SOILS SOUTHWEST, INC.

SOILS, MATERIALS AND ENVIRONMENTAL ENGINEERING CONSULTANTS

897 VIA LATA, SUITE N • COLTON, CA 92324 • (909) 370-0474 • (909) 370-0481 • FAX (909) 370-3156

Report of

Soils and Foundation Evaluations

Proposed Gas Station, Drive-in-Restaurant and Retail Center
SWC of Main Street and Ramona Expressway
Sobaba area of the City of San Jacinto, California

Project No. 17021-F2

November 8, 2017

Prepared for:

All Speck, Inc.
c/o Mr. William Speck
10073 Valley View Street
Cypress, California 90630

soilssouthwest@aol.com
Established 1984

SOILS SOUTHWEST, INC.

SOILS, MATERIALS AND ENVIRONMENTAL ENGINEERING CONSULTANTS

897 VIA LATA, SUITE N • COLTON, CA 92324 • (909) 370-0474 • (909) 370-0481 • FAX (909) 370-3156

November 8, 2017 Project No. 17021-F2

All Speck, Inc.
10073 Valley View Street
Cypress, California 90630

Attention: Mr. William Speck

Subject: Report of Soils and Foundation Evaluations
Proposed Gas Station, Drive-in-Restaurant and Retail Center
SWC of Main Street and Ramona Expressway
Sobaba area of the City of San Jacinto, California

Reference: Preliminary Conceptual Plan dated 5-1-17 by MPA Architects, Inc.

Gentlemen:

Presented herewith is the report of soils and foundation evaluations conducted for the site of the proposed gasd station, In-n-Out drive in and retail commercial center to be constructed on vacant parcels located at the southwest intersection of Main Street and Ramona Expressway, City of San Jacinto, Riverside County, California. In absence of detailed grading and/or development plan, the recommendations supplied should be considered as "preliminary", subject to revisions following grading plan rebview.

Based on review of the 1980 CDMG map, attached, it is understood that the site is not situated within an A-P Special Study Zone. However, review of the Riverside County web search indicate the subject property and its vicinity may be moderately susceptible to earthquake induced potential for soil liquefactions.

Based on the investigations completed it is our opinion that the planned development should be considered feasible, provided the recommendations included are incorporated in deign and construction.

The findings and conclusions presented are based on the general principles and practices as per the current CBC, and as used by other geotechnical professionals practicing in Southern California. We offer no other warranty, express or implied.

Respectfully submitted,
Soils Southwest, Inc.

Moloy Gupta, RCE 31708

John Flippin
Project Coordinator

soilssouthwest@aol.com

Established 1984

1.0 Introduction

1.1 Purpose and Scope of Work

This report presents the results of Soils and Foundation Evaluations conducted for the site of the proposed gas station, drive-in restaurant and retail commercial center to be constructed on vacant parcels located at the southwest corner of Main Street and Ramona Expressway, City of San Jacinto, Riverside County, California.

The soils/material descriptions included are based on visual observations during test explorations conducted for the site, supplemented by the necessary laboratory testing completed as described herein. Being beyond Scope of Work no Phase I Environmental Site Assessment (ESA) or geologic evaluations are included. Reports on such will be supplied if, and when requested.

The recommendations contained reflect our best estimate of the soils conditions as encountered during the current field investigations conducted. It is not to be considered as a warranty of the soils existing for other areas, or for the depths beyond the explorations completed at this time.

The recommendations supplied should be considered valid and applicable when the following conditions, in minimum, are observed:

i. Pre-grade meeting with contractor, public agency and soils engineer,
ii. Excavated bottom inspections and verifications by soils engineer prior to backfill placement,
iii. Continuous observations and testing during site preparation and structural fill soils placement,
iv. Observation and inspection of footing trench prior to steel and concrete placement,
v. Plumbing trench backfill placement prior to concrete slab-on-grade placement,
vi. On and off-site utility trench backfill testing and verifications, and
vii. Consultations as required during construction, or upon request.

1.2 Site Description

The near level rectangular shaped subject site is currently vacant and undeveloped. In general, the site is bounded by Main Street on the north, by the paved Donna Way followed by Sobaba Indian Health Clinic on the south, by Ramona Expressway on the east, and single family dwellings on the west. Overall vertical relief within the property is unknown; however sheet flow from incidental rainfall appears to flow towards the northwest. With the exception of tilled weeds and widely scattered debris, presence of no other significant features are noted.

1.3 Proposed Development

No detailed development and/or grading plans are prepared and none such is available for our review. However, based on the preliminary project information supplied, it is understood that the subject development will primarily include a gas station, In-n-Out drive-in restaurant and retail. Conventional construction of wood frame and stucco is expected, along with associated parking, paving and driveways and others. Based on existing topography and adjacent developments, moderate site preparations and grading, including placement of imported fill soils, are anticipated. Static structural loadings of 40 kip and 4 klf are assumed in preparation this report. Moderate site preparations and grading should be anticipated for the development planned.

1.4 Geotechnical Investigation

The project geotechnical investigation included nine (9) exploratory test borings by using a hollow-stem auger drill rig supplied by Cal Pac Drilling, advanced to maximum 51 feet below grade. Prior to test excavations, an underground utility clearance was established from Underground Service Alert of Southern California and from other involved utility agencies. Approximate test boring locations are shown on the attached Plate 1. Following necessary soil sampling and in-situ testing, the boring locations were backfilled with local soils using minimum compaction effort. Supplemental densifications within the test boring locations should be anticipated within the test locations described.

During test excavations, representative bulk and undisturbed California ring samples were procured and Standard Penetration (SPT) blow-counts were recorded. Collected samples were subsequently sent to our laboratory for necessary geotechnical testing.

1.5 Laboratory Testing

Representative bulk and undisturbed site soils sampled were tested in in-house laboratory to aid in soils classifications and to evaluate relevant engineering properties pertaining to the project requirements. In general, the laboratory testing included the following:

- In-situ moisture contents and dry density (ASTM Standard D2216)
- Maximum dry density and optimum moisture content (ASTM Standard D1557)
- Direct Shear (ASTM Standard D3080)
- Soil Consolidation (ASTM Standard D2435)
- Soil gradation analysis (ASTM Standard D422), and
- Atterburg Limits (ASTM Standard D4318)

Description of the test results and test procedures used are provided in Appendix B.

- Based on the field investigation and laboratory testing, engineering analyses and evaluations were made on which to base our preliminary recommendations for design of foundations, slab-on-grade, paving and parking, site grading, utility trench excavations backfill, estimated soils potential for expansion, site preparations and grading and monitoring during construction.

- Preparation of this report for initial use by the project design professionals. The recommendations supplied should be considered as "preliminary" and may require substantial revisions and/or upgrading following final grading/development plan review.

2.0 Geotechnical Characteristics

2.1 Soils Conditions

Based on the geotechnical investigations completed at this time it is our opinion that the site soils primarily consist of upper loose and low-density fills or upper loose (SPT <10) to slightly dense silty sand and poorly graded sand (SP-SM) estimated to an approximate depth of about 5 to 7 feet below grade, overlying deposits of medium dense to dense gravelly sand (GP-SP) with scattered minor rocks to the maximum 51 feet depth explored. Presence of free groundwater was encountered at about 42 feet below grade.

Based on review of the 1980 CDMG map, attached, it is understood that the site is not situated within an A-P Special Study Zone. However, based on the County of Riverside website, along with the evaluations included herein, it is our opinion that the area of the planned development and its immediate vicinity, may be susceptible to earthquake induced potentials for soil liquefaction causing excessive ground settlements. Presence of the low-density near grade soils as encountered may also cause moderate deformations under static loading conditions

Laboratory shear tests conducted on the upper bulk samples remolded to 90% indicate moderate shear strengths under increased soil moisture conditions. Results of the laboratory shear tests are provided in Plate B-1 of this report. Soil consolidation testing conducted on similar remolded samples indicate potential for "tolerable" soil settlement of less than 2% may be expected from conventional static structural loadings for footings and concrete slab-on-grade . The results of laboratory determined soils consolidation potential is shown on Plate B-2 in Appendix B.

Silty sandy in nature, the near grade soils encountered are considered "very low" in expansion potential requiring no special construction requirements other than those as recommended herein. Supplemental soil expansion testing is recommended following mass grading completion.

A formal liquefaction induced soil settlement analysis is performed based on the recorded SPT blow-counts and using the CivilTech computer program Software V5.2E LiquefyPro using Ishihara/Yoshimine settlement analyses method. Results of the study indicate "pre-construction" potential for overall site-soils liquefaction induced ground settlement of the site and its general vicinity up to about 9.61 inches, while the "Post-Construction" total settlement potential is estimated to about 2.63-inch.The settlement evaluations are attached.

When seismically induced soil liquefaction phenomenon and associated ground settlements potentials and their adverse effects on structures *cannot be fully mitigated,* it is our opinion that implementation of the mitigation measures as described herein, may *minimize* the potentials for seismically induced adverse effects to structures to "a tolerable and to an acceptable level of risks"; more specifically to "effectively minimize/reduce" the adversities to "acceptable levels" (CCR Title 14, Section 3721). Accordingly, th*e geotechnical recommendations included are with an intention to achieve an "acceptable level of risk" to reduce earthquake induced potential excessive ground settlements so as to allow sufficient time for occupants to seek safety without total collapse of the structure built.*

The recommendations described are in no way guarantee total structural integrity following severe ground shaking, therby requiring post-earthquake structural repair.

If "total" or "near total" elimination of the ground distress due to soil liquefaction can not be tolerated, such may be accomplished following additional site explorations, laboratory analyses, engineering evaluations and recommendations to include ground improvements in form of:

(i) Rigid Foundations,
(ii) Compaction grouting,
(iii) Dynamic consolidation;
(iv) Compaction piles;
(v) Compaction with vibratory probes
(vi) Driven pile foundation, and/or
(vii) Post-tension load bearing concrete, or others.

Supplemental recommendations on such will be supplied when requested.

2.2 Subsurface Variations

During grading, buried irrigation, debris, organic and others may be encountered. In addition, variations in soil strata, their continuity and orientations may be expected. Due to the nature and depositional characteristics of the natural soils encountered, care should be exercised interpolating or extrapolating the subsurface soils conditions existing in between and beyond the test explorations conducted.

2.3 Groundwater

Fluctuations in groundwater levels can occur due to seasonal variations in the amount of rainfall, runoff, altered natural drainage paths, and other factors not evident at the time the borings were completed. Consequently, the project civil engineer and grading contractor should establish a surface water runoff pattern that is directed away from the structural pads, once constructed. Presence of free groundwater was encountered at about 40-42 feet as described in the test boring logs attached. While the historical ground water is reported at a depth in excess of 50 feet as described in the following table, the presence of the groundwater as encountered may be considered as localized and perched, adverse effect of which, however cannot be ignored.

The following table lists the nearest well to the site as listed by the local reporting agency.

GROUNDWATER TABLE	
Reporting Agency	California Department of Water Resources
Well Number	04S/01W-35J002S
Well Name	EMWD 10346 Site Code 337802N1169483W001
Well Monitoring Agency	5035
Well Location: Township/Range/Section	T04S/R01W-35
Current Depth to Water (Measured in feet)	430.4
Current Date Water was Measured	September 28, 2016
Depth to Water (Measured in feet) (Shallowest)	395.6
Date Water was Measured (Shallowest)	March 27, 2012

2.4 Excavatability

It is our opinion that the grading required for the project may be accomplished using conventional heavy-duty construction equipment. However, some difficulty may be expected during deep trenching due to soil caving. No blasting or jack-hammering, however, is anticipated.

2.5 Soil Corrosivity

Since change in soil chemical compositions are expected during site preparations and grading, no soil laboratory chemical testing on existing soils are evaluated at this time. Following mass grading completions, it is suggested that soil chemical evaluations should be conducted for the soils expected in contact with concrete and metals. Evaluations of such should include, in minimum, pH, sulfate, chloride and resistivity. Post-grading results of such will be supplied, if and, when requested.

3.0 Faulting And Seismicity

3.1 Faulting and Seismicity

Based on the information published by the Department of Conservation, State of California, it is understood that the site is *not* situated within an A-P Special Study Zone (*where a fault(s) run through or adjacent to the development site*) and the site soils are considered non-susceptible to soil liquefaction in event of a strong motion earthquake.

Considering Southern California is in a seismically risky area for structures, with the conventional design/construction know-how currently being used, it is not possible to construct structures economically that are totally resistant to earthquake-related hazards. However, it is our opinion that implementation of the current CBC along with the geotechnical recommendations in design and construction as described in this report may reduce/minimize earthquake induced potential hazards, such as liquefaction-induced ground and structural settlements.

3.2 Direct or Primary Seismic Hazards

Surface ground rupture along with active fault zones and ground shaking represent primary or direct seismic hazards to structures. There are no known active or potentially active faults that pass through or towards the subject site, and the site is not situated within an AP Special Studies Zone. According to the current CBC, the site is considered within Seismic Zone 4. As a result, it is likely that during the life expectancy of the structure built, moderate to severe ground shaking may have potential for adverse effects on the site.

3.3 Induced or Secondary Seismic Hazards

In addition to ground shaking, effects of seismic activity may include flooding, land-sliding, lateral spreading, settlements and subsidence. Potential effects of such are discussed below.

3.3.1 Flooding

Flooding hazards include tsunamis (seismic sea waves), Seiches, and failure of manmade reservoirs, tanks and aqueducts. The potential for these hazards are considered "remote" considering the inland site location and the distance to known nearby bodies of water.

3.3.2 Land Sliding

Considering the subject site being near level, potential for seismically land sliding should be considered as "remote".

3.3.3 Lateral Spreading

Seismically induced lateral spreading involves lateral movement of soils due to ground shaking. Lateral spreading is demonstrated by near vertical cracks with predominantly horizontal movement of the soil mass involved.

Methods for mitigating lateral spread hazards may include, among others, the following:

a. Edge containment structures (e.g.,berms, dikes, sea walls, retaining structures, compacted soil zones);
b. Removal or treatment of liquefiable soils to reduce liquefaction potential;
c. Modification of site geometry to reduce the risk of translational site instability; and/or
d. Drainage to lower the groundwater table below the level of the liquefiable soils,
e. Excavation and removal or recompaction of potentially liquefiable soils,
f. In-situ ground densification (e.g. compaction with vibratory probes, dynamic consolidation, compaction piles, blasting densification, compaction grouting);
g. Other types of ground improvement (eg., permeation grouting, columnar jet grouting, gravel drains, surcharge pre-loading, structural fills, dewatering etc.), and
h. Reinforced shallow foundation (e.g. grade beams, combined footings, reinforced or post-tensioned slabs, rigid raft foundations.

The topography of the site being near level, it is our opinion that the potential for seismically induced lateral spreading should be considered as "remote".

Design of the proposed structures or facilities is recommended to withstand predicted ground softening and/or predicted vertical and lateral ground displacements, to *an acceptable level of risk*.

3.4 Seismically Induced Settlement and Subsidence (Pre and Post-Construction)

The site is situated at about 1.2 miles from the San Jacinto-San Jacinto Valley Fault capable of generating an earthquake magnitude of M=6.9 and PGA of 0.639g (10%) . Considering the proximity of the earthquake fault as described, it is our opinion that potential for some "total and differential settlements" due to ground shaking may be expected, with severity increasing considerably due to potential for site soils liquefaction susceptibility potential. Based on site specific seismically induced settlement analysis using CivilTech Software, V5.2E LiquefyPro, it is our opinion that with a Factor of Safety FS=1.1, earthquake induced total and differential settlements for saturated and dry soils may described below.

The results of the seismically induced pre-construction ground settlement evaluations are provided in the following table and in Appendix D of this report.

TABLE 3.4.1 Preliminary Settlement Analysis (Pre-Construction)

DYNAMIC SETTLEMENT	MEASURED IN INCH.
Settlement of Saturated Soils	2.10
Settlement of Dry Soils	10.20
Total Settlement of Saturated and Dry Soils	12.30
DIFFERENTIAL SETTLEMENT	6.151-8.119

Post-Construction similar analyses indicate a total ground settlements to about 2.11-inch, and differential settlements varying from 1.056-inch to 1.394-inch. Post-Construction settlement evaluations are attached.

3.5 Seismic Design Coordinates

The design spectrum was developed based on the 2016 CBC. Site Coordinates of 33.783601°N, -116.938786 W was used to establish the seismic design parameters presented below.

3.6 Seismic Design Coefficients

For foundation and structural design, the following seismic parameters are suggested based on the current 2016 CBC:

Recommended values are based upon USGS ASCE 7-10 (March 2013 erata) Seismic Hazard Maps-Fault Parameters and the California Geologic Survey: PSHA Ground Motion Interpolator Supplemental seismic parameters are provided in Appendix C of this report.

The following presents the seismic design parameters as based on the currently published California Geological Survey and 2016 CBC.

Seismic Design Parameters

CBC Chapter 16	2016 ASCE 7-10 (March 2013 erata) Seismic Design Parameters	Recommended Values
1613A.3.2	Site Class	D
1613A.3.1	The mapped spectral accelerations at short period	S_s
1613A.3.1	The mapped spectral accelerations at 1.0-second period	S_1
1613A.3.3(1)	Seismic Coefficient, S_s	2.427
1613A.3.3(2)	Seismic Coefficient, S_1	1.081 g
1613A.3.3(1)	Site Class D / Seismic Coefficient, F_a	1.000 g
1613A3.3(2)	Site Class D / Seismic Coefficient, F_v	1.500 g
16A-37 Equation	Spectral Response Accelerations, $S_{Ms} = F_a S_s$	2.427 g
16A-38 Equation	Spectral Response Accelerations, $S_{M1} = F_v S_1$	1.621 g
16A-39 Equation	Design Spectral Response Accelerations, $S_{Ds} = 2/3 \times S_{Ms}$	1.618 g
16A-40 Equation	Design Spectral Response Accelerations, $S_{D1} = 2/3 \times S_{M1}$	1.081 g

TABLE 3.6A.2 Seismic Source Type

Based on California Geological Survey-Probabilistic Seismic Hazard Assessment, Peak Horizontal Ground Acceleration (PHGA) having 10% percent probability of exceedance in a 50- year period is described as below:

Seismic Source Type / Appendix C	
Nearest Maximum Fault Magnitude	M>\=6.9
Peak Horizontal Ground Acceleration (PHGA) @10% "damping"	0.639g

4.0 Evaluations and Recommendations

4.1 General Evaluations

Based on field explorations, laboratory testing and subsequent engineering analysis, the following conclusions and recommendations are presented for the site under study:

(I) From geotechnical viewpoint, the site is considered grossly stable under *static loading* conditions. The proposed development should be considered feasible, provided the recommendations included are incorporated in design and construction. Moderate site preparations and grading should be expected.

With the presence of potentially liquefiable soils capable of excessive ground settlement during a strong motion earthquake, for structural support, site preparation and grading may include use of reinforced engineered fill soils placement, along with implementing the foundation systems as described.

(II) During mass grading the recommended subexcavation depth should be considered as "minimum". Localized deeper subexcavations may be required within areas underlain by buried debris, utilities, presence of deeper undocumented fills and /or soft unstable soils or others. It will be the responsibility of the grading contractor to inform the project soils engineer the presence of such fills, debris or utilities.

(III) In order to minimize potential for dynamically induced excessive differential settlements to load bearing footings, it is recommended that structural footings should be established exclusively into engineered fills of local soils compacted to the minimum percent compaction as described in later section of this report. Construction of footings and slabs straddling over cut/fill transition shall be avoided.

(IV) Structural design consideration should include probability for moderate to high peak ground acceleration from relatively active nearby earthquake faults with the PGA as described. Implementing the seismic design parameters and procedures as outlined in the current CBC are anticipated to minimize the potential adverse effects of ground shaking. Use of more conservative seismic design parameters will be entirely at the discretion of the project structural engineer.

(V) Provisions should be maintained during construction to divert incidental rainfall away from the structural pads, once constructed.

(VI) Along with adequate structural design and construction, it is our opinion that proposed development will not adversely affect the stability of the site or it's adjacent.

(Vii) Considering earthquake Southern California, use of flexible utility connections should be considered along with regular cosmetic repair.

4.1.1 Preparations for Structural Pad

For adequate structural bearing, site preparations and grading should include, in minimum, subexcavations of the near surface soils measuring vertically to either (i) to minimum 5-8 feet below the current grade surface, or (ii) the planned deepest footing embedment + 24-inch, or to the depth of underlying moist and dense natural soils as approved by soils engineer, whichever is greater.

Site grading should also include 6 to 8-inch scarification, moisture conditioning to near Optimum Moisture Content, followed by replacement of the approved local excavated soils in 6 to 8-inch thick vertical lifts compacted to *minimum 95 percent* of the soil's Maximum Dry Density as determined by the ASTM D1557 test method. Proper selection of construction equipment during grading and construction will be contractor's responsibility.

Site preparations and earth work should be in accordance with the applicable grading recommendations as provided in the current CBC, and as recommended in this report.

The subexcavation depths described should be considered "approximate". Localized additional subexcavations may be required within areas underlain by undocumented old fills, buried utilities, abandoned sewer, buried septic systems and others.

Prior to grading, the site should be cleared of surface and subsurface obstructions, including vegetation, roots, organic matter, debris, septic tanks, and cesspools, etc. During grading, it should be the responsibility of the grading contractor to clearly mark the future building footprint areas and minimum five feet beyond, along with the final pad grade elevations that will be established. Being beyond our expertise and scope of work, we assume no responsibility for lines and grades established for the project.

4.2 Foundation Recommendations

To minimize potentials for seismically induced structural distress, it is our opinion that the structure planned may be supported using either (i) conventional checkered rigid footings, or (ii) rigid mat foundation system, adequately reinforced and founded exclusively into engineered fills of local sandy soils or on approved imported non-expansive soils **compacted to minimum 95%.**

4.2.1 Alternative I: Conventional Checkered/WaffleType Rigid Footings

Checkered foundations, in form of exterior load bearing conventional walls along with interior grade beams, may be considered as designed based on the following equations:

Continuous Wall Footing: $q_{allowable} = 600 + 750d + 300b$
Isolated Square: $q_{allowable} = 780 + 750d + 240b$, where

$q_{allowable}$ = allowable soil vertical bearing capacity, in psf.
d= footing depth, min. 18-inch, b = footing width, min. 15-inch.

The above soil bearing capacit0es may be increased for each additional depth in footing and width in excess of the minimum recommended. Total maximum vertical bearing capacity is recommended not to exceed 3500 psf. If normal code requirements are applied, the above capacities may further be increased by an additional 1/3 for short duration of loading which includes the effect of wind and seismic forces. The load bearing footings should be reinforced with minimum 2-#4 near the near the top and 2-#4 rebar near bottom of continuous wall and grade beams recommended.

Actual foundation dimensions (b & d) and reinforcement requirements should be provided by the project structural engineer based on anticipated structural dead loadings, soil bearing capacity and Peak Ground Acceleration (PGA) described.

From geotechnical viewpoint, the perimeter wall footings should be sized to minimum 15-inch wide, embedded to minimum18-inch below the lowest adjacent final grade, reinforced adequately using 2-#4 rebar placed near the top and 2-#4 rebar near bottom of continuous wall and interior grade beams, or as required by the project structural engineer.

In addition to the exterior load bearing foundations described, use of similarly sized and reinforced interior grade beams should be considered spaced at an interval not exceeding 15 feet on-center,

rigidly connected to the exterior load bearing wall foundations and interior isolated pier footings, if any,

4.2.2 Alternative II : Rigid Mat Foundations

As an alternative, for adequate structural support, minimum 18-inch thick rigid mat foundations may be considered bearing on engineered fills and adequately reinforced as recommended by the project structural engineer.

4.3 Foundation Settlements under Static Loading Conditions

Based on the laboratory determined soils consolidation characteristics, settlements to properly designed and constructed foundations supported exclusively into engineered fills of site soils or its equivalent or better, and carrying the maximum anticipated structural loadings, are expected to be within tolerable limits. Under static loading conditions, over a 40-ft. span, estimated total and differential settlements are about 1 and 1/2-inch, respectively. Most of the elastic deformations, however, are expected to occur during construction.

It is recommended that excavated footing trenches should be verified, tested and certified by soils engineer immediately prior to concrete placement. Soils Southwest, Inc. will assume no responsibility for any structural distress in event the excavated footings are not verified prior to concrete placement.

4.4 Concrete Slab-on-Grade

The prepared subgrades to receive footings should be considered adequate for concrete slab-on-grade placement. For commercial/retail use, concrete slabs should be a minimum 4.5-inch thick (net), reinforced with #3 rebar at 18-inch o/c., or as recommended by design engineer considering expected dead and seismic loadings. Use of low-slump concrete is recommended. In order to minimize potentials for cracking and warping, *no concrete should be placed on excessive wet subgrade, or during extreme weather conditions, such as extreme heat and high Santa Ana wind conditions*. Slab subgrades should be moistened to near Optimum Moisture conditions as would be expected in any such concrete placement. Use of low-slump concrete is recommended.

Within moisture sensitive areas (office, store and others), concrete slabs should be underlain by 2-inch of compacted clean sand of Sand Equivalent, SE, of minimum 30, followed by commercially available 10-mil thick Stego Wrap, or its equivalent. Actual slab thickness and reinforcement requirements should be as required by the project structural engineer.

In addition, it is recommended that utility trenches underlying concrete slabs should be thoroughly backfilled with gravelly sandy soils and such should be mechanically compacted to the minimum as recommended. Water jetting should not be allowed in lieu of mechanical compaction recommended. Slab subgrades should be verified and certified by soils engineer immediately prior to concrete pour. Without verifications, Soils Southwest will assume no responsibility, what-so-ever, for any structural distress during life-time use of the development proposed.

Within moisture sensitive areas, concrete slabs should be underlain by 2-inch of compacted clean sand, followed by 10-mil thick commercially available Stego Wrap or Visqueen or others, underlain b an additional 2-oinch thick compacted sand. The gravelly sands used should have a Sand Equivalent, SE of 30, or greater

Subgrades to receive concrete should be "pre-moistened" as would be expected in any such concrete placement. Use of low-slump concrete is recommended. In addition, it is recommended that utility trenches underlying concrete slabs and driveways should be thoroughly backfilled with gravelly sandy soils mechanically compacted to minimum 90% (+2 feet below final grade) and 95% (0-2 feet below final grade) immediately prior to concrete pour.

4.4.1 Concrete Driveways

For estimation purpose, concrete driveways, if any, should be minimum 5.5-inch thick (net), placed over local silty sandy soils compacted to at least 95%. Driveway slab reinforcing and construction and expansion joints etc. should be incorporated as required by the project structural engineer. Actual thickness should be recommended the project structural engineer based on design using a soil Subgrade Reaction (ks) of 150-300 kcf. Supplemental recommendations are provided in the later section of his report.

4.4.2 Concrete Curing

The following recommendations are intended to reduce potential for concrete slabs-on-grade cracking due to concrete inadequate curing or ground settlements. Even when implemented, foundations, stucco walls and concrete slabs-on-grade may display some minor cracking due to minor soil movement and/or concrete shrinkage.

To reduce and/or control concrete shrinkage, curling or cracking, concrete slabs shall be "cured" by using water prior to structural load placement. The following general procedures are recommended:

1. CONCRETE STRENGTH @ 28 DAYS SHOULD BE AS DETERMINED BY STRUCTUAL ENGINEER.
2. WAIT 14 DAYS BEFORE OPERATING VEHICLES AND EQUIPMENT ON SLABS.
3. DO NOT POUR CONCRETE WHEN THE TEMPERATURE EXCEEDS 90^{O} F OR 80^{O} F WHEN THE WIND EXCEEDS 12MPH.
4. START CURING AS SOON AS HARD TROWELING IS DONE. ALL CURING SHALL BE WET CURING BY USING BURLAP FOR A MINIMUM OF 7 DAYS. BURLAP MUST BE PLACED WITHIN 2 HOURS OF POURING (NO SPRAY CURING).
5. WHEN WIND, TEMPERATURE AND HUMIDITY CONDITIONS CAUSE EARLY DISAPPEARANCE OF BLEED WATER, STEPS SHALL BE TAKEN TO USE A FOG SPRAY. CURING SHALL COMMENCE IMMEDIATELY AFTER FINISHING TROWELING.

The occurrence of concrete cracking may also be reduced and/or controlled by limiting the slump of the concrete used, proper concrete placement and curing, and by placement of crack control joints at reasonable intervals, in particular, where re-entrant slab corners occur. For standard crack control maximum expansion joint spacing of 12 feet should not be exceeded. Shorter distance between joint spacing would provide greater crack control. Joints at curves and angle points are suggested as recommended by structural engineer.

4.5 Active Pressure and Passive Resistance

With level backfills, equivalent active lateral fluid pressures of 33 pcf and 60 pcf may be considered for "unrestrained" and "restrained" structural conditions, respectively.Resistance to lateral loads can be provided by friction acting at the base of foundation and by passive earth pressures. A coefficient of friction of 0.3 may be assumed with normal dead load forces for footings established into

compacted fills. An allowable passive lateral earth resistance of 230 lb/ft2./ft depths may be assumed for sides of foundations poured against compacted fills. Maximum passive earth resistance is recommended not to exceed 2300 lb/ft2.

In design, the above values may be increased by 1/3 when designing for short duration wind or seismic forces. The above values are based on footings placed on compacted engineered fills. In the case where footing sides are formed, all backfill placed against the footings should be compacted to at least the minimum compaction requirements as described.

4.6 Shrinkage and Subsidence

With the presence of upper loose and compressible local soils as described; it is our opinion that such soils may be subjected to volume change during grading. In average, such volume change due to shrinkage is estimated to about 15-20 percent, or more.

Further volume change may be expected following removal of undetected buried utilities etc. Supplemental shrinkage is anticipated during preparation of the underlying natural soils prior to compacted fills placement. Such subsoil subsidence may be approximated to about 2.5-inch when conventional construction equipments are used.

4.7 Construction Consideration

4.7.1 Unsupported Excavation

Temporary construction excavations up to an approximate depth of 5 feet may be made without any lateral support. It is recommended that no surcharge loads such as construction equipments, be allowed within a line drawn upward at 45 degree from the toe of temporary excavations. Use of sloping for deep excavation may be considered where plan excavation dimensions are not constrained by existing development.

4.7.2 Supported Excavations

If vertical excavations exceeding 5 feet become warranted, for the excavation adjacent to existing development, such should be achieved using shoring to support side walls.

4.8 Structural Pavement Thickness

Flexible Paving/Parking

Anticipating change in soil-matrix during mass grading, no actual soil R-value determination is currently made. Based on estimated Traffic Index (TI) and on assumed soils R-value of 45, for estimation purpose, the following paving sections may be considered.

Preliminary Pavement Design

Preliminary On-Site Asphalt Concrete (AC) Pavement Thickness	
Assumed Traffic Index	6.5
R-value (assumed)	45
AC Thickness (inches)	4.0*
AB Thickness (inches)	4.5*

Notes: AC - Asphaltic Concrete, AB - Aggregate Base

For a.c over base, upper 12-inch of subgrade soils should be compacted to minimum 90%. Base material used should conform to the Caltrans Class II specifications, compacted to minimum 95%.

4.9 Concrete Flatwork/Driveways

Concrete flatworks (such as walkways and driveways) have potential for cracking due to fluctuations in soil volume in relationship to moisture content changes. In order to prevent excessive cracking or lifting, concrete paving should meet the minimum guidelines as shown in the table below. It is our opinion that when designed and adequately constructed, the following guidelines will help to "reduce" potential for irregular cracking or lifting, but will not eliminate all concrete distress.

	Private Sidewalks	*Private Drives*	*Patios/Entryways*	*City Sidewalk/Curb and Gutters*
Minimum Thickness (in.)	4 (nominal)	5.5 (full)	4 (full)	City/Agency Standard
Pressoaking (+/-2% Optimum)	12 inches	12 inches	12 inches	City/Agency Standard
Reinforcement	—	No. 3 at 24 inches on center	No. 3 at 24 inches on centers	City/Agency Standard
Thickness Edge	—	8" x 8"	8" x 8 "	City/Agency Standard
Crack Control	Saw cut or deep open tool joint to a minimum of 1/3 of concrete thickness	Saw cut or deep open tool joint to a minimum of 1/3 of concrete thickness	Saw cut or deep open tool joint to a minimum of 1/3 of concrete thickness	City/Agency Standard
Maximum Joint Spacing	5 feet	10 feet or quarter cut whichever is closer	6 feet	City/Agency Standard

No concrete slabs, sidewalks and flatworks should be placed bearing directly on the surface soils currently existing. The prepared subgrades to receive footings should be adequate for concrete slab-on-grade placement. The maximum density of the base material should be more than its supporting subgrade material.

Actual driveway slab reinforcing and construction and expansion joints etc. should be incorporated if required by the project structural engineer.

Subgrades to receive concrete should be "pre-moistened" as would be expected in any such concrete placement. Use of low-slump concrete is recommended. In addition, it is recommended that utility trenches underlying concrete slabs and driveways should be thoroughly backfilled with gravelly sandy soils mechanically compacted to minimum 90% (+2 feet below final grade) and 95% (0-2 feet below final grade) immediately prior to concrete pour.

4.10 Utility Trench Backfill

Utility trench backfill within the structural pad and beyond should be placed in accordance with the following recommendations:

- Trench backfill for wet and dry utilities should be placed in 6 to 8-inch thick lifts and mechanically compacted to minimum 90 percent. Jetting is not recommended as a substitute for backfill compaction. Within paving areas, such backfills should be compacted to minimum 90% more than two feet below final grade and 95% from 0 to 2.0 feet.

- Exterior trenches along foundations or a toe of a slope extending below a 1:1 imaginary line projected from outside bottom edge of the footing or toe of the slope, should be compacted to 90 percent of the Maximum Dry Density for the soils used as backfill. All trench excavations should conform to the requirements and safety as specified by the Cal-Osha

4.11 Soil Caving

With the dry silty nature of the local soils, some caving may be expected. Temporary excavations in excess of 5 feet should be feasible at 2 to 1 (h:v) slope ration or flatter, and as per the construction guidelines provided by Cal-Osha.

4.12 Pre-Construction Meeting

It is suggested that no site clearance and grading should be commenced without the presence of a representative of this office. On-site pre-grading meeting should be arranged between the soils engineer and grading contractor. Over-night pre-moistening is recommended.

4.13 Seasonal Limitations

No fill shall be placed, spread or rolled during unfavorable weather conditions. Where the work is interrupted by heavy rains, fill operations shall not be resumed until moisture conditions are considered favorable by the soils engineer.

4.14 Planters

Use of planters requiring heavy irrigation should be restricted adjacent to footings. In event such becomes unavoidable, planter boxes with sealed bottoms, should be considered.

4.15 Landscape Maintenance

Only the amount of irrigation necessary to sustain plant life should be provided. Pad drainage should be directed towards streets and to other approved areas away from foundations. Slope areas should be planted with draught resistant vegetation. Over watering landscape areas could adversely affect the site development during its life-time use.

4.16 Observations and Testing During Construction

Recommendations provided are based on the assumption that structural footings and slab-on-grade be established exclusively into engineered fill of local sandy soils compacted to minimum 90%. Excavated footings and slab subgrades should be inspected, verified and certified by soils engineer prior to steel and concrete placement. Structural backfills discussed, should be placed under direct observations and testing by this facility. Excess soils generated from footing excavations should be removed from pad areas and such should not be allowed on subgrades underlying concrete slab.

In event other geotechnical consultants are retained during grading, Soils Southwest, Inc. will not be held responsible for any distress that may occur during life-time use of the structures constructed.

4.17 Grading Plan and Foundation Details Review

No topographic, grading or development plans are available at this time for review. Precise grading plans, when prepared, should be available to verify applicability of the assumptions and the recommendations supplied. If during construction, conditions are observed different from those as presented, revised and/or supplemental recommendations will be required.

Additionally, foundation details prepared by structural engineer should be available to verify the minimum foundation dimensions and reinforcement requirements as described in this report.

5.0 General Site Preparations and Grading

Site preparations and grading should involve over-excavation and replacement of local soils as structural fill compacted to the minimum relative compactions as described earlier.

Structural Backfill:

Local soils free of debris, large rocks and organic should be considered suitable for reuse as backfill. Loose soils, formwork and debris should be removed prior to backfilling retaining walls. On-site sand backfill should be placed and compacted in accordance with the recommended specifications provided below. Where space limitations do not allow conventional backfilling operations, special backfill materials and procedures may be required. Pea gravel or other select backfill can be used in limited space areas. Recommendations for placement and densification of pea gravel or other special backfill can be provided during construction.

Site Drainage:

Adequate positive drainage should be provided away from the structure to prevent water from ponding and to reduce percolation of water into backfill. A desirable slope for surface drainage is 2 percent in landscape areas and 1 percent in paved areas. Planters and landscaped areas adjacent to building perimeter should be designed to minimize water filtration into sub-soils. Considerations should be given to the use of closed planter bottoms, concrete slabs and perimeter sub-drains where applicable.

Utility Trenches:

Buried utility conduits should be bedded and backfilled around the conduit in accordance with the project specifications. Where conduit underlies concrete slab-on-grade and pavement, the remaining trench backfill above the pipes should be placed and compacted in accordance with the following grading specifications.

General Grading Recommendations:

Recommended general specifications for surface preparation to receive fill and compaction for structural and utility trench backfill and others are presented below.

1. Areas to be graded or paved, shall be grubbed, stripped and cleaned of all buried and undetected debris, structures, concrete, vegetation and other deleterious materials prior to grading.

2. Where compacted fill is to provide vertical support for foundations, all loose, soft and other incompetent soils should be removed to full depth as approved by soils engineer, or at least up to the depth as previously described in this report. The areas of such removal should extend at least 5 feet beyond the perimeter of exterior foundation limit or to the extent as approved by soils engineer during grading.

3. The recommended compaction for fill to support foundations and slab-on-grade is 95% of the maximum dry density at or near optimum moisture content. To minimize any potential differential settlement for foundations and slab-on-grade straddling over cut and fill, the cut portion should be over-excavated and replaced as compacted fill, compacted to the maximum dry density as described in this report.

4. All utility trenches within the building pad areas and beyond, should be backfilled with granular material and such should be compacted to at least 90% of the maximum density for the material used.

5. Compaction for all fill soils shall be determined relative to the maximum dry density as determined by ASTM D1557 compaction method. In-situ field density of compacted fill shall be determined by ASTM Standard D1556, or by other approved procedures.

6. Imported soils if required shall be clean, granular, non-expansive in nature as approved by soils engineer.

7. During grading, fill soils shall be placed as thin layers, thickness of which following compaction, shall not exceed six inches.

8. No rocks over six inches in diameter shall be permitted to use as a grading material without prior approval of soils engineer.

9. No jetting and/or water tampering be considered for backfill compaction for utility trenches without prior approval of the soils engineer. For such backfill, hand tampering with fill layers of 8 to 12 inches in thickness, or as approved by the soils engineer is recommended.

10. Any and all utility trenches at depth as well as cesspool and abandoned septic tank within building pad area and beyond, should either be completely excavated and removed from the site, or should be backfilled with gravel, slurry or by other material, as approved by soils engineer.

11. Any and all grading required for pavement, side-walk or other facilities to be used by general public, should be constructed under direct supervision of soils engineer or as required by the local public agency.

12. A site meeting should be held between the grading contractor and soils engineer prior to actual construction. Two days of notice will be required by soils engineer for such meeting.

6.0 Closure

The conclusions and recommendations presented are based on the findings and observations made at the time of subsurface test explorations. In absence of site specific grading plan, the recommendations supplied should be considered "preliminary", and may require supplemental investigations including additional borings, laboratory testing and engineering evaluations. If during construction, the subsoil conditions appear to be different from those as disclosed during field investigation, this office should be notified to consider any possible need for modification for the geotechnical recommendations provided in this report.

Recommendations provided are based on assumptions that structural footings will be established exclusively into compacted engineered fills of local non-expansive gravelly sandy soils or its similar imported fills. No footings and/or slabs should be allowed straddling over cut/fill transition interface.

Final grading and foundation plans should be reviewed by this office when they become available. As the project Geotechnical Consultant, Soils Southwest should be provided with the opportunity to verify footing excavations and slab subgrades prior to steel and concrete placement. Soils Southwest will assume no responsibility in event concrete is poured without the required verifications described.

A pre-grading meeting between grading contractor and soils engineer is recommended prior to construction preferably at the site, to discuss the grading procedures to be implemented and other requirements described in this report to be fulfilled.

This report has been prepared exclusively for the use of the addressee for the project referenced in the context. It shall not be transferred or be used by other parties without a written consent by Soils Southwest, Inc. We cannot be responsible for use of this report by others without the necessary inspection and testing by our personnel.

Should the project be delayed beyond one year after the date of this report; the recommendations presented shall be reviewed to consider any possible change in site conditions.

The recommendations presented are based on the assumption that the geotechnical observations and testing required for the project shall be performed by a representative of Soils Southwest, Inc. The field observations are considered as a continuation of the geotechnical investigation performed. If another firm is retained for geotechnical observations and testing, our professional liability and responsibility shall be limited to the extent that Soils Southwest, Inc. would not be the geotechnical engineer of record. A letter of Transfer of Responsibility shall be supplied by the new geotechnical engineer clearly describing Soils Southwest, Inc. as 'harmless and non-responsible' for any distress that may occur to the structures during their life-time use.

PLOT PLAN AND TEST LOCATIONS
Proposed 3.5+ Acre Commercial Development
Main Street @ Ramona Expressway
San Jacinto, California
(Not to Scale)

Legend:
- B-1 Approximate Location of Exploratory Test Boring on 10-13-17
- B-1 Approximate Location of Exploratory Test Boring on 5-31-17

Plate 1

7.0 APPENDIX A

Field Explorations

Field evaluations included site reconnaissance and exploratory test boring using a Hollow-Stem Auger (HSA) truck-mounted drill-rig.

Soils encountered during explorations were logged and such were classified by visual observations in accordance with the generally accepted classification system. The field descriptions were modified, where appropriate, to reflect laboratory test results. Approximate test locations are shown on Plate 1.

Relatively undisturbed soils were sampled using a drive sampler lined with soil sampling rings. The split barrel steel sampler was driven into the bottom of test excavations at various depths. Soil samples were retained in brass rings of 2.5 inches in diameter and 1.00 inch in height. The central portion of each sample was enclosed in a close-fitting waterproof container for shipment to our laboratory. In addition to undisturbed sampling, bulk soils were procured along with Standard Penetration Test (SPT) blow-counts as described in the Boring Logs.

Logs of test explorations are presented in the following summary sheets that include the description of the soils and/or fill materials encountered.

LOG OF TEST EXPLORATIONS

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-1

Project: All Speck, Inc. | **Job No.:** 17021-F2

Logged By: John F. | **Boring Diam.:** 8"HSA | **Date:** October 13, 2017

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					FILL			IN & OUT Restaurant
								tilled weeds
6								SAND - light gray, fine to medium, pebbles, scattered rock fragments, dry, loose
							5	- color change to light brown, gravely, medium to medium coarse, pebbles, occasional rock fragments, scattered asphalt debris, loose, dry to damp
								- (Max Density = 108 pcf @ 7.5%)
		3.8	103.2	89.7	SP			- color change to light yellowish gray fine to medium coarse sugar like sand dry
10							10	- loose, damp to moist
							15	
					GP-SP			- color change to light brown, gravely medium coarse to coarse, pebble, rock fragments, scat 1/2"-1" rock, damp to moist
							20	
15					SP			- color change to light gray-brown, fine to medium, pebbles, scattered rock fragments, medium dense, dry to damp
							25	
							30	
17					GP-SP			- color change to light brown, gravely, coarse, rock fragments, damp to moist.
								- moist with rock 1/4"-1/2"

Groundwater: +/- 42.0 ft.
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location
Proposed Commercial Development
SWC Main Street & Ramona Expressway
San Jacinto, California

Plate #

Standard penetration test | Bulk/Grab sample | California sampler

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-1

Project: All Speck, Inc.			**Job No.:** 17021-F2
Logged By: John F.	**Boring Diam.:** 8"HSA		**Date:** October 13,2017

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
							40	
21					SP-SM			- slightly silty, fine to medium coarse medium dense, very moist - Groundwater encountered @ 42.0 ft.
							45	
25					SP			- medium dense, traces of silts, fine to medium coarse, rock fragments, wet
9							50	
20					VS			- color change to dark gray, silt-silty sand mix, fine, very moist to wet
								- End of test boring @ 51.0 ft. - no bedrock - groundwater @ 42.0 ft.
							55	
							60	
							65	
							70	

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-2

Project: All Speck, Inc.			**Job No.:** 17021-F2
Logged By: John F.	**Boring Diam.:** 8"HSA		**Date:** October 13,2017

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					FILL			IN & OUT Restaurant
								tilled weeds, scattered organic debris
								SAND - light gray, medium to medium coarse pebble, rock fragments, dry
							5	
		2.5	106.9	93.0	SP			- color change to light yellowish gray, fine to medium coarse sugar like sand pebble, rock fragments, dense, dry
14								- medium to coarse, occasional rock fragments, dry to damp
							10	
		3.8	102.9	89.6	GP-SP			- gravely, medium coarse to coarse, rock fragments and rock, dense, dry to damp
							15	
9					SP-SM			- color change to gray-brown, silty, fine to medium, pebble, loose, moist
							20	
		3.2	108.9	94.7	GP-SP			- color change to light yellowish gray to white, gravely, medium coarse to coarse grained with rock fragments and 1/8" rock, very dense, dry to damp
							25	
18								
								- End of test boring @ 26.0 ft. - no bedrock - no groundwater
							30	

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Proposed Commercial Development SWC Main Street & Ramona Expressway San Jacinto, California	**Plate #**

California sampler Standard penetration test

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-3

Project: All Speck, Inc.		**Job No.:** 17021-F2
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** October 13,2017

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					FILL			PAVING-EAST
								tilled weeds
								SAND - light gray, fine to medium coarse, pebble, rock fragments
							5	- gravely, medium to medium coarse, pebble, rock fragments, dry
5								- loose with scattered 1/4" to 1/2" rock, damp
								- End of test boring @ 6.0 ft.
								- no bedrock
								- no groundwater
							10	
							15	
							20	
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location
Proposed Commercial Development
SWC Main Street & Ramona Expressway
San Jacinto, California

Plate #

Standard penetration test

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-4

Project: All Speck, Inc.		**Job No.:** 17021-F2
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** October 13,2017

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					FILL			GAS STATION CANOPY
								tilled weeds
								SAND - gray brown, slightly silty, fine to medium coarse, pebble, rock fragments scattered 1/2" rock, trace odor, damp
							5	
17								- medium dense with pieces of asphalt
								- color change to light brown, slightly silty, fine to medium coarse, pebble, rock fragments, damp
		2.7	104.6	91	GP-SP			
							10	- color change to yellowish light gray to white, gravely, medium to coarse, fragmented 1/8" rock, dry, dense
12					SW-SM			- slightly silty, fine to medium coarse pebble, rock fragments, damp
							15	
					SP			- traces of silts, fine to medium coarse, pebble, rock fragments, damp
							20	
16					GP-SP			- gravely, medium coarse to coarse, pebbles and rock fragments.
								- End of test boring @ 21.0 ft.
								- no bedrock
								- no groundwater
							25	
							30	

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Proposed Commercial Development SWC Main Street & Ramona Expressway San Jacinto, California	**Plate #**

California sampler Standard penetration test

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-5

Project: All Speck, Inc.		**Job No.:** 17021-F2
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** October 13, 2017

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					FILL			GAS STATION
								tilled weeds and live
								SAND - light gray, fine to medium, occasional pebbles, dry to damp, loose
							5	- color change to gray-brown, gravely, medium to coarse, pebbles with occasional rock fragments, loose, damp
9								- coarse, rock fragments, loose, dry
					GP-SP		10	- medium coarse to coarse, pebbles, rock fragments, damp
							15	
14								- medium dense, dry to damp
								- very damp to moist
							20	
							25	- with 1/4" to 1/2" rock, damp
		3.8	111.9	97.3				- color change to light yellowish gray to white, medium to medium coarse, rock fragments and 1/2" rock, dry to damp
							30	
14					SP-SM			- slightly silty, fine to medium coarse pebble, rock fragments, medium dense moist
								- End of test boring @ 31.0 ft. no bedrock

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Proposed Commercial Development SWC Main Street & Ramona Expressway San Jacinto, California	**Plate #**

California sampler Standard penetration test

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-5

Project: All Speck, Inc. | **Job No.:** 17021-F2

Logged By: John F. | **Boring Diam.:** 8"HSA | **Date:** October 13,2017

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
								no groundwater
							40	
							45	
							50	
							55	
							60	
							65	
							70	

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-6

Project: All Speck, Inc.		**Job No.:** 17021-F2
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** October 13,2017

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					FILL			GAS STATION tilled weeds and scattered debris
		1.0	100.8	93.3				SAND - light gray brown, slightly silty, fine to medium, pebble, scattered rock fragments and 1/4"to1/2" rock
							5	- color change to light gray to white medium to medium coarse, pebble, rock fragments, scattered 1"-2" rock, very dry, loose
9								
		3.2	103.4	90.0	GP-SP			- color change to light yellowish gray to white, gravely, medium to coarse, rock fragments with 1/4" rock, dense dry
							10	
19					SP			- fine to medium coarse, with greenish gray silts, medium dense,damp to moist
							15	
		3.2	104.2	90.6				- End of test boring @ 16.0 ft. - no bedrock - no groundwater
							20	
							25	
							30	

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Proposed Commercial Development SWC Main Street & Ramona Expressway San Jacinto, California	**Plate #**

California sampler Standard penetration test Bulk/Grab sample

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-7

Project: All Speck, Inc.		**Job No.:** 17021-F2
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** October 13,2017

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					FILL			PAVING-southside
								tilled and live weeds
								SAND - light gray, traces of silt, fine to medium, pebble, damp
							5	- color changt to light gray brown, fine to medium coarse, pebble, rock fragments, dry
6								- loose, gravely, medium coarse to coarse, pebble, rock fragments, dry
								- End of test boring @ 6.0 ft.
								- no bedrock
							10	- no groundwater
							15	
							20	
							25	
							30	

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Proposed Commercial Development SWC Main Street & Ramona Expressway San Jacinto, California	**Plate #**

California sampler | Standard penetration test | Bulk/Grab sample

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-8

Project: All Speck, Inc.		**Job No.:** 17021-F2
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** October 13,2017

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					FILL			RETAIL BUILDING SOUTHWEST
								tilled weeds
6								SAND - light gray-brown, fine to medium coarse, traces of silt, dry
							5	- loose, traces of silts, fine to medium, pebbles, dry
					GP-SP			- gravely riverbed type sand, coarse, pebble, rock fragment, dry to damp
		2.7	103.4	89.8				- color change to light yellowish gray to white wit rock fragments and 1/8" rock, dense
							10	
9								- loose with scattered 1/4" to 1/2"rock
							15	
							20	
28								- very coarse river bed type sand, fragmented 1/2" to 1" rock, medium dense to dense, dry to damp
								- End of test boring @ 21.0 ft.
								- no bedrock
								- no groundwater
							25	
							30	

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Proposed Commercial Development SWC Main Street & Ramona Expressway San Jacinto, California	**Plate #**

Standard penetration test California sampler

Soils Southwest, Inc.
897 Via Lata, Suite N
Colton, CA 92324
(909) 370-0474 Fax (909) 370-3156

LOG OF BORING B-9

Project: All Speck, Inc.		**Job No.:** 17021-F2
Logged By: John F.	**Boring Diam.:** 8"HSA	**Date:** October 13,2017

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
								RETAIL BUILDING SOUTHWEST
								tilled and live weeds
								SAND - light gray, slightly silty, fine to medium, pebble, occasional rock fragments, dry, loose
5.0					GP-SP		5	- color change to grayish light brown
								- gravely, coarse, scattered root, medium coarse to coarse, rock fragments, loose, dry
								- medium to medium coarse, pebble, rock fragments, loose, dry
							10	- no sample ring recovery
4					SM-ML			- dry to damp
								- silty, fine to medium, pebble, very loose, moist to ver moist
							15	
10					GP-SP			- loose, gravely, medium to medium coarse, pebble, rock fragments
								- End of test boring @ 16.0 ft.
								- no bedrock
								- no groundwater
							20	
							25	
							30	

Groundwater: n/a
Approx. Depth of Bedrock: n/a
Datum: n/a
Elevation: n/a

Site Location
Proposed Commercial Development
SWC Main Street & Ramona Expressway
San Jacinto, California

Plate #

California sampler | Standard penetration test | Bulk/Grab sample

KEY TO SYMBOLS

Symbol Description

Strata symbols

 Fill

 Poorly graded gravel and sand

 Poorly graded sand

Soil Samplers

 California sampler

 Standard penetration test

 Bulk/Grab sample

Notes:

1. Exploratory borings were drilled on October 13,2017 using a 4-inch diameter continuous flight power auger.

2. No free water was encountered at the time of drilling or when re-checked the following day.

3. Boring locations were taped from existing features and elevations extrapolated from the final design schematic plan.

4. These logs are subject to the limitations, conclusions, and recommendations in this report.

5. Results of tests conducted on samples recovered are reported on the logs.

8.0 APPENDIX B

Laboratory Test Programs

Laboratory tests were conducted on representative soils for the purpose of classification and for the determination of the physical properties and engineering characteristics. The number and selection of the types of testing for a given study are based on the geotechnical conditions of the site. A summary of the various laboratory tests performed for the project is presented below.

Moisture Content and Dry Density (D2937):

Data obtained from these test, performed on undisturbed samples are used to aid in the classification and correlation of the soils and to provide qualitative information regarding soil strength and compressibility.

Direct Shear (D3080):

Data obtained from this test performed at increased and field moisture conditions on relatively remolded soil sample is used to evaluate soil shear strengths. Samples contained in brass sampler rings, placed directly on test apparatus are sheared at a constant strain rate of 0.002 inch per minute under saturated conditions and under varying loads appropriate to represent anticipated structural loadings. Shearing deformations are recorded to failure. Peak and/or residual shear strengths are obtained from the measured shearing load versus deflection curve. Test results, plotted on graphical form, are presented on Plate B-1 of this section.

Consolidation (D2835):

Drive-tube samples are tested at their field moisture contents and at increased moisture conditions since the soils may become saturated during life-time use of the planned structure.

Data obtained from this test performed on relatively undisturbed and/or remolded samples, were used to evaluate the consolidation characteristics of foundation soils under anticipated foundation loadings. Preparation for this test involved trimming the sample, placing it in one inch high brass ring, and loading it into the test apparatus which contained porous stones to accommodate drainage during testing. Normal axial loads are applied at a load increment ratio, successive loads being generally twice the preceding.

Soil samples are usually under light normal load conditions to accommodate seating of the apparatus. Samples were tested at the field moisture conditions at a predetermined normal load. Potentially moisture sensitive soil typically demonstrated significant volume change with the introduction of free water. The results of the consolidation tests are presented in graphical forms on Plate B-2.

Potential Expansion (ASTM Standard D4829-88)

Silty sand to gravely sandy in nature, the site soils are considered 'very low' in expansion characteristic. Supplemental testing for soil expansion should be performed following mass grading completion.

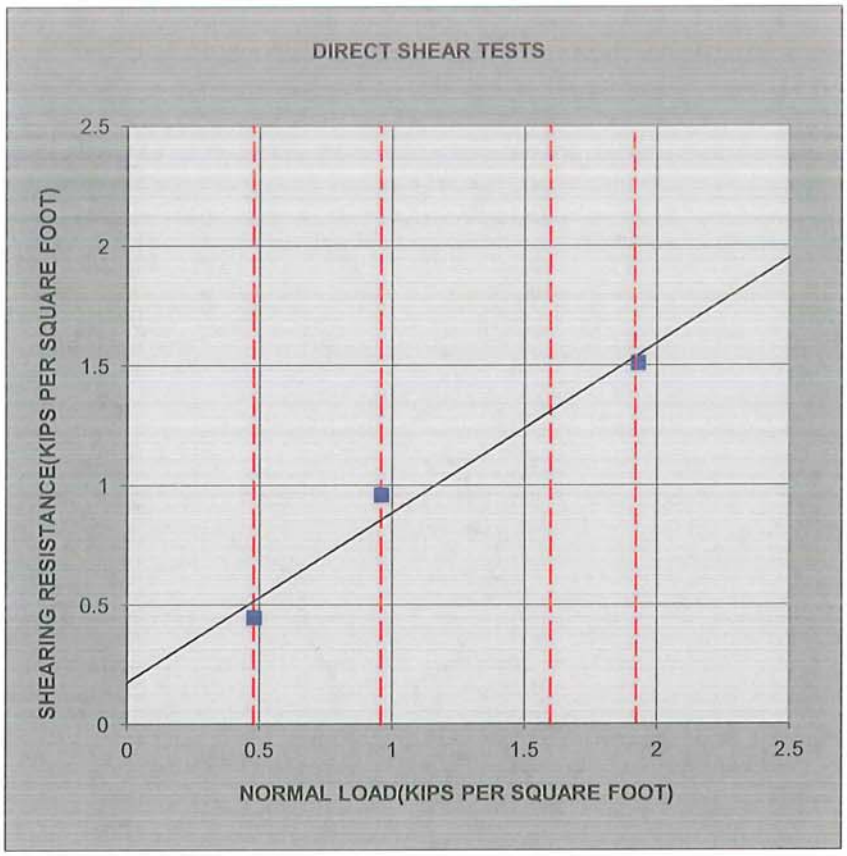
Laboratory Test Results

A Table I: In-Situ Moisture-Density (ASTM D2937)

Test Boring No.	Sample Depth, ft.	% Compaction	Moisture Content, %
1	8	89	3.8
2	5	93	2.5
2	10	89	3.8
2	20	95	3.2
4	8	91	2.7
5	25	97	3.8
6	3	93	1.0
6	8	90	3.2
6	15	91	3.2
8	7	90	2.7

B Table II: Max. Density/Optimum Moisture Content (ASTM D1557)

Sample Location @ depth, ft.	Max. Dry Density, pcf	Optimum Moisture (%)
B-1 @ 3-5 Sand-silty, gravelly, with scattered rock fragments, broken asphalt, slight odor, very dry	108	7.50



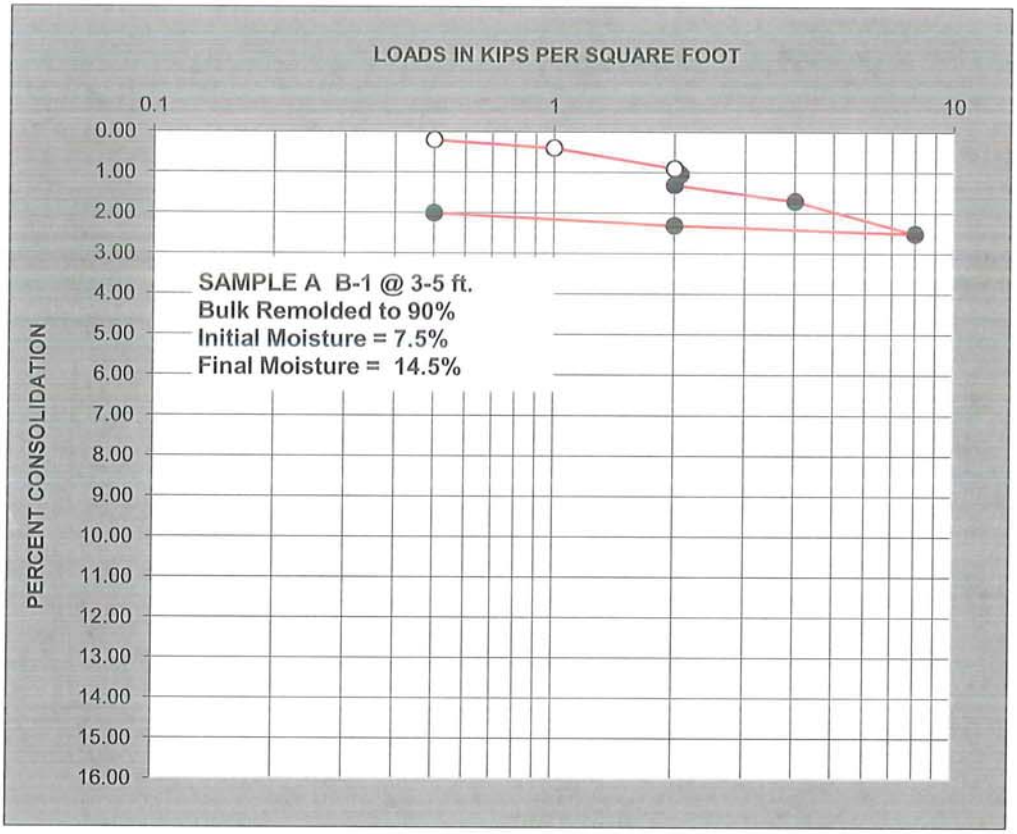
SYMBOL	LOCATION	DEPTH (FT)	TEST CONDITION	COHESION (psf)	FRICTION (degree)
■	B-1	3 to 5	Bulk Remolded to 90%	175.40	35.35

Proposed Commercial Complex
Main Street w/o Ramona Expressway
San Jacinto, California

PROJECT NO.	17021-F2
PLATE	B-1

SOILS SOUTHWEST, INC.
Consulting Foundation Engineers

CONSOLIDATION TESTS

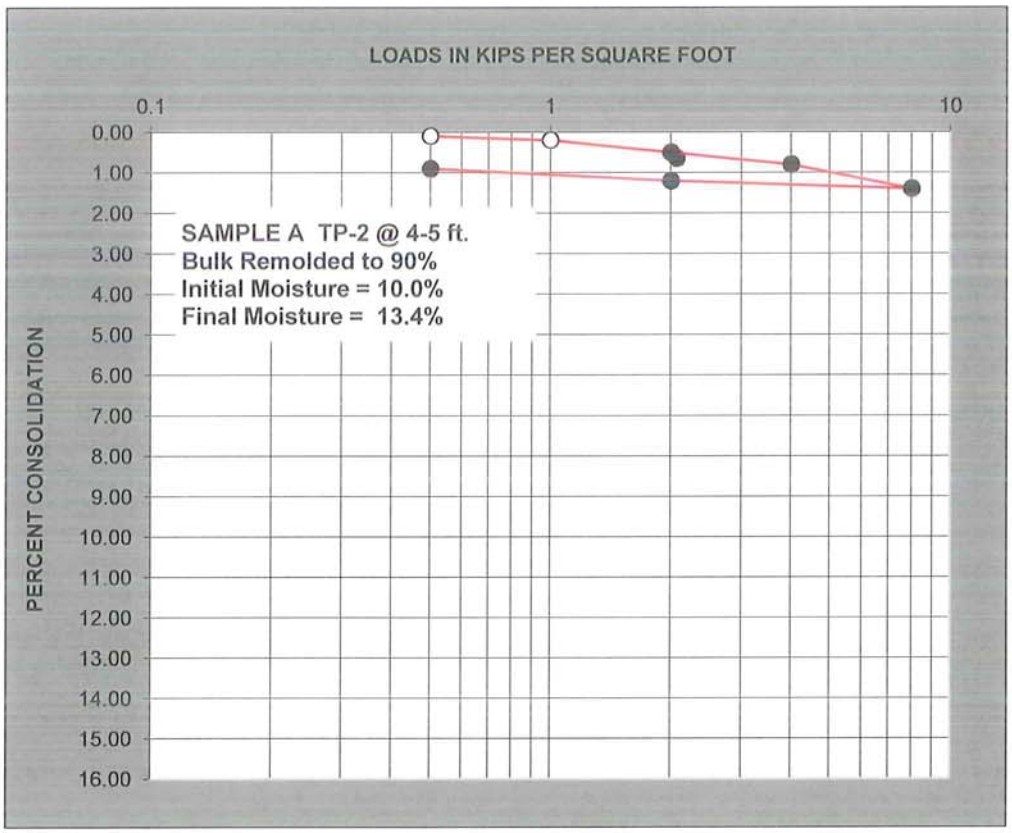


- **WATER PERMITTED TO CONTACT SAMPLE**

	PROJECT	Proposed Commercial Complex Main Street w/o Ramona Expressway, San Jacinto		
	PROJECT NO.	17021-F2	PLATE	B-2

SOILS SOUTHWEST INC.
Consulting Foundation Engineers

CONSOLIDATION TESTS



- **WATER PERMITTED TO CONTACT SAMPLE**

	PROJECT	Proposed Popeyes Restaraunt & Retail Center 525 S. Citrus Avenue, Covina		
	PROJECT NO.	17053-F	PLATE	B-2

SOILS SOUTHWEST INC.
Consulting Foundation Engineers

APPENDIX C

Seismic Design Parameters

CALIFORNIA DIVISION OF MINES AND GEOLOGY
JAMES E. SLOSSON, STATE GEOLOGIST

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF CONSERVATION

SAN JACINTO QUADRANGLE
CALIFORNIA—RIVERSIDE CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

SCALE 1:24 000

CONTOUR INTERVAL 40 FEET

REFERENCES USED TO COMPILE FAULT DATA

MAP EXPLANATION

Potentially Active Faults

Faults considered to have been active during Quaternary time: solid line where accurately located, long dash where approximately located, short dash where inferred, dotted where concealed, query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by creep or possible creep

Aerial photo lineaments (not field checked), based on youthful geomorphic and other features believed to be the results of Quaternary faulting

Special Studies Zone Boundaries

These are delineated as straight-line segments that connect encircled turning points so as to define special studies zone segments

Seaward projection of zone boundary

STATE OF CALIFORNIA
SPECIAL STUDIES ZONES

Delineated in compliance with
Chapter 7.5, Division 2 of the California Public Resources Code

SAN JACINTO QUADRANGLE

REVISED OFFICIAL MAP
Effective: January 1, 1980

James E. Slosson State Geologist

IMPORTANT - PLEASE NOTE

1) This map may not show all potentially active faults either within the special studies zones or outside their boundaries
2) Faults shown are the basis for establishing the boundaries of the special studies zones
3) The identification of these potentially active faults and the location of such fault traces are based on the best available data. Traces have been drawn as accurately as possible at this map scale; however, the quality of data used is varied
4) Fault information on this map is not sufficient to serve as a substitute for the geologic site investigations (special studies) required under Chapter 7.5, Division 2, Section 2623 of the California Public Resources Code

State of California
Department of Conservation

Ground Motion Interpolator (2008)

Longitude: -116.938786

Latitude: 33.783601

VS30: 270 (180-1050 m/sec)

Return Period:

2% in 50 years 10% in 50 years

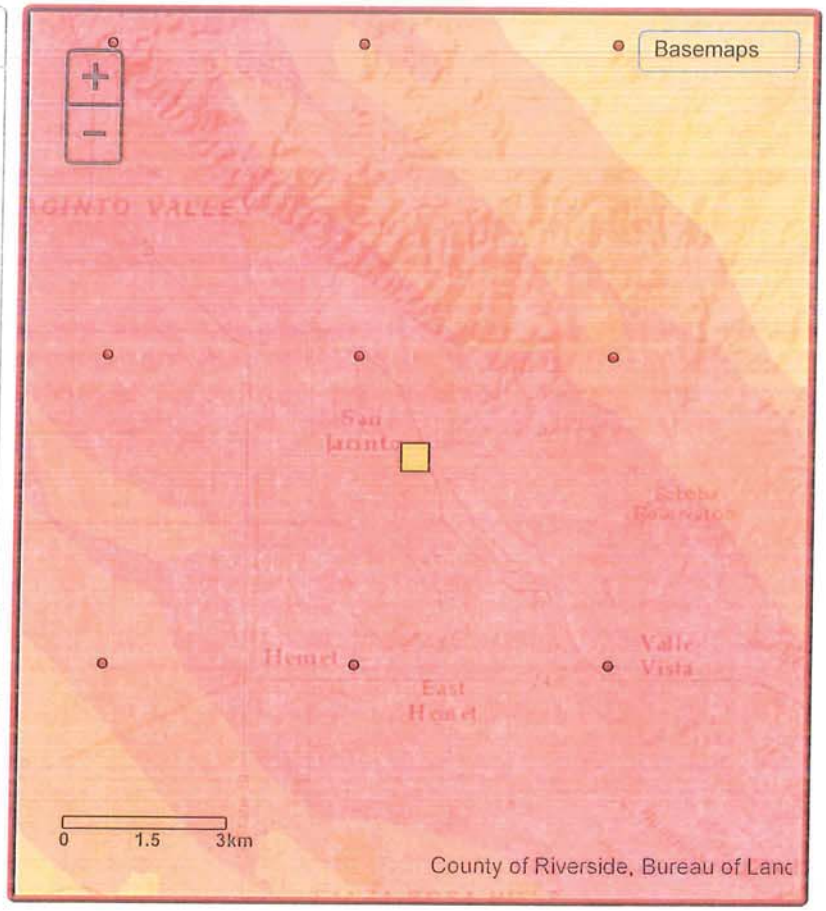
Spectral Acceleration:

PGA 0.2 second SA 1.0 second SA

Submit

Inputs:	Result:
-116.938786, 33.783601 vs30: 270 m/sec 10% in 50 years PGA	0.639 g

Information and Disclaimer



USGS Design Maps Summary Report

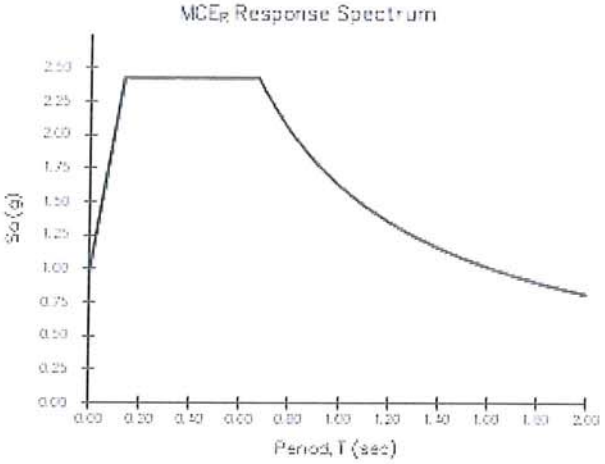
User-Specified Input

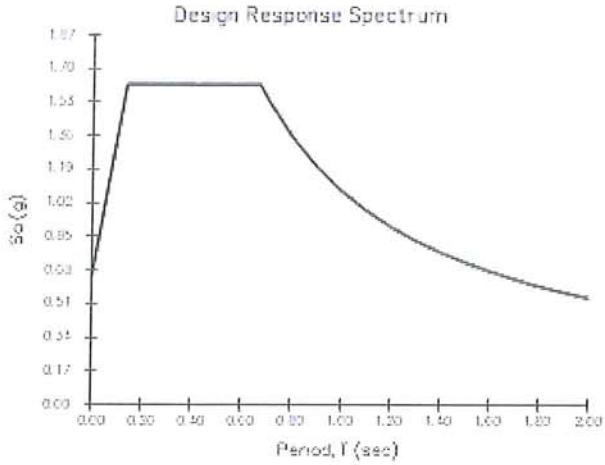
Report Title	All Speck, Inc., Main Street w/o Ramona, San Jacinto, CA Fri July 7, 2017 17:03:16 UTC
Building Code Reference Document	ASCE 7-10 Standard (which utilizes USGS hazard data available in 2008)
Site Coordinates	33.7836°N, 116.93879°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

USGS-Provided Output

S_S =	2.427 g	S_{MS} =	2.427 g	S_{DS} =	1.618 g
S_1 =	1.081 g	S_{M1} =	1.621 g	S_{D1} =	1.081 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (33.7836°N, 116.93879°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	S_S = 2.427 g
From Figure 22-2 [2]	S_1 = 1.081 g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\overline{v}_s$	$\overline{N}$ or $\overline{N}_{ch}$	$\overline{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index PI > 20, • Moisture content $w \geq 40\%$, and • Undrained shear strength $\overline{s}_u$ < 500 psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk-Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4-1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_S

For Site Class = D and S_S = 2.427 g, F_a = 1.000

Table 11.4-2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1-s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 1.081 g, F_v = 1.500

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 2.427 = 2.427$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 1.081 = 1.621$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

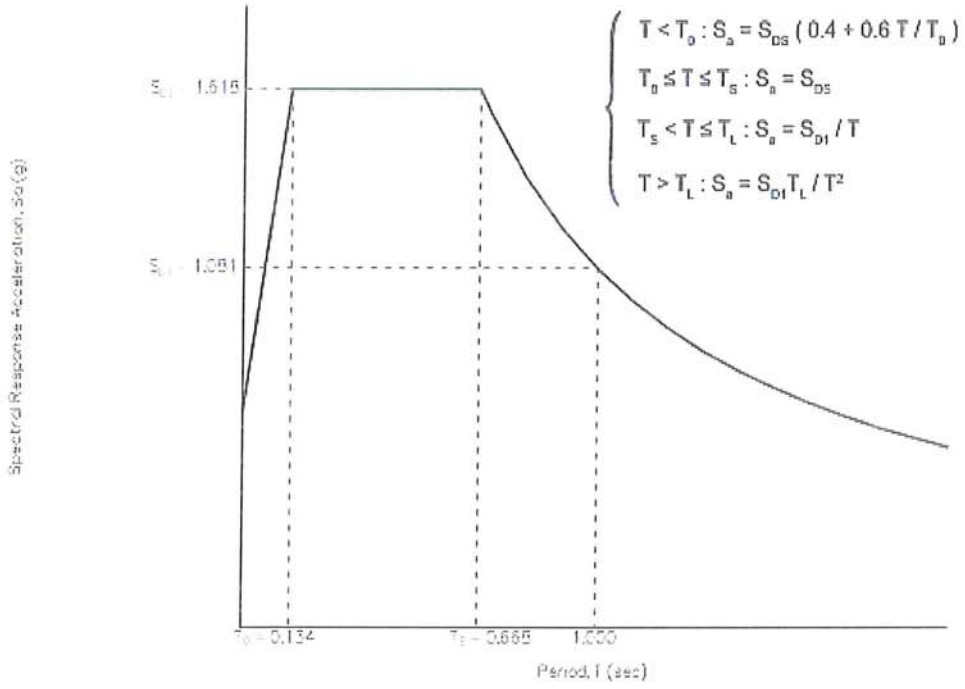
Equation (11.4–3): $S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 2.427 = 1.618$ g

Equation (11.4–4): $S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 1.621 = 1.081$ g

Section 11.4.5 — Design Response Spectrum

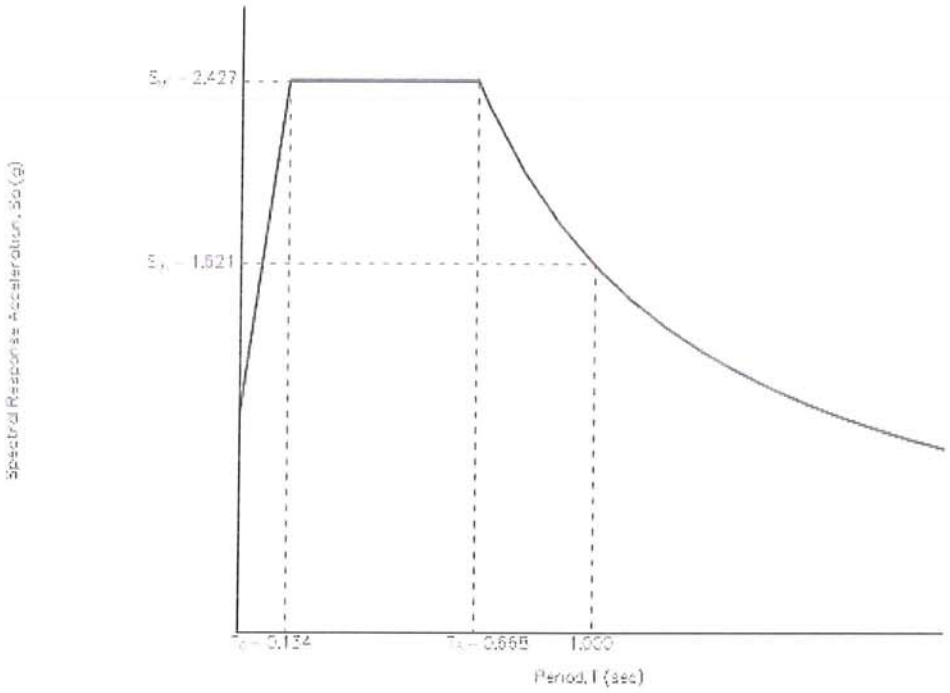
From Figure 22-12 [3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.933

Equation (11.8-1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.933 = 0.933$ g

Table 11.8-1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.933 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.955

From Figure 22-18 [6] C_{R1} = 0.924

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 1.618 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 1.081 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = E

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

APPENDIX D

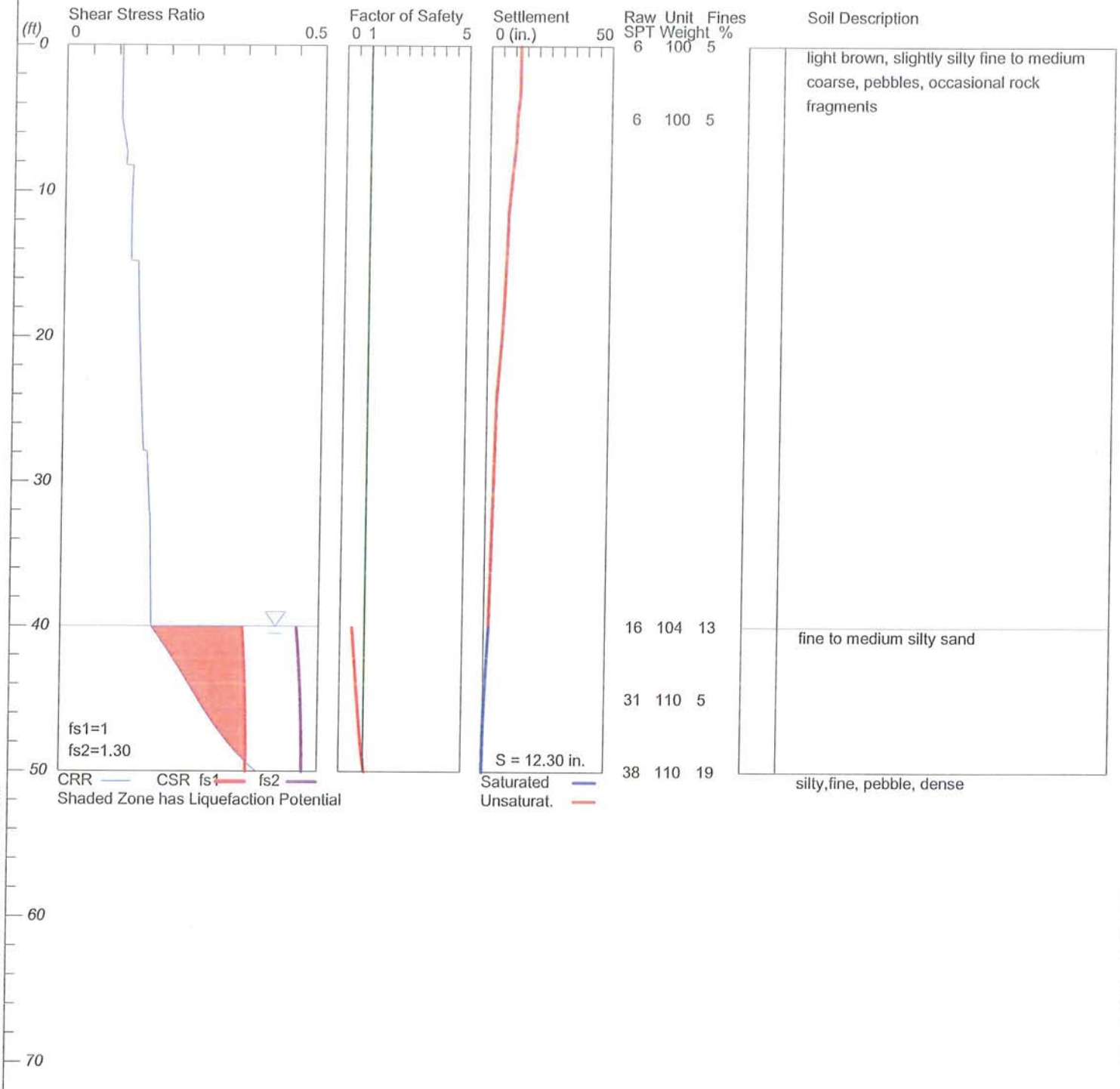
Liquefaction Analyses and Pre and Post-Construction Settlement Evaluations

LIQUEFACTION ANALYSIS

All Specks, Inc.

Hole No.=B-1 Water Depth=40 ft Surface Elev.=1596

Magnitude=6.9
Acceleration=0.639g



LIQUEFACTION ANALYSIS SUMMARY

www.civiltechsoftware.com

****

Font: Courier New, Regular, Size 8 is recommended for this report.

Licensed to , 6/20/2017 10:15:26 AM

Input File Name: UNTITLED

Title: All Specks, Inc.

Subtitle: 17021-F ***Pre-Construction Analysis***

Surface Elev.=1596

Hole No.=B-1

Depth of Hole= 50.00 ft

Water Table during Earthquake= 40.00 ft

Water Table during In-Situ Testing= 400.00 ft

Max. Acceleration= 0.64 g

Earthquake Magnitude= 6.90

Input Data:

Surface Elev.=1596

Hole No.=B-1

Depth of Hole=50.00 ft

Water Table during Earthquake= 40.00 ft

Water Table during In-Situ Testing= 400.00 ft

Max. Acceleration=0.64 g

Earthquake Magnitude=6.90

No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1
7. Borehole Diameter, Cb= 1
8. Sampling Method, Cs= 1
9. User request factor of safety (apply to CSR) , User= 1.3

   Plot two CSR (fs1=1, fs2=User)
10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth	SPT	gamma	Fines
ft		pcf	%
0.00	6.00	100.00	5.00
5.00	6.00	100.00	5.00
40.00	16.00	104.00	13.00
45.00	31.00	110.00	5.00
50.00	38.00	110.00	19.00

Output Results:

Settlement of Saturated Sands=**2.10** in.

Settlement of Unsaturated Sands=**10.20** in.

Total Settlement of Saturated and Unsaturated Sands=**12.30** in.

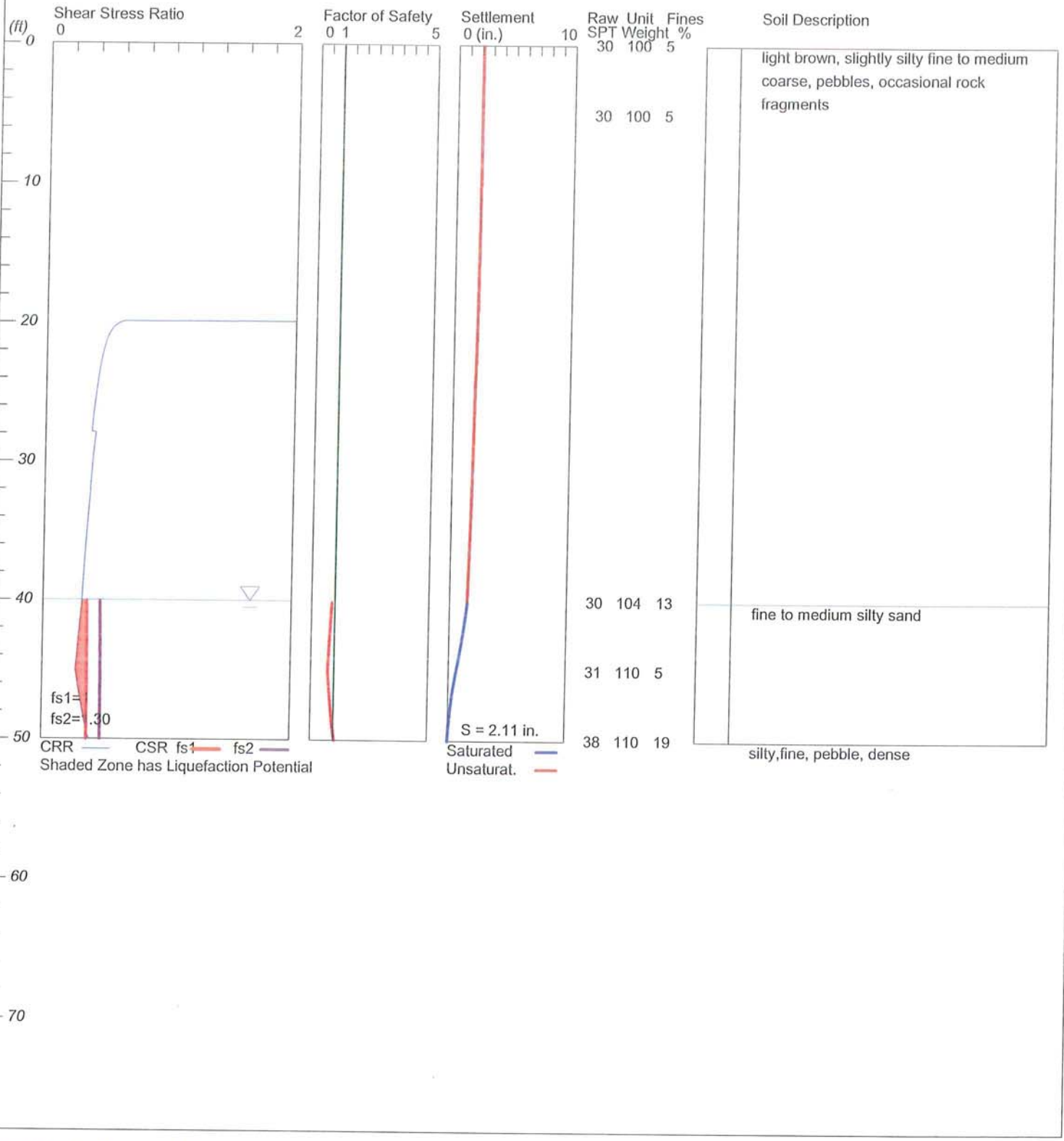
Differential Settlement=***6.151 to 8.119*** in.

LIQUEFACTION ANALYSIS

All Specks, Inc.

Hole No.=B-1 Water Depth=40 ft Surface Elev.=1596

Magnitude=6.9
Acceleration=0.639g



****

LIQUEFACTION ANALYSIS SUMMARY

www.civiltechsoftware.com

****

Font: Courier New, Regular, Size 8 is recommended for this report.

Licensed to , 6/20/2017 10:22:56 AM

Input File Name: C:\Users\Soils Southwest\Desktop\Liquefy5\17021Precon.liq

Title: All Specks, Inc.

Subtitle: 17021-F ***Post-Construction***

Surface Elev.=1596

Hole No.=B-1

Depth of Hole= 50.00 ft

Water Table during Earthquake= 40.00 ft

Water Table during In-Situ Testing= 400.00 ft

Max. Acceleration= 0.64 g

Earthquake Magnitude= 6.90

Input Data:

Surface Elev.=1596

Hole No.=B-1

Depth of Hole=50.00 ft

Water Table during Earthquake= 40.00 ft

Water Table during In-Situ Testing= 400.00 ft

Max. Acceleration=0.64 g

Earthquake Magnitude=6.90

No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. SPT or BPT Calculation.

2. Settlement Analysis Method: Ishihara / Yoshimine

3. Fines Correction for Liquefaction: Stark/Olson et al.*

4. Fine Correction for Settlement: During Liquefaction*

5. Settlement Calculation in: All zones*

6. Hammer Energy Ratio, Ce = 1

7. Borehole Diameter, Cb= 1

8. Sampling Method, Cs= 1

9. User request factor of safety (apply to CSR) , User= 1.3

Plot two CSR (fs1=1, fs2=User)

10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth	SPT	gamma	Fines
ft		pcf	%
0.00	30.00	100.00	5.00
5.00	30.00	100.00	5.00
40.00	30.00	104.00	13.00
45.00	31.00	110.00	5.00
50.00	38.00	110.00	19.00

Output Results:

Settlement of Saturated Sands=**1.53** in.

Settlement of Unsaturated Sands=**0.59** in.

Total Settlement of Saturated and Unsaturated Sands=**2.11** in.

Differential Settlement=**1.056 to 1.394** in.

PROFESSIONAL LIMITATIONS

Our investigation was performed using the degree of care and skill ordinarily exercised, under similar circumstances by other reputable Soils Engineers practicing in these general or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

The investigations are based on soil samples only, consequently the recommendations provided shall be considered 'preliminary'. The samples taken and used for testing and the observations made are believed representative of site conditions; however, soil and geologic conditions can vary significantly between test excavations. If this occurs, the changed conditions must be evaluated by the Project Soils Engineer and designs adjusted as required or alternate design recommended.

The report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the project architect and engineers. Appropriate recommendations should be incorporated into structural plans. The necessary steps should be taken to see that out such recommendations in field.

The findings of this report are valid as of this present date. However, changes in the conditions of a property can occur with the passage of time, whether they due to natural process or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur from legislation or broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by change outside of our control. Therefore, this report is subject to review and should be updated after a period of one year.

RECOMMENDED SERVICES

The review of grading plans and specifications, field observations and testing by a geotechnical representative of this office is integral part of the conclusions and recommendations made in this report. If Soils Southwest, Inc. (SSW) is not retained for these services, the Client agrees to assume SSW's responsibility for any potential claims that may arise during and after construction, or during the life-time use of the structure and its appurtenant.

The recommendations supplied should be considered valid and applicable, provided the following conditions, in minimum, are met:

i. Pre-grade meeting with contractor, public agency and soils engineer,
ii. Excavated bottom inspections and verification s by soils engineer prior to backfill placement,
iii. Continuous observations and testing during site preparation and structural fill soils placement,
iv. Observation and inspection of footing trenching prior to steel and concrete placement,
v. Subgrade verifications including plumbing trench backfills prior to concrete slab-on-grade placement,
vi. On and off-site utility trench backfill testing and verifications,
vii. Precise-grading plan review, and
viii. Consultations as required during construction, or upon your request.

Soils Southwest, Inc. will assume no responsibility for any structural distresses during its life-time use; in event the above conditions are not strictly fulfilled.