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TYPE OF SERVICES	Geotechnical Feasibility Study
PROJECT NAME	3035 El Camino Real
LOCATION	3035 El Camino Real Santa Clara, California
CLIENT	3035 El Camino Real LLC
PROJECT NUMBER	851-1-3
DATE	June 23, 2017

CORNERSTONE EARTH GROUP

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Project Name	**3035 El Camino Real**
Location	**3035 El Camino Real** **Santa Clara, California**
Client	**3035 El Camino Real LLC**
Client Address	**15732 Los Gatos Boulevard, #101** **Los Gatos, California**
Project Number	**851-1-3**
Date	**June 23, 2017**

Prepared by

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SECTION 1: INTRODUCTION

This geotechnical report provides the result of our geotechnical feasibility study and preliminary recommendations for the 3035 El Camino Real project in Santa Clara, California. This report was prepared for the sole use of 3035 El Camino Real LLC. The location of the site is shown on the Vicinity Map and Site Plan, Figures 1 and 2.

The purpose of this study was to develop an opinion regarding potential geotechnical concerns that could impact proposed development. The preliminary geotechnical recommendations contained in this report are for your forward planning, cost estimating, and preliminary project design and are not intended to be used for final project design or construction.

1.1 PROJECT DESCRIPTION

The project site is located at 3035 El Camino Real in Santa Clara, California. The project is still in early planning stages, however, we understand the planned development will likely consist of a three-story wood framed structure with approximately 100 units overlying ½ level of underground parking. We assume appurtenant utilities, landscaping, and other improvements necessary for site development would also be constructed.

1.2 SCOPE OF SERVICES

Our scope of services was presented in our proposal dated October 9, 2015, and consisted of a site reconnaissance to observe existing conditions, a review of available data in our files and published documents, preform a limited analysis, and preparation of this report.

SECTION 2: REGIONAL SETTING

2.1 GEOLOGICAL SETTING

The site is located within the Santa Clara Valley, which is a broad alluvial plane between the Santa Cruz Mountains to the southwest and west, and the Diablo Range to the northeast. The

San Andreas Fault system, including the Monte Vista-Shannon Fault, exists within the Santa Cruz Mountains and the Hayward and Calaveras Fault systems exist within the Diablo Range. Alluvial soil thicknesses in the area of the site range from 200 to 400 feet (Rogers & Williams, 1974).

2.2 REGIONAL SEISMICITY

The San Francisco Bay area region is one of the most seismically active areas in the Country. While seismologists cannot predict earthquake events, geologists from the U.S. Geological Survey have recently updated earlier estimates from their 2015 Uniform California Earthquake Rupture Forecast (Version 3) publication. The estimated probability of one or more magnitude 6.7 earthquakes (the size of the destructive 1994 Northridge earthquake) expected to occur somewhere in the San Francisco Bay Area has been revised (increased) to 72 percent for the period 2014 to 2043 (Aagaard et al., 2016). The faults in the region with the highest estimated probability of generating damaging earthquakes between 2014 and 2043 are the Hayward (33%), Rodgers Creek (33%), Calaveras (26%), and San Andreas Faults (22%). In this 30-year period, the probability of an earthquake of magnitude 6.7 or larger occurring is 22 percent along the San Andreas Fault and 33 percent for the Hayward or Rodgers Creek Faults.

The faults considered capable of generating significant earthquakes are generally associated with the well-defined areas of crustal movement, which trend northwesterly. The table below presents the State-considered active faults within 25 kilometers of the site.

Table 1: Approximate Fault Distances

Fault Name	Distance	
	(miles)	(kilometers)
Monte Vista-Shannon	5.3	8.6
Hayward (Southeast Extension)	8.6	13.9
San Andreas (1906)	9.0	14.5
Hayward (Total Length)	11.2	18.1
Calaveras	11.8	19.0
Sargent	14.9	24.0

A regional fault map is presented as Figure 3, illustrating the relative distances of the site to significant fault zones.

SECTION 3: SITE CONDITIONS

3.1 SURFACE DESCRIPTION

The approximately 2-acre site is located at 3035 El Camino Real in Santa Clara and is bounded by residential development to the north, auto repair shops to the east, El Camino Real and restaurants and retail shops beyond to the south, and restaurants and retail shops to the west.

The site is currently occupied by a Wheels and Deals used car dealership consisting of a centrally located one-story building surrounded by asphalt concrete. Some landscaping areas consisting of grass and a few shrubs and small trees are located in the front of the property along El Camino Real. The site is relatively flat but slopes slightly toward the rear with elevations around Elevation 85 to 86 feet along El Camino Real and Elevation 80 to 81 feet near the rear of the site (Google Earth, 2016).

3.2 ANTICIPATED SUBSURFACE CONDITIONS

The surficial geology at the site is mapped as Holocene alluvial fan deposits (CGS, 2002). Based on the mapped geological unit and our experience at other sites in the vicinity, we anticipate the site is underlain by generally medium stiff to very stiff fine-grained soils (silts and clays) interbedded with generally medium dense to dense sands. Plasticity Index tests performed at nearby sites indicate the surficial soils may exhibit high expansion potential.

Based on previous site use, we anticipate encountering localized areas of undocumented fill. Undocumented fill and potential mitigation measures are discussed in the “Undocumented Fill and Re-development” section in this report.

3.3 GROUND WATER

Maps published by the California Geological Survey (CGS, 2002) indicate historical high ground water depth at approximately 9 to 10 feet below the ground surface. Fluctuations in ground water levels occur due to many factors including seasonal fluctuation, underground drainage patterns, regional fluctuations, and other factors.

SECTION 4: GEOLOGIC HAZARDS

4.1 FAULT RUPTURE

As discussed above several significant faults are located within 25 kilometers of the site. The site is not located within a State-designated Alquist Priolo Earthquake Fault Zone or a Santa Clara County Fault Hazard Zone; therefore, fault rupture hazard is not a significant geologic hazard at the site.

4.2 GROUND SHAKING

Moderate to severe (design-level) earthquakes can cause strong ground shaking, which is the case for most sites within the Bay Area. While a seismic hazard analysis has not been prepared for this feasibility study, strong ground shaking can be expected at the site during the life of the improvement.

Potential mitigation of strong ground shaking likely includes designing new structures to meet current building codes and applicable requirements.

4.3 LIQUEFACTION POTENTIAL

The site is within a State-designated Liquefaction Hazard Zone (CGS, San Jose West Quadrangle, 2002) as well as a Santa Clara County Liquefaction Hazard Zone (Santa Clara County, 2002).

During strong seismic shaking, cyclically induced stresses can cause increased pore pressures within the soil matrix that can result in liquefaction triggering, soil softening due to shear stress loss, potentially significant ground deformation due to settlement within sandy liquefiable layers as pore pressures dissipate, and/or flow failures in sloping ground or where open faces are present (lateral spreading) (NCEER 1998). Limited field and laboratory data is available regarding ground deformation due to settlement; however, in clean sand layers settlement on the order of 2 to 4 percent of the liquefied layer thickness can occur. Soils most susceptible to liquefaction are loose, non-cohesive soils that are saturated and are bedded with poor drainage, such as sand and silt layers bedded with a cohesive cap.

As previously discussed, historic high ground water in the area is mapped to be on the order of 9 to 10 below the ground surface. In addition, the site is expected to be underlain by alluvial deposits consisting of clayey, silty, and sandy soils. The granular materials, including sandy soils, are anticipated to be generally medium dense to dense in consistency. As a result, there is the potential for liquefaction to impact site development.

We recommend the potential for liquefaction be evaluated during the design-level geotechnical investigation once the project plans are finalized.

4.4 LATERAL SPREADING

Lateral spreading is horizontal/lateral ground movement of relatively flat-lying soil deposits towards a free face such as an excavation, channel, or open body of water; typically lateral spreading is associated with liquefaction of one or more subsurface layers near the bottom of the exposed slope. As failure tends to propagate as block failures, it is difficult to analyze and estimate where the first tension crack will form.

Calabazas Creek is located approximately 400 feet to the west of the site and is about 12 feet deep. However, the creek channel bottom and sides are concrete lined. In our opinion, the concrete lining of the creek would likely prevent lateral spreading from occurring and affecting improvements.

4.5 SEISMIC SETTLEMENT/UNSATURATED SAND SHAKING

Loose to medium dense unsaturated sandy soils can settle during strong seismic shaking. If loose to medium dense unsaturated sandy soils are present at the site, these soils could experience differential seismic settlement after strong seismic shaking. Currently, a ½-level basement for parking is planned. As such, we anticipate much of the unsaturated soils beneath the surface will likely be removed for the basement excavation. However some may remain.

We recommend the potential for unsaturated sand shaking settlement be evaluated during the design-level geotechnical investigation once the project plans are finalized.

4.6 LANDSLIDING

The site is not located within a California Seismic Hazard Zone for landsliding (CGS, 2002) or a Santa Clara County Landslide Hazard Zone (Santa Clara County, 2002). Due to the relatively flat topography, the potential for landsliding at the site is considered low.

4.7 TSUNAMI/SEICHE

A tsunami or seiche originating in the Pacific Ocean would lose much of its energy passing through San Francisco Bay. Based on the study of tsunami inundation potential for the San Francisco Bay Area (Ritter and Dupre, 1972), areas most likely to be inundated are marshlands, tidal flats, and former bay margin lands that are now artificially filled, but are still at or below sea level, and are generally within 1½ miles of the shoreline. The site is approximately 7½ miles inland from the San Francisco Bay shoreline, and is approximately 80 to 86 feet above mean sea level according to Google Earth®. Therefore, the potential for inundation due to tsunami or seiche is considered low.

4.8 FLOODING

Based on our internet search of the Federal Emergency Management Agency (FEMA) flood map public database, the site is located within Zone X, an area described as "Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood." We recommend the project civil engineer be retained to confirm this information and verify the base flood elevation, if appropriate.

SECTION 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY

Based on available data and our engineering judgement, the planned project appears feasible from a geotechnical standpoint. This feasibility report and preliminary recommendations are intended for conceptual planning and preliminary design only. A design-level geotechnical investigation should be performed once site development plans are finalized. The design-level investigation findings will be used to confirm preliminary recommendations and develop detailed recommendations for design and construction.

Potential geotechnical concerns, design considerations, and preliminary recommendations are provided herein. Descriptions of these geotechnical concerns with brief outlines of our preliminary recommendations follow the listed concerns.

- Potential for liquefaction-induced and unsaturated sand shaking settlements
- Potential for static settlements
- Presence of expansive soils
- Shallow ground water
- Differential movement at on-grade to on-structure transitions
- Undocumented fill and re-development considerations
- Proximity of basement excavation to at-grade structures and improvements

5.1.1 Potential for Liquefaction-Induced and Unsaturated Sand Shaking Settlements

The site is located within a State of California and County of Santa Clara liquefaction hazard zones. Liquefaction is a phenomenon where soils lose strength and stiffness during strong ground shaking. Liquefaction can result in ground failure (fissures, sand boils, etc.), foundation bearing failure, and settlement of the ground surface. Soils most susceptible to liquefaction are loose, non-cohesive soils that are saturated and bedded with poor drainage, such as sand and silt layers bedded with a cohesive cap. Depending on the liquefiable layer thickness and depth, liquefaction-induced settlements can range from less than an inch to several inches and significantly larger, if surface rupture occurs. Additionally, loose to medium dense unsaturated sandy soils above the ground water can settle during strong seismic shaking. The potential for liquefaction and unsaturated sand shaking settlements should be evaluated further as part of the design-level geotechnical investigation.

5.1.2 Potential for Static Settlements

The compressibility and stiffness of clays, the density of sands, the actual ground water conditions beneath the site, the depth of basement, and building loads will all dictate the total estimated static settlements building foundations may experience. Based on general subsurface conditions in the site area and assuming a structure with a ½ level basement and three stories above, we anticipate static settlements for shallow spread footings or a reinforced concrete mat foundation would likely be on the order of 1 inch or less. However, site specific subsurface explorations and settlement estimates should be performed and evaluated during a design-level geotechnical investigation.

5.1.3 Presence of Expansive Soils

Based on our review of data from other sites within the vicinity, we anticipate that the surficial soils may be highly expansive. Expansive soils can undergo significant volume change with changes in moisture content. They shrink and harden when dried and expand and soften when wetted. Potential measures to reduce the potential for damage to any at-grade improvement and/or at-grade structures, foundations, and slabs-on-grade that may be proposed, may include:

- employing grading and compaction methods to reduce potential volume change,
- providing sufficient reinforcement to resist expansive soil forces, and
- supporting slabs on a layer of non-expansive fill.

At-grade foundations should be designed to extend below the zone of seasonal moisture fluctuation. In addition, it is important to limit moisture changes in the surficial soils by using positive drainage away from the building as well as limiting landscaping watering.

5.1.4 Shallow Ground Water

As discussed, historic high ground water is mapped at approximately 9 to 10 feet below the ground surface. The bottom of the ½-level below-grade basement is anticipated to extend to approximately 7 to 10 feet below grade. Ground water could potentially be encountered in the garage excavation and deeper excavations for utilities, elevators, or other deep excavations. Impacts associated with high ground water typically consist of potentially wet and unstable subgrade, difficulty achieving compaction, and difficult underground utility installation. Dewatering and shoring of the below-grade basement and utility trenches may be required. Depending on the final basement depth, below-grade garage slabs and retaining walls may need to be designed to resist potential hydrostatic uplift pressures from high ground water. More detailed recommendations and an evaluation of the depth of ground water should be evaluated further as part of a design-level geotechnical investigation.

5.1.5 Differential Movement at On-Grade to On-Structure Transitions

Some improvements may transition from on-grade support to the basement. Where the improvements transition from on-grade to the basement, varying amounts of settlement can be anticipated between the parking structure and the joining improvements supported on-grade due to difficulty in compacting the retaining wall backfill as well as other issues. Subslabs beneath flatwork or pavers that can cantilever at least 3 feet beyond the wall may need to be considered.

5.1.6 Undocumented Fill and Re-development Considerations

The site is currently developed. Potential issues that are often associated with redeveloping sites include demolition of existing improvements, abandonment of existing utilities, and undocumented fill. Undocumented fills and improvements will likely be removed for the ½-level below-grade basement. However, if fills and existing improvements extend below the bottom of basement or in areas of future at-grade improvements, the fills and improvements should be removed and replaced as engineered fill.

5.1.7 Proximity of Basement Excavation to At-Grade Structures and Improvements

We anticipate the proposed garage basement walls will be close to existing buildings, roadways, and other improvements adjacent to the site. Design of permanent walls and shoring incorporating surcharge loads from adjacent existing structures and improvements or underpinning of the adjacent structures and improvements may be required.

5.2 FOUNDATIONS

We understand the project will likely consist of a three-story structure overlying ½ level of underground parking. We anticipate the underground parking level will be concrete construction and the three stories above will be wood construction. Based on this understanding and on estimated loading for this type of structure, we anticipate the building will be able to be supported by conventional spread footings or a conventional reinforced mat foundation bearing entirely on competent native soils or engineered fill. However, if softer clays and highly compressive clays, loose sands, or liquefiable soils, etc. are present directly beneath basement foundations, alternative foundations (deep foundations) or ground improvement elements may be required to support the structure.

Feasibility of and recommendations for shallow spread footings, a mat foundation, or another foundation system should be evaluated further during the design-level geotechnical investigation.

5.3 DESIGN-LEVEL GEOTECHNICAL INVESTIGATION

The design considerations and feasibility recommendations contained in this report were based on limited site development information, geotechnical data in our files, and available published information. We recommend that Cornerstone Earth Group be retained to perform a design-level geotechnical investigation, once detailed site development plans are available. The recommendations provided in this letter should not be used for project design.

SECTION 6: LIMITATIONS

This report, an instrument of professional service, has been prepared for the sole use of 3035 El Camino Real LLC specifically to support the design of the 3035 El Camino Real project in Santa Clara, California. The opinions, conclusions, and feasibility level recommendations presented in this report have been formulated in accordance with accepted geotechnical engineering practices that exist in Northern California at the time this report was prepared. No warranty, expressed or implied, is made or should be inferred.

Feasibility level recommendations in this report are based on limited site development information, geotechnical data in our files, and available published information.

3035 El Camino Real LLC may have provided Cornerstone with plans, reports and other documents prepared by others. 3035 El Camino Real LLC understands that Cornerstone reviewed and relied on the information presented in these documents and cannot be responsible for their accuracy.

Cornerstone prepared this report with the understanding that it is the responsibility of the owner or his representatives to see that the feasibility recommendations contained in this report are presented to other members of the design team and incorporated into the project plans and specifications, and that appropriate actions are taken to implement the geotechnical recommendations during construction.

Conclusions and recommendations presented in this report are valid as of the present time for the development as currently planned. Changes in the condition of the property or adjacent properties may occur with the passage of time, whether by natural processes or the acts of other persons. In addition, changes in applicable or appropriate standards may occur through legislation or the broadening of knowledge. Therefore, the conclusions and recommendations presented in this report may be invalidated, wholly or in part, by changes beyond Cornerstone's control. This report should be reviewed by Cornerstone after a period of three (3) years has elapsed from the date of this report. In addition, if the current project design is changed, then Cornerstone must review the proposed changes and provide supplemental recommendations, as needed.

An electronic transmission of this report may also have been issued. While Cornerstone has taken precautions to produce a complete and secure electronic transmission, please check the electronic transmission against the hard copy version for conformity.

Recommendations provided in this report are based on the assumption that Cornerstone will be retained to provide observation and testing services during construction to confirm that conditions are similar to that assumed for design, and to form an opinion as to whether the work has been performed in accordance with the project plans and specifications. If we are not retained for these services, Cornerstone cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of Cornerstone's report by others. Furthermore, Cornerstone will cease to be the Geotechnical-Engineer-of-Record if we are not retained for these services.

SECTION 7: REFERENCES

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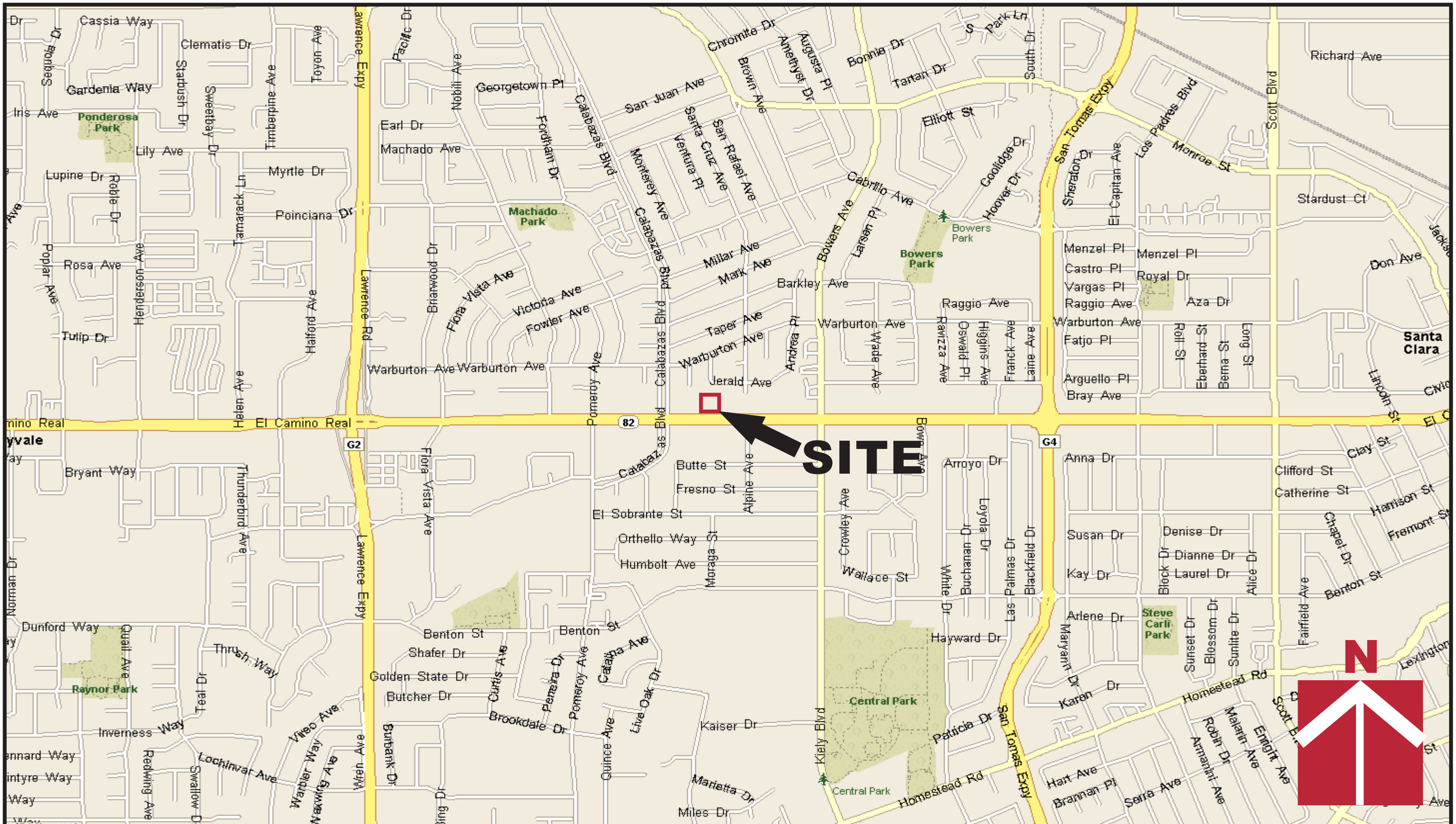

Vicinity Map

3035 El Camino Real
Santa Clara, CA

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Project Number	851-1-3
Figure Number	Figure 1
Date	June 2017
Drawn By	RRN

Base by Google Earth, dated 3/28/2015

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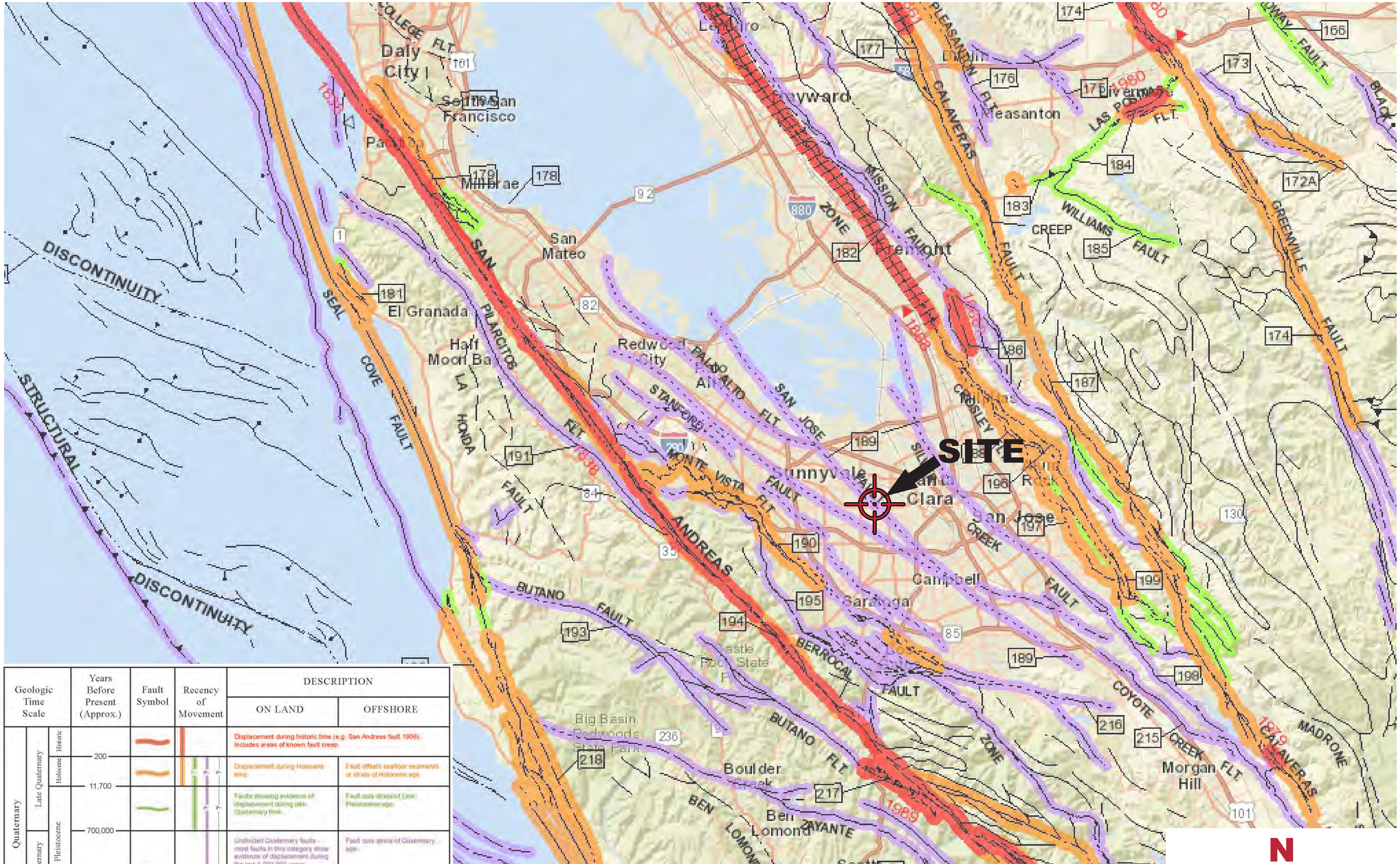
Site Plan	Project Number 851-1-3
3035 El Camino Real Santa Clara, CA	Figure Number Figure 2
	Date June 2017 / Drawn By RRN



Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION: ON LAND	DESCRIPTION: OFFSHORE
Quaternary	Late Quaternary	Historic	200			Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.	
		Holocene	11,700			Displacement during Holocene time	Fault offsets seafloor sediments or strata of Holocene age
		Pleistocene	700,000			Faults showing evidence of displacement during late Quaternary time	Fault cuts strata of Late Pleistocene age
	Early Quaternary		1,600,000			Undivided Quaternary faults - most faults in this category show evidence of displacement during the last 1,600,000 years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age	Fault cuts strata of Quaternary age
Pre-Quaternary			4.5 billion (Age of Earth)			Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive.	Fault cuts strata of Pliocene or older age.

Base by California Geological Survey - 2010 Fault Activity Map of California (Jennings and Bryant, 2010)

Project Number 851-1-3

Figure Number Figure 3

Date June 2017

Drawn By RRN

Regional Fault Map

3035 El Camino Real
Santa Clara, CA

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