall be paid. Permittee continues to be responsible for all activity under this permit until final clearance and inspection is performed and/or signed off below.
28. This permit may be revoked or canceled without cause at any time by the City Engineer or his/her designee, upon written cancelation or revocation of this permit for any cause, permittee shall promptly restore the City right of way and/or site conditions to their pre-existing state, and then vacate such premises.
29. If the Permittee/s fail to provide services and/or equipment necessary to fulfill permit conditions, the City Engineer shall have the authority to have the work performed by others at the expense of the Permittee/s.
30. Permittee/s shall notify the City Engineer or his designee when work is completed. This permit is not completed until signed off by the City Engineer/designee and all outstanding fees are paid in full.
31. All areas of pavement within the public roadway disturbed during potholing activities shall be backfilled with Class 2 AB compacted to 95%, with the upper most 6 inches being structural concrete

that is asphalt black tinted (Lampblack, Black Iron Oxide, or similar material), unless otherwise approved by the Public Works Director.

32. Slurry seal and/or crack seal treatments shall be utilized for all asphalt damage or trenching repairs within the public right of way to the satisfaction of the City Engineer or his/her designee.

33. Pursuant to Carpinteria Municipal Code §8.52.050 smoking is prohibited in all public places and places of employment within the City. Smoking may be permitted in marked Designated Smoking Areas, inside a private automobile when no minors are present and any unenclosed area in which no nonsmoker is present and, due to the time of day or other factors, it is not reasonable to expect another person to arrive.

Signature of Permittee (Contractor) ____________ Print STEVE CAMPBELL CAMPBELL GEO, INC. Date 3/19/18

Signature of Permittee (Property Owner) ____________ Print SUNIL K. MEHTA O.RHYAN CAPITAL MGMT, LLC Date 3/19/18

Permit Issued By ____________ Print Charles W Ebeling 4/6/18 Date 4/6/18

Permit Cleared By ____________ Print ____________ Date ____________

PERMIT NO. 6254

City of Carpinteria, California

DEPARTMENT OF PUBLIC WORKS

STANDARD INDEMNIFICATION AND INSURANCE AGREEMENT

Encroachment Type(s): ☐ Tables and Chairs ☐ Sign ☐ Planters ☐ Display Items

☐ Newsrack ☒ Other: Excavation

Location of Encroachment: 5885 Carpinteria Avenue

Permitted Dates: 4/6/18 - 6/6/18

Indemnification

Campbell Geo, Inc. *(permit holder)*, shall defend, indemnify and save harmless the CITY, its officers, agents and employees from any and all claims, demands, damages, costs, expenses (including attorney's fees), judgments or liabilities arising out of this Agreement or occasioned by the performance or attempted performance of the provisions hereof; including, but not limited to, any act or omission to act on the part of the or his agents or employees or other independent directly responsible to him; except those claims, demands, damages, costs, expenses (including attorney's fees), judgments or liabilities resulting solely from the negligence or willful misconduct of the CITY.

PERMIT HOLDER shall notify CITY immediately in the event of any accident or injury arising out of or in connection with this Agreement or Permit.

Insurance Requirements

Without limiting the PERMIT HOLDER/APPLICANT indemnification of the CITY, PERMIT HOLDER shall procure the following required insurance coverage at its sole cost and expense. All insurance coverage are to be placed with insurers which (1) have a Best's rating of no less than B+: VIII, and (2) are admitted insurance companies in the State of California. All other insurers require the prior approval of the CITY. Such insurance coverage shall be maintained during the term of this Agreement. Failure to comply with the insurance requirements shall place PERMIT HOLDER in default. *PERMIT HOLDER shall provide a certified copy of any insurance policy to the CITY within ten (10) working days of scheduled event or permit commencement.*

General Liability Insurance

The general liability insurance shall include personal injury liability coverage, shall afford coverage for all premises and operations of PERMIT HOLDER and shall include contractual liability coverage for this Agreement between CITY and PERMIT HOLDER. CITY, its officers, employees, and agents shall be named as Additional Insured on any policy. *A copy of the endorsement evidencing that the CITY has been added as a named additional insured on the policy, must be attached to the certificate of insurance.* The limit of liability of said policy or policies for general and automobile liability insurance shall not be less than $1,000,000 per occurrence combined single limit for bodily injury and property damage. Personal injury liability coverage shall also be in the amount of not less than $1,000,000 per occurrence and aggregate. Said policy or policies shall include severability of interest or cross liability clause or equivalent wording. Said policy or policies shall contain a provision of the following form: "Such insurance as is afforded by this policy shall be primary and contributory to the full limits stated in the declarations, and if the CITY has other valid and collectible insurance for a loss covered by this policy, that other insurance shall be excess only." Said policy or policies shall provide that the CITY shall be given thirty (30) days written notice prior to cancellation or expiration of the policy or reduction in coverage.

PERMIT HOLDER shall submit to the office of the designated CITY representative certificate(s) of insurance and endorsements documenting the required insurance as specified above, prior to this Agreement becoming effective. Current certificate(s) of insurance shall be maintained at all times in the office of the designated CITY representative, as a condition precedent to any payment by CITY under this Agreement. The approval of insurance shall neither relieve nor decrease the liability of the CONTRACTOR.

A signed copy of this Agreement and copy of proof of insurance shall be submitted to the City of Carpinteria, Department of Public Works, Carpinteria, California, 93013 prior to the placement of any "encroachments" for which permission is requested.

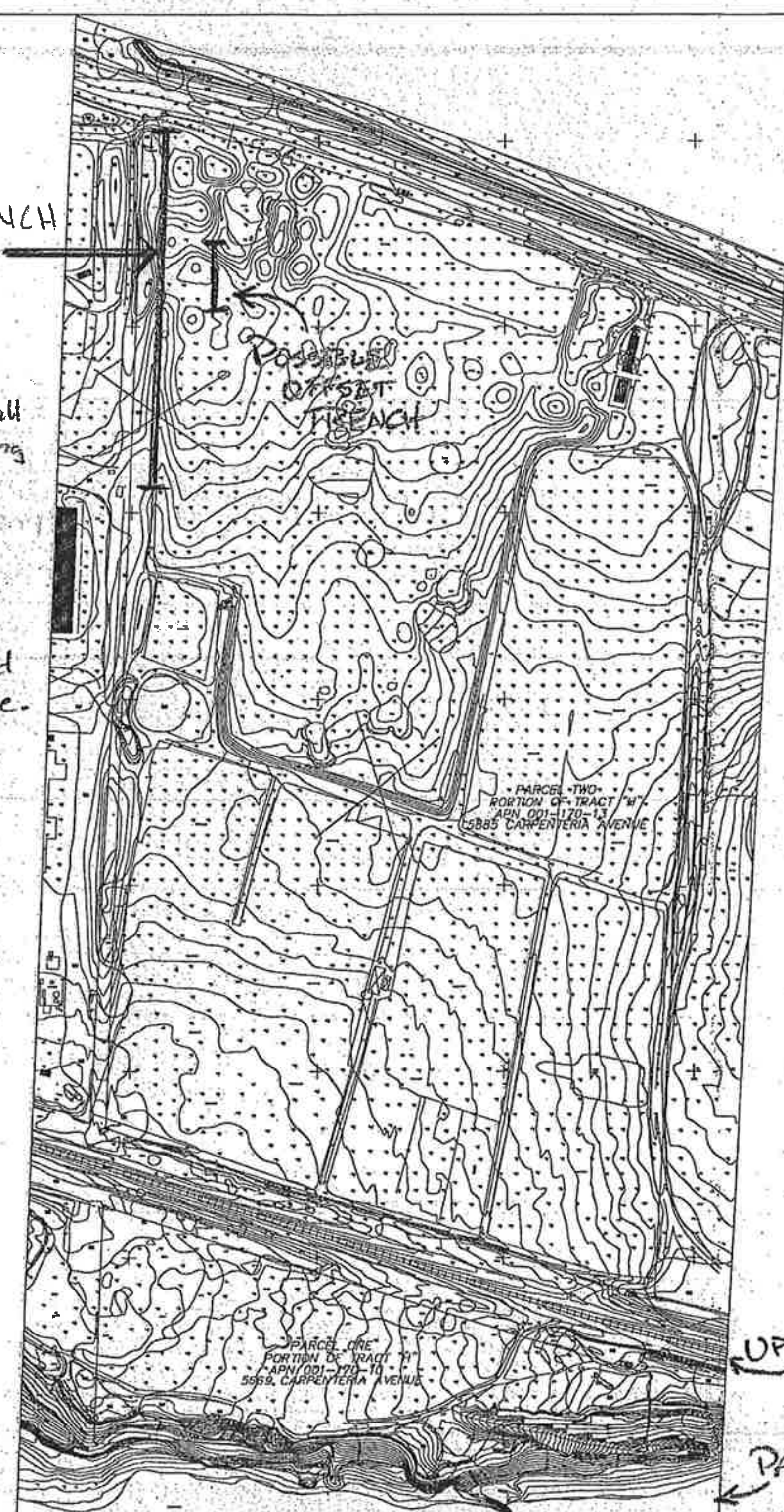
Permittee [signature] CAMPBELL-GEO, INC. Date 3/20/18

Public Works Director/Designee [signature] Date 4/6/18

PROPOSED TRENCH LOCATION

Note - Erosion control measures shall include silt fencing and staked straw wattle where necessary.

The trench area will be completely enclosed by locked chain link fence.



LEGEND

I.P. = IRON PIPE
MON = MONUMENT
N/T = NAIL AND TAG

GRAPHIC SCALE

NOTES

(1) (R) = SIMPSON ALTA SURVEY DATED 06-30-04 PROVIDED.
(2) HORIZONTAL BASIS IS NAD 83 PER CAL-TRANS CENTER LINE MONUMENT. POST MILE CONTROL 1.62
(3) VERTICAL DATUM IS NAVD 88 PER CAL-TRANS CENTER LINE MONUMENT. POST MILE CONTROL 1.62. ELEVATION=124.69
(4) BEARINGS SHOWN ARE NAD 83 BASIS

PROPOSED GEOLOGIC EXPLORATION TRENCH
5885 Carpinteria Avenue
MARCH, 2018

TOPOGRAPHIC MAP OF A PORTION OF APN'S 01-170-13 AND 01-170-10 AT THE REQUEST OF FLOWERS AND ASSOCIATES

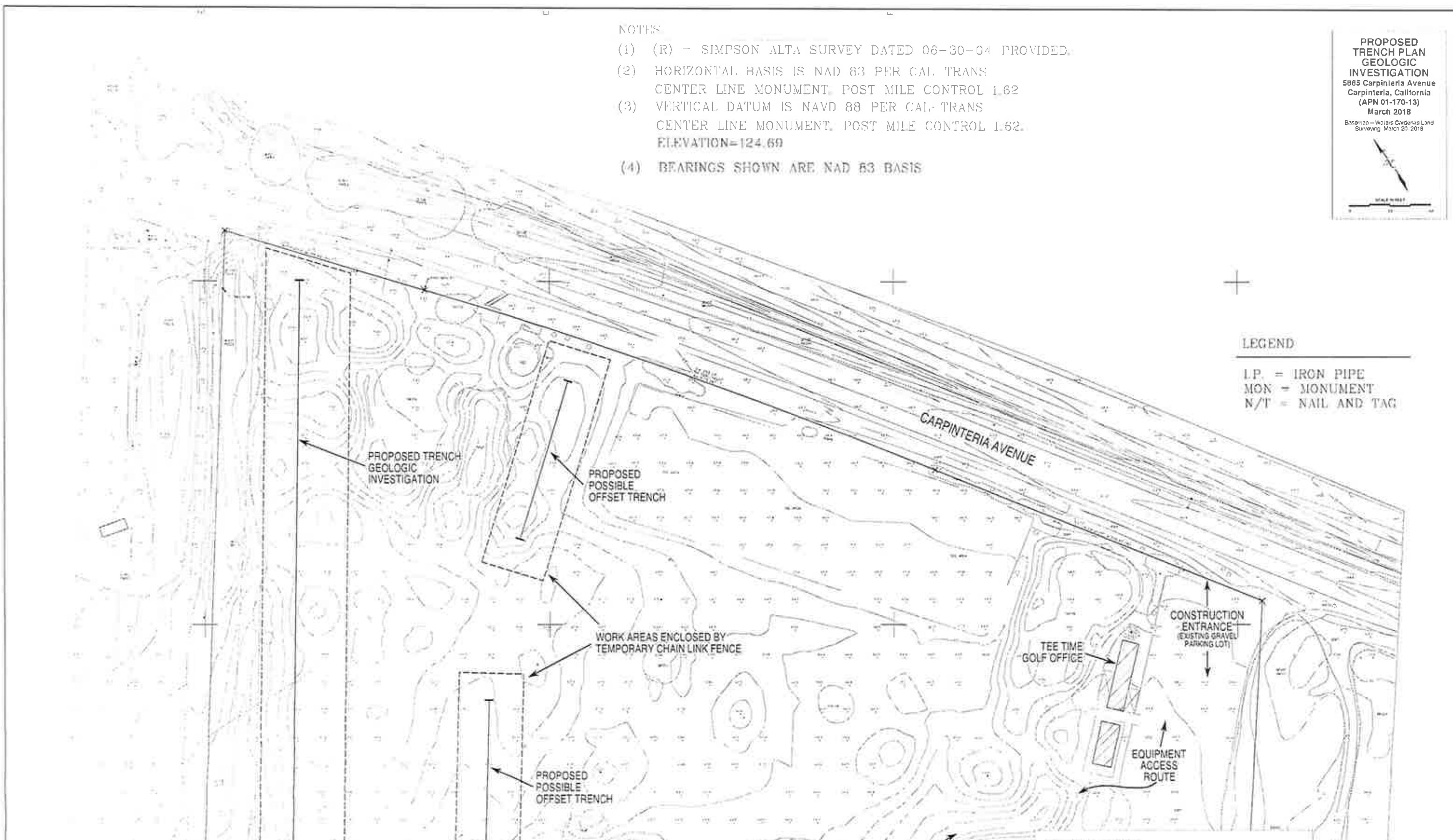
REV.	DESCRIPTION	BY	DATE

CARDENAS AND ASSOCIATES SURVEYING, INC.

DRAWN BY: | CHECKED BY:
SCALE:
DATE: 06-27-06
JOB NUMBER: 06-0062 | SHEET

PLOTTED: Thursday, July 13, 2006 11:05:47 AM

W.O. 0581



NOTES:

(1) (R) – SIMPSON ALTA SURVEY DATED 06-30-04 PROVIDED.

(2) HORIZONTAL BASIS IS NAD 83 PER CAL TRANS CENTER LINE MONUMENT, POST MILE CONTROL 1.62

(3) VERTICAL DATUM IS NAVD 88 PER CAL TRANS CENTER LINE MONUMENT, POST MILE CONTROL 1.62. ELEVATION=124.69

(4) BEARINGS SHOWN ARE NAD 83 BASIS

GRADING NOTES

1. CONTRACTOR SHALL NOTIFY THE CITY GRADING INSPECTOR AT LEAST 48 HOURS BEFORE START OF GRADING WORK.
2. UNDERGROUND SERVICE ALERT (DIG-ALERT 1-800-422-4133) SHALL BE CONTACTED AT LEAST TWO FULL WORKING DAYS BEFORE EXCAVATION. NO EXCAVATION SHALL BE CONDUCTED UNTIL EACH UTILITY IDENTIFIED BY USA DIG ALERT HAS PROVIDED SITE MARKS OR A WRITTEN RESPONSE OF NO CONFLICT. PRIVATE UTILITIES SUCH AS IRRIGATION LINES SHALL BE EVALUATED BY CONSULTATION WITH THE PROPERTY OWNER AND/OR THE TENANT AND THE USE OF A PRIVATE LOCATING CONTRACTOR, WHERE APPROPRIATE.
3. CONTRACTOR SHALL EMPLOY ALL LABOR, EQUIPMENT, AND METHODS REQUIRED TO CONTROL DUST IN AMOUNTS DAMAGING TO ADJACENT PROPERTY.
4. TRENCH EXCAVATION DEPTHS ARE ANTICIPATED TO BE AS DEEP AS 16 FEET. TRENCH SAFETY WILL BE ADDRESSED BY THE USE OF BENCHED OR SLOPED SIDEWALLS AT SLOPE ANGLES AND DEPTHS TO BE DETERMINED BY SOIL TYPE THAT WILL BE CONFIRMED IN THE FIELD IN ACCORDANCE WITH OSHA STANDARDS (29 CFR, SEC. 1926.651). TRENCH SPOILS PILES SHALL BE OFFSET AT LEAST 2 FEET FROM THE EXCAVATION TO PREVENT SOIL OR ROCKS FROM ROLLING INTO THE TRENCH.
5. ADDITIONAL TRENCH SAFETY WILL BE ADDRESSED BY INSTALLING ALUMINUM HYDRAULIC SHORING FOR PORTIONS OF THE TRENCH WITH VERTICAL SIDEWALLS.
6. TRENCH INGRESS AND EGRESS SHALL BE ESTABLISHED BY MEANS OF GRADED RAMPS AND LADDERS. LADDERS SHALL EXTEND 3 FEET FROM THE TOP OF THE EXCAVATION.
7. IN A LOCATION TO BE DETERMINED BY A GEOPHYSICAL SURVEY, AN HISTORIC OIL WELL CASING WILL BE EXPOSED BY A ROUGHLY 15 X 15 X 10 FOOT DEEP TEST PIT. SMALLER ADJACENT TEST PITS MAY BE EXCAVATED NEAR THE WELL HEAD TO EVALUATE THE PRESENCE OF IMPACTED SOIL AND TO COLLECT SOIL SAMPLES.
8. TRENCH AND TEST PIT BACKFILL WILL BE PERFORMED WITHOUT ENGINEERED COMPACTION. EACH TRENCH WILL BE FINISHED WITH A SLIGHTLY MOUNDED BACKFILL SURFACE AND EACH TRENCH WILL BE STAKED AND LOCATED BY A LICENSED LAND SURVEYOR FOR FUTURE RECOVERY AS NEEDED.
9. NO SOIL EXPORT OR IMPORT IS PLANNED.

EROSION CONTROL NOTES

1. THE OWNER/CONTRACTOR WILL BE RESPONSIBLE FOR MONITORING EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO, DURING AND AFTER STORM EVENTS.
2. SILT FENCING AND STAKED STRAW WATTLE WILL BE INSTALLED AS NEEDED TO CONTROL EROSION AND PREVENT SEDIMENT RUN-OFF FROM THE PROPERTY.
3. THE CONSTRUCTION ENTRANCE IS THROUGH THE EXISTING GRAVEL SURFACED PARKING LOT AS SHOWN ON THE PLAN. ALL CONSTRUCTION TRAFFIC ENTERING ONTO PAVED ROADS FROM THE PROJECT SITE MUST CROSS THE GRAVEL PARKING LOT.

EARTHWORK

ESTIMATED EARTHWORK QUANTITIES	EXCAVATION	BACKFILL
MAIN TRENCH	625 C.Y.	625 C.Y.
OFFSET TRENCHES	160 C.Y.	160 C.Y.
OIL WELL TEST PITS	100 C.Y.	100 C.Y.
TOTAL	885 C.Y.	885 C.Y.

CAMPBELL GEO, INC.

Evaluation of Fault Location and Surface Rupture Hazard
5885Carpinteria Avenue
Carpinteria, California
May, 2018

South End of Trench CG-1

View to Northwest, Trench CG-1

Evaluation of Fault Location and Surface Rupture Hazard
5885Carpinteria Avenue
Carpinteria, California
May, 2018

Waters Cardenas survey of trench and locations of staked features

View to West, CG-Test Pit 1

Evaluation of Fault Location and Surface Rupture Hazard
5885Carpinteria Avenue
Carpinteria, California
May, 2018

Collection of Sample for Analysis by OSL Age Dating Method

Sample Recovery and Preparation for OSL Analysis

APPENDIX C

Age Dating

Laboratory Results

Optically Stimulated Luminescence Dating of Quaternary Sediment Sample CG-1-OSL-1

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Background

Optically Stimulated Luminescence (OSL) dating determines the time elapsed since a sediment sample was last exposed to daylight (Aitken, 1998). The method relies on the interaction of ionizing radiation with electrons in semi-conducting minerals within buried sediment, which results in metastable accumulation of charge. Illumination of the sediment releases the charge as a measurable emission of photons (luminescence). The methods assume that mineral grains during or immediately prior to the transport were exposed to daylight to set them to their geological zero residual level. Upon burial, day light exposure ceases and essentially the luminescence signal begins to accumulate due to the radiation arising from the decay of ambient radioisotopes that include U, Th, Rb and K, and from cosmic rays. Given that, as a first approximation, the radiation exposure (the dose rate - D_R) is constant over the timescales of interest, luminescence builds up (equivalent dose - D_E) in the minerals in proportion to the duration of burial and the concentration of the radioisotopes in the sample environment and the cosmic dose. The depositional age (A) of the sample is thus a ratio of luminescence acquired and the rate of luminescence acquisition, i.e., $A=D_E/D_R$ (Aitken, 1998; Murray and Olley, 2002; Singhvi and Porat, 2008).

Preparation and measurement

As requested, a sediment sample was prepared for quartz OSL dating. The OSL sample were provided in a six-inch-long steel tube. The sample was opened in the Luminescence Dating Laboratory at the University of Cincinnati under safe light conditions. Approximately 1 inch of the sediment was removed from each end of the tube and was dried to determine the water content. The sediment from the ends of the tube was then crushed and sent to the Activation Laboratories Limited in Ancaster, Ontario, Canada for Major Elements Fusion ICP/MS/Trace Elements analysis to determine the U, Th, Rb and K concentrations for D_R calculations (Table 1).

The reminding sediment was pretreated with 10% HCl and 10% H_2O_2 to remove carbonates and organic matter, respectively. The pretreated sample were rinsed in water, dried and sieved to attract the 90–150 μm particle size fraction. A sub-fraction (~20 g) of sample was etched using 44% HF acid for 80 minutes to remove the outer alpha irradiated layer from quartz particles. This treatment also helps dissolves any feldspars present. Any fluorides precipitated during HF treatment were removed using concentrated HCl for 30 min. The quartz sample was then rinsed in distilled water and acetate, and dried and sieved to obtain grain size 90–150 μm in diameter. Next, a low field controlled Frantz isodynamic magnetic separator (LFC

Model-2) was used to separate feldspar and magnetic minerals from quartz in the 90–150 μm particle size fraction following the methods of Porat (2006) with the forward and side slopes were set at 100° and 10°, respectively, within a variable magnetic field. The quartz was sieved using a 90 μm mess to remove any grains smaller than 90 μm, so that the 90–150 μm fraction could be used for OSL measurement.

An automated Riso OSL reader model TL-DA-20 was used for OSL measurements and irradiation. Aliquots, containing approximately several hundred grains of the samples, were mounted onto ~ 6 mm-diameter stainless steel discs as a small central circle ~ 3 mm in diameter. Aliquots for the sample were first checked for feldspar contamination using infrared stimulated luminescence (IRSL) at room temperature before the main OSL measurements were undertaken (Jain and Singhvi, 2001). The aliquots did not pass the IRSL test so the sample was etched in 40% HF for further 30 minutes to remove any feldspar, followed by 10% HCl treatment and sieving again. The sample then past the IRSL test and was used for OSL dating. Aliquots of the sample were illuminated with blue LEDs stimulating at a wavelength of 470 nm (blue light stimulated luminescence – BLSL). The detection optics comprised Hoya U-340 and Schott BG-39 color glass filters coupled to an EMI 9235 QA photomultiplier tube. The aliquots were irradiated using a $^{90}Sr/^{90}Y$ beta source. The single aliquot regeneration (SAR) method of (Murray and Wintle, 2000, 2003) was used to determine the D_E for age estimation. Only aliquots that satisfy the criterion of a recycling ratio not more than 10% were used in determining D_E. A preheat of 240 ˚C for 10s was used and the OSL signal was recorded for 40 s at 125 ˚C. OSL sensitivity of the samples had a high signal to noise ratio. Dose recovery tests (Wintle and Murray, 2006) indicate that a laboratory dose of 10.9 Gy could be recovered to within 10% by the SAR protocol suggesting that the protocol was appropriate.

Results

Table 1 presents the radioisotope, water content, and cosmic dose, D_R, D_E and OSL age for the sample. Dose rate calculations follows the details highlighted in the footnotes of Table 1 and confirmed using the Dose Rate and Age Calculator (DRAC) of Duncan et al. (2015). The dose rates for the sample was 3.29±0.15 Gy/ka, which is within the normal range for terrestrial sediments. The Th/U ratio is consistent with there being no problems of leaching of radionuclides from the sediment. Natural water content was ~10%, and we assumed a conservative value with a large uncertainty (±5%) to account for any possible changes in water content over the geologic history.

The natural OSL signal for all aliquots were at least two orders of magnitude greater than background signal. The shine down curves (luminescence stimulated in the lab over 40 s of exposure to light) for all aliquots showed fast decay patterns that confirm that the signal is the fast component of luminescence, which is dominant in quartz. This provides confidence quartz would have likely been bleached quickly if only briefly exposed to sunlight. Figure 1 shows an example of a shine down curves for the dated sample. Figure 1 also shows examples of the regenerative curves, illustrating good growth and recuperation. An example of an IRSL "shine down" curves used to test that there was no feldspar within the sample (the curves only have background signals and no shine down) are also shown in Figure 1. Dose rate recovery tests for the samples shows that they have good recovery within the uncertainty of the laboratory measurement and 10% of the applied dose of 100 s (Figure 2).

Forty-eight aliquots were measured. Of those 11 aliquots were saturated (»500 Gy), four ranged from 288 to 576 Gy with infinite uncertainties, and five failed the recuperation and recycling criteria. The remaining 28 aliquots were used to determining a likely DE for the sample (Figure 3). The spread of D_E varied between samples and are shown in Figure 3. The large spread of D_E values and the significant number of aliquots that were saturated suggests partial bleaching problems, i.e., not all the sand grains were totally rest by sunlight before burial. This can result in an overestimate of the age. To address this issue, we use a minimum age model separating the population of DE using a three-mixing model (Figure 3, lower graph), which gives mean D_E value of the minimum peak of 120.3 ± 6.2 Gy (Table 1). **This provides an age of 36.6 ± 2.5 ka, which is the best estimation of the age of sample CG-1-OSL-1 given the partial bleaching issues** (see age highlighted in bold in Table 1). For completeness and comparison, single and 2 mixing models have minimum peaks yielding D_E values of 153 ± 3 and 151 ± 3 Gy, respectively. This gives ages of 46.6 ± 2.3 and 46.0 ± 2.3 ka. An average and weighted mean for aliquots yields D_E values of 176.3 ± 8.6 and 120.3 ± 2.6 Gy, respectively (Table 1). These give ages of 53.6 ± 2.7 and 46.6 ± 2.3 ka (Table 1). These ages are likely too old given partial bleaching issues.

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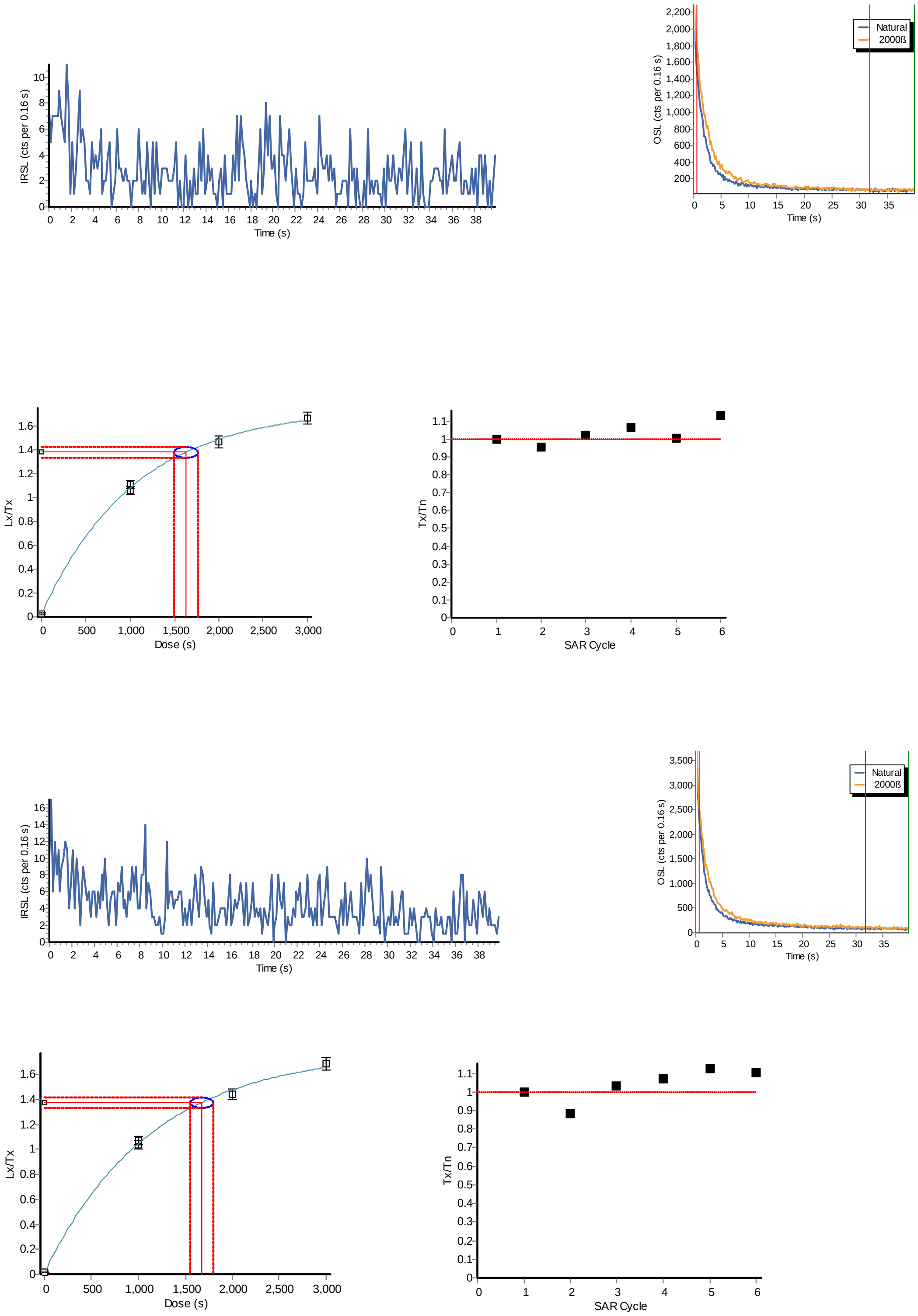
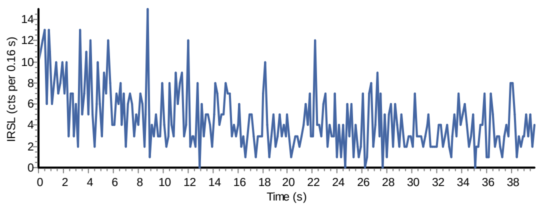
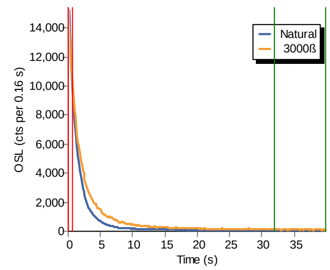
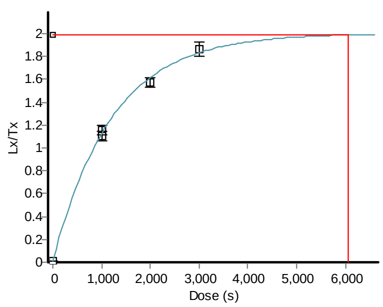
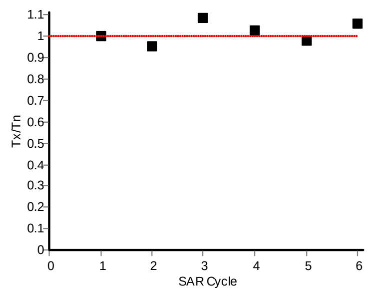
Figure 1. Examples of typical ISRL tests for feldspar (top left), OSL shine down curves (top right), regenerative curves (bottom left) and recycling ratio (bottom right) for three different aliquots.




IRSL (cts per 0.16 s)
0
2
4
6
8
10
12
14
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38
Time (s)


Natural
3000ß
OSL (cts per 0.16 s)
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
0 5 10 15 20 25 30 35
Time (s)


Lx/Tx
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
0 1,000 2,000 3,000 4,000 5,000 6,000
Dose (s)


Tx/Tn
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
0 1 2 3 4 5 6
SAR Cycle

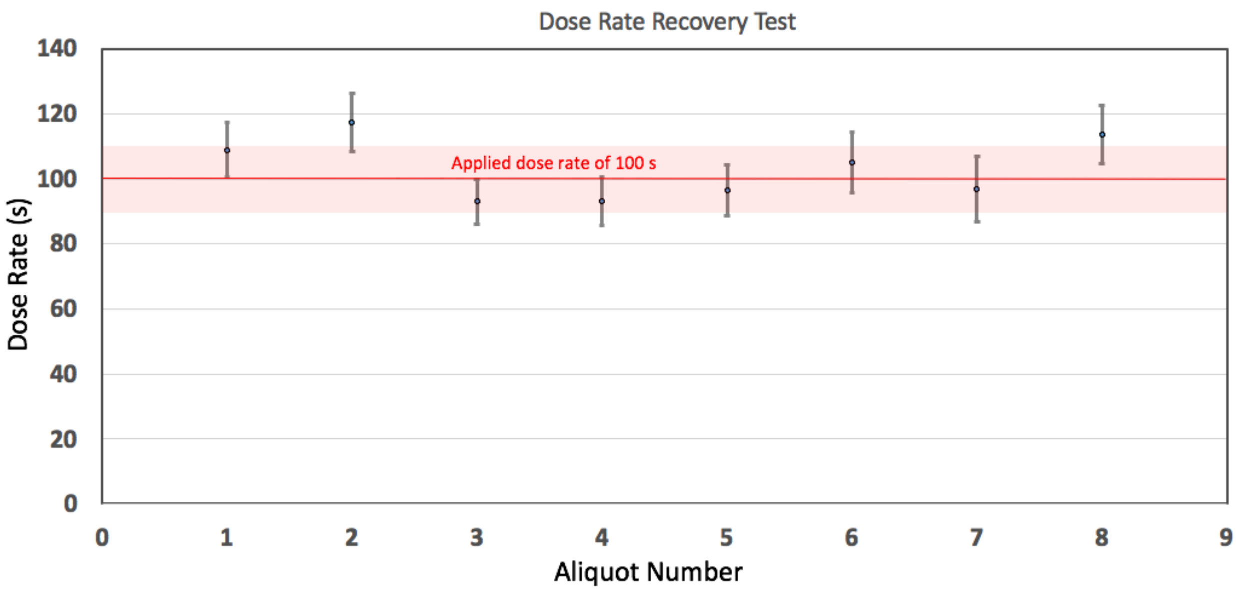


Figure 2. Dose rate recovery test for sample CG-1-OSL-1 using eight aliquots. The applied dose was 100 s and the pink band show 10% variance from the dose. All aliquots recover with 10% of the applied dose.

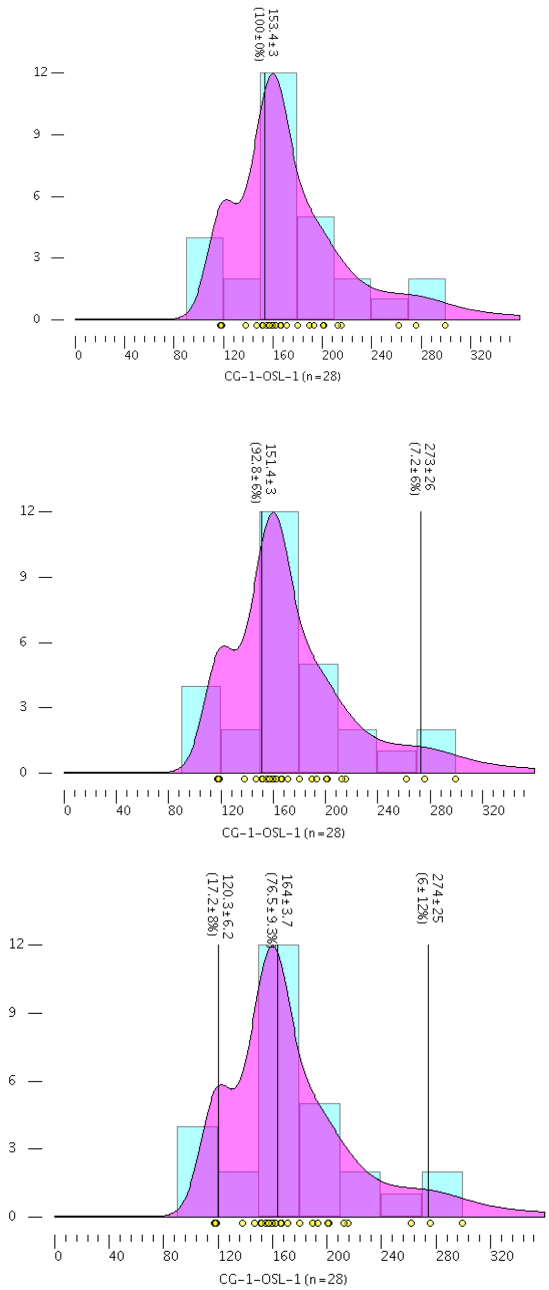


Figure 3. Equivalent doses for sample CG-1-OSL-1, plotted as histograms (number of aliquots) and probability against equivalent dose (Gy) for single (upper), two (middle) and three mixing (lower) models.

Table 1: Summary of OSL dating results for sample CG-1-OSL-1 from extracted from sediment, sample locations, radioisotopes concentrations, moisture contents, total dose-rates, D_E estimates and optical ages.

Location (ºN/ºW)	Altitude (m asl)	Depth (cm)	Water Content (%)	U[a] (ppm)	Th[a] (ppm)	K[a] (%)	Rb[a] (ppm)	Cosmic[b, c] (Gy/ka)	Dose-rate[b, c, d] (Gy/ka)	n[e]	Average equivalent dose[f] (Gy)	Weighted average equivalent dose[h] (Gy)	3-mixed model equivalent dose[i] (Gy)	Average OSL Age[f,j,] (ka)	Weighted average OSL Age[h,j] (ka)	**3-mixing model OSL Age[h,i,j] (ka)**
34.38930/ 119.50525	17	180	10.4	2.3±0.1	8.9±0.1	2.3±0.1	101±2	0.17±0.02	3.29±0.15	28(48)	176.3±8.6	153.4±3.0	120.3±2.6	53.6±2.7	46.6±2.3	**36.6±2.5**

[a] Elemental concentrations from ICP-MS of whole sediment measured at Activation Laboratories Limited Ancaster, Ontario Canada.

[b] Estimated fractional day water content for whole sediment is taken as 10% and with an uncertainty of ± 5%.

[c] Estimated contribution to dose-rate from cosmic rays calculated according to Prescott and Hutton (1994). Uncertainty taken as ±10%.

[d] Total dose-rate from beta, gamma and cosmic components. Beta attenuation factors for U, Th and K compositions incorporating grain size factors from Mejdahl (1979). Beta attenuation factor for Rb is taken as 0.75 (cf. Adamiec and Aitken, 1998). Factors utilized to convert elemental concentrations to beta and gamma dose-rates from Adamiec and Aitken (1998) and beta and gamma components attenuated for moisture content. Dose rates calculation was confirmed using the Dose Rate and Age Calculator (DRAC) of Duncan et al. (2015).

[e] Number of replicated equivalent dose (D_E) estimates used to calculate D_E. These are based on recuperation error of < 10%. The number in the parenthesis is the total measurements made including failed runs with unusable data.

[f] Average equivalent dose (D_E) determined from replicated single-aliquot regenerative-dose (SAR; Murray and Wintle, 2000) runs. The uncertainty is the standard error and includes an uncertainty from beta source estimated of ±2.5%.

[h] Weighted average equivalent dose (D_E) determined from replicated single-aliquot regenerative-dose (SAR; Murray and Wintle, 2000) runs. The uncertainty is the standard error and includes an uncertainty from beta source estimated of ±2.5%.

[i] Age based on minimum population in 3-mixing model.

[j] Uncertainty incorporate all random and systematic errors, including dose rates errors and uncertainty for the D_E.