ALR ENGINEERING & TESTING

Civil & Geotechnical Engineering w/ Material Testing

18361 Symeron Road, Apple Valley, Ca. 92307

760-810-2031 Cell # - 760-242-3130 Office #

(alrengineeringtesting@gmail.com)

REPORT

PRELIMINARY GEOTECHNICAL INVESTIGATION
OSHPD SEISMIC DESIGN PARAMETERS
2016 CALIFORNIA BUILDING CODE
CHAPTER 18 SOILS AND FOUNDATIONS
STRUCTURAL SECTION DESIGNS

APN 0438-165-33

On a 1.50-acre parcel located on the Southwest corner of Rock Springs Road and Deep Creek Road, in Apple Valley, County of San Bernardino, California

Prepared for

Mark Maida

13302 Ranchero Road
Oak Hills, CA. 92344

March 28, 2018
Revised December 6, 2018
Revised January 18, 2019

Project No. 1803409

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MARK MAIDA
13302 Ranchero Road
Oak Hills, CA. 92344

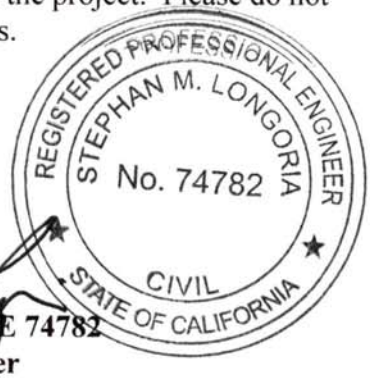
Attention: Mr. Mark Maida,

Subject: ***Preliminary Geotechnical Investigation*** on the **1.50**-acre parcel, **APN 0438-165-33**, located at the Southwest corner of Rock Springs Road and Deep Creek Road, in Apple Valley, San Bernardino County, California.

In accordance with your authorization, **ALR Engineering & Testing**. performed a ***Preliminary Geotechnical Investigation*** for the above-mentioned property for the purpose of a proposed **4,500 sf** proposed **Gas Station** with **Convenience Store**. The enclosed report contains the results of our field investigation and laboratory testing and classification. Our efforts were directed towards providing classification and strength of the soils for determination of the foundation design.

We sincerely appreciate the opportunity of being service to you on this aspect of the project. Please do not hesitate to call us should you have any questions regarding the content of the reports.

Respectfully submitted,
ALR ENGINEERING & TESTING



John Longoria, EIT, QSP, NICET III, CESSWI, ICC
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Registered Civil Engineer

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1.0 INTRODUCTION AND SCOPE OF WORK

1.1 Introduction

This report presents the results of our **P**reliminary **G**eotechnical **I**nvestigation for the **1.50-acre** parcel, **APN 0438-165-33,** located at the Southwest corner of Rock Springs Road and Deep Creek Road in Apple Valley, San Bernardino County, California. **Figures 1** and **2 s**how the property location. We understand that the site will be utilized for a proposed **Gas Station** with **Convenience Store**.

1.2 Scope of Work

Our scope of work included:

* Review of available soils data.
* Subsurface investigation by CAT Backhoe.
* Report preparation with conclusions and recommendations.
* Perform laboratory testing.
* Geotechnical Engineering considerations.

2.0 FIELD INVESTIGATION AND LABORATORY TESTING

2.1 Field Investigation

A field investigation using a CAT backhoe equipped with a 24" bucket was performed on March 25, 2018. Four **(4)** trenches were excavated to an approximate depth of fifteen **(15)** feet measured from the existing ground surface. On January 20, 2019 two (2) borings were drilled to maximum depth of fifty (**50**) feet **Figure 4** shows the approximate location of the trenches and borings.

The purpose of our investigation was to ascertain the geotechnical properties of near surface underlying soils for foundation recommendations, and was not intended to provide evidence of potential environmental conditions. **Appendix A** presents the trench logs and borings. The trench and boring logs and related data depict subsurface conditions only at the specific locations and time indicated.

2.2 Laboratory Testing

Laboratory testing on select representative samples included:

* Maximum Density Tests
* Inplace Dry Density Tests
* Gradation/Sieve Analysis
* Sand Equivalent Tests
* R-Values

Inplace dry density in conjunction with laboratory maximum dry density, provides an indication of relative density (or relative compaction). This in-place relative compaction is utilized in estimation of potential shrinkage factors during grading and recommendations for site preparations, with relative compaction ranging from mid-eighties, two **(2)** Maximum Density Tests were performed in the laboratory on representative bulk samples.

Gradation/Sieve Analysis is useful in classifying of soils in accordance with the Unified Soil Classification System, ASTM D2487. Eight **(8)** Gradation/Sieve Analysis Tests were performed. Gradation analysis can be utilized in qualitative determination of other engineering properties, such as compressibility, shear strength, and R-value.

Sand Equivalent (SE) is an indicator for cleanliness of the coarse-grained soils and is useful in qualitative estimation of the R-value. Eight **(8)** sand equivalent tests were performed.

R-Value Tests are used to determine the strength of the soils for the roadways and in determining the structural sections of the streets. A total of two **(2)** R-value tests were performed on the two streets.

The site will incorporate a detention basin that will mitigate the storm runoff. The Double-Ring Infiltrometer was utilized to determine the infiltration rate of the basin for WQMP and hydrology studies within other reports. Results of our laboratory testing are contained in **Appendix B**.

3.0 SITE AND SUBSURFACE CONDITIONS

3.1 Site Conditions

The subject site is vacant. The proposed location of the proposed **Gas Station** with **Convenience Store** is shown on **Figure 1-4**. The property is located at the Southwest corner of Rock Springs Road and Deep Creek Road in Apple Valley, San Bernardino County. The property is located in the SW ¼ of the SE ¼ of ***Section 19, T4N, R3W, APN 0438-165-33***. The surface topography has an approximate gradient slope of **1%** that drains towards the West.

3.2 Subsurface Conditions

Our field investigation and laboratory testing revealed that the near surface soils consist predominantly of poorly graded **SANDS** with silts **(SP-SM),** well graded **SANDS** with silts and gravel **(SW-SM),** and well graded **SANDS** with some gravel **(SW). Appendix A** presents the detailed logs of soils encountered in our trenches and borings.

4.0 GEOTECHNICAL ENGINEERING CONSIDERATIONS

Our geotechnical engineering evaluations are based on the limited field investigation and laboratory testing performed for the subject project.

4.1 Foundation System Considerations

Allowable bearing pressure for foundations depends upon the shear strength, settlement characteristics of the underlying soils, types of foundation system, acceptable differential movement, and depth of embedment. Based on the type of structures, our evaluations are directed towards the isolated footings as well as continuous footings.

4.2 Settlement and Heaving considerations:

Although no swell consolidation testing was performed, based on low field densities and our observations, the top four feet of soils are likely to settle due to loading and introduction of water. Based on the loose to medium dense condition, the site is susceptible to low to moderate settlement. This condition can be mitigated by **over-excavation** and **re-compaction**.

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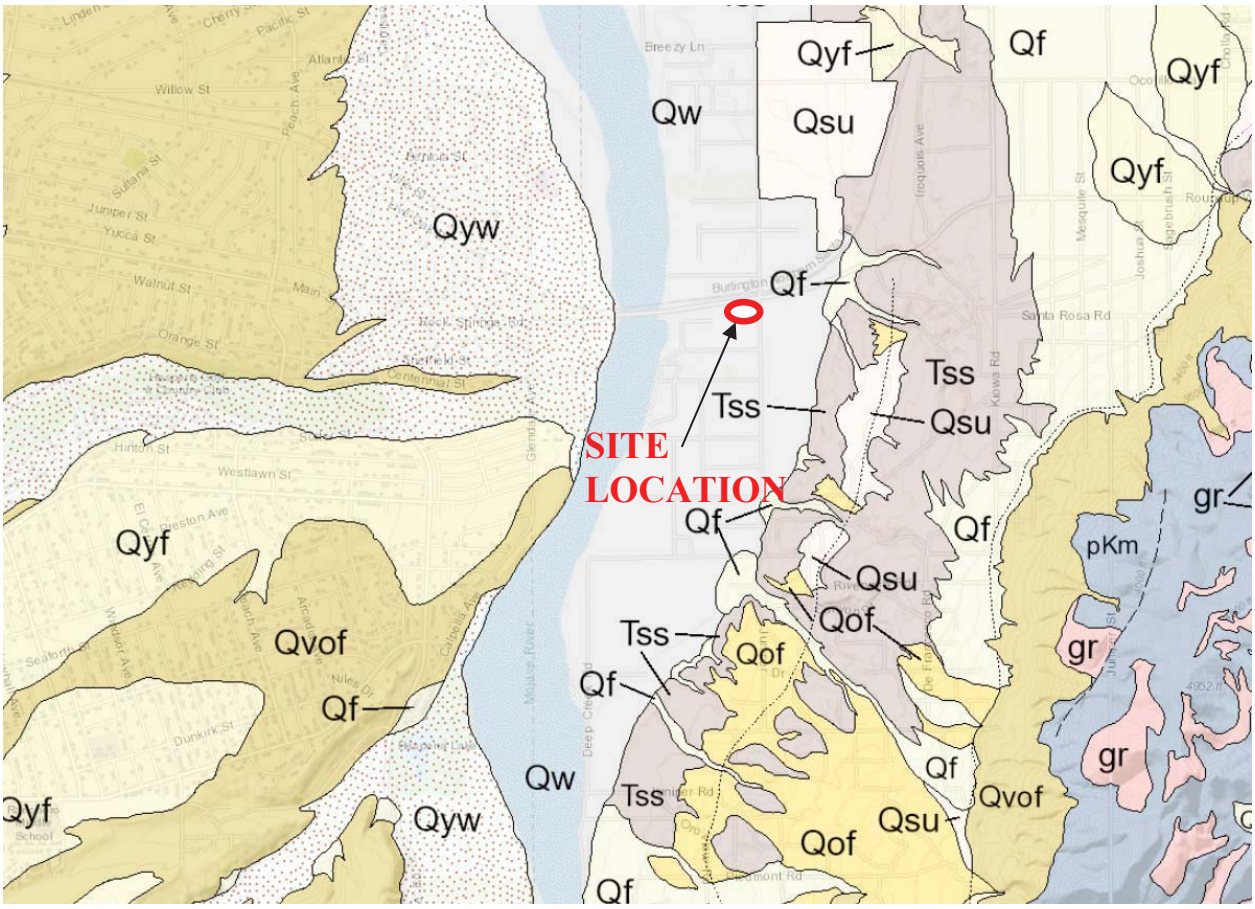

The site is within Qw – Alluvial Wash Deposits

Appendix E contains the following:
San Bernardino County Hazard Overlay Map
AP Map
FEMA FIRM Map
USDA Soil Type Description
Nearby Well Depth information

4.3 Seismic Considerations

Review of available Alquist-Priolo Special Studies Maps indicate that the site is not located within any known or published active fault zones. **Detailed geologic study was not within the scope of this report**. It is noted that there are several active faults situated in Southern California. Some of these major fault zones are located within thirty (30) miles of the project location.

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Faulting and Seismicity

Active faulting is one of the most significant geologic hazards affecting development in California. Active faults have undergone movement within the Holocene Epoch, less than the last 11,000 years. Potentially active faults have experienced movement within the last 11,000 to approximately 750,000 years, the late Quaternary period. The site is within 50 miles of several active and potentially active faults in the seismically active southern California region, therefore, the potential for future strong ground shaking at the site is high. The site and region will likely experience future earthquakes of moderate to large size. Some of the near future earthquakes on nearby active faults may be greater that Richter magnitude 8.0.

The site is not located within any mapped Alquist-Priolo Special Studies Zones, Apple Valley South Quadrangle (1988). As such, surface rupture is not anticipated to be a hazard since there are not known or suspected fault traces within the Victorville area. Five fault systems affect the Victor Valley including the San Andreas, Helendale, San Jacinto faults, North Frontal and Landers fault. The San Andreas is considered most likely to produce a major earthquake.

The Helendale fault, located approximately nine miles northeast of the Victorville Area could also be responsible for a moderate earthquake with Richter magnitude of approximately 5.9. A third major fault system, the San Jacinto fault, is located approximately 16 miles south of the Victorville area and trends parallel to the San Andreas fault. This fault is expected to be capable of generating a magnitude 6.7 earthquake. This fault is the most seismically active fault in southern California and has generated ground-rupturing earthquakes greater than magnitude 5.5 as recently as 1968, and 1987 (Treimain and Lundberg, 1999). This extensive fault zone ranges up to 1.3 miles wide and extends southeastward approximately 120 miles into eastern San Diego County.

The North Frontal fault zone of the San Bernardino Mountains is located approximately 5.5 miles southeast of the Victorville Area along the base of the Ord Mountains. This active fault zone has the potential to produce a moderate earthquake with a Richter Magnitude of approximately 6.2. The Landers fault was discovered as a result of a 7.4 Richter magnitude sized earthquake on June 28, 1992.

Silverwood Lake, Lake Arrowhead and Lake Gregory all are upstream of the site and pose very little impact to the site. The site is protected by the Mojave River Forks Reservoir. The embankment is 5.5 miles upstream of the site. Silverwood Lake is an additional 6 miles to the embankment, Lake Gregory is 4.25 miles to Silverwood Lake and Lake Arrowhead is 16 miles to the embankment. The seiche hazards are extremely low for this site. The Mojave River Forks Reservoir is designed to hold back any flooding. The Mojave River Forks Reservoir has a low flow outlet 20 feet wide as well as an emergency overflow 200 feet wide.

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According to the **2016 California Building Code (CBC)** and **ASCE 7-10** the site soils can be classified as **Type D**. The site is considered to be located in **Seismic Risk Category 2**. The Table below provides the seismic parameters as contained in **ASCE 7-10 and Seismic Design Maps produced by OSHPD**. Any changes in the present code should be considered during the design.

Latitude – N 34.414166 Longitude – W -117.225280

Site Classification: D

Short period spectral site acceleration: S_S = 1.874g

Spectral acceleration for a 1-sec period: S_1 = 0.722g

Short period acceleration coefficient: Fa = 1.00

1-second acceleration coefficient: Fv = 1.50

Modified: SMs = Fa*Ss = (1.00)(1.874) = 1.874g

SM_1 = Fv*S_1 = (1.50)(0.722) = 1.083g

Design Values: SDs = 2/3*(SMs) = 2/3*1.874 = 1.249g

SD_1 = 2/3*(SM_1) = 2/3*1.083 = 0.722g

Seismic Design Category: D

Design Response Spectrum: T_L = 8 seconds

Liquefaction Hazard Analysis

SPT $(N_1)_{60}$	Depth	CSR eqk	CSR 7.5	CSR 8.0	Total Stress	Effective Stress	r_d	FS(7.5)	FS(8.0)
	0.0		0.079	0.051	0	0	1.000		
6	5.0	0.100	0.078	0.051	580	580	0.993	1.280	1.970
12	10.0	0.130	0.077	0.050	1160	1160	0.985	1.678	2.582
14	15.0	0.150	0.077	0.050	1740	1740	0.975	1.956	3.009
15	20.0	0.163	0.076	0.049	2320	2320	0.960	2.152	3.311
21	25.0	0.230	0.074	0.048	2900	2900	0.945	3.095	4.761
22	30.0	0.240	0.073	0.048	3480	3480	0.930	3.281	5.048
20	35.0	0.215	0.072	0.047	4060	4060	0.910	3.004	4.622
23	40.0	0.250	0.068	0.044	4640	4640	0.870	3.654	5.621

Even though the top 5 feet is relatively loose it had a higher fine content. The adjustment for fines brought the factor of safety higher. Also, the top five (5) ft of soil around the foundation will be over-excavated and recompacted to a relative compaction of 90% or higher. Below that depth the soils have a higher confining stress. The factor of safety exceeds the minimum standard of 1.25 (Seed and Idriss, 1982).

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Figure 1 REGIONAL FAULT MAP (City of Victorville General Plan 2030)

4.4 Seismically Induced Settlement

Ground movement and settlement can occur when relatively low-density soils are subject to ground vibrations. Potential for settlement of near surface soils due to earthquake cannot be precluded. However, with the over-excavation and re-compaction of the surface soils the settlement will be mitigated. The densification of the surface soils and the confined nature of the deeper soils, an adequate shear strength and bearing pressure will be provided. The structure will only influence the top two (**2**) feet below the bottom of the foundation. The recommendation of over excavation and re-compaction is for the top five (**5**) feet of soil. The supporting soils will bear the weight of the structure.

4.5 Liquefaction Potential

Although our field investigation did not extend to great depths, based on our general experience, the site is not subject to liquefaction.

Liquefaction is a phenomenon where earthquake induced ground vibrations increases the pore pressure in saturated, granular soils until it is equal to the confining, overburden pressure. When this occurs, the soil can completely lose its shear strength and enter a liquefied state. The possibility of liquefaction is dependent upon the grain size, relative density, confining pressure, saturation of the soils, strength of the ground motion and duration of ground shaking. For liquefaction to occur three criteria must be met: Underlying loose, coarse grained soils, a ground water depth of less than 50 feet and a nearby large magnitude earthquake.

Based on the loose relative density and granular soils and the ground water in 2018 from the nearest two wells (USGS 3424535117135702 004N003 W30D005S) and (USGS 342514117134802, N003W19G003S) were **64 feet** and **91 feet** below proposed average ground surface, respectively. However, historically in 2011 the water level elevation was approximately **27** feet below proposed average ground surface. The likelihood of the water level to be that shallow again and coincide with a massive nearby earthquake is unlikely. The soils have a very high infiltration rate of **6 in/hr** and the saturated hydraulic conductivity is High to Very High.

"**Liquefaction occurs only when all of the following criteria have been met:**

- ***The soil is cohesionless***
- ***The soil is loose***
- ***The soil is saturated***
- ***The earthquake produces ground shaking with sufficient intensity and duration***
- ***The ground shaking produces undrained conditions in the soil*****" (1)**

4.6 Wind Consideration

The site is located in the high wind zone. Design provisions of the latest California Building Code should be followed.

(1) Geotechnical Engineering Principles and Practices (p. 692), by Donald Caduto, 1999 Upper Saddle River, NJ 07458, Prentice Hall

4.7 Depth of Groundwater

The depth of the groundwater at this site is approximately **64'–90'** from the ground surface. This depth is shown on the ***USGS Water Resources Data*** file for the surrounding area.

4.8 Flooding Potential

The site is outside the **100 yr** flood plain and is in Zone X per the FEMA FIRM MAP 06071C6515J September 2, 2016, which states that the location is outside the **0.2%** annual chance floodplain. The County Hazard Overlay utilizes the same data from FEMA showing the site has a very low chance of flooding and shows the site is outside the **500 yr** floodplain. The potential for flooding is extremely low.

4.9 Dam Inundation

The site does lie within the Count Hazard Overlay for Dam Inundation however the likelihood of Dam Inundation is **extremely** low. The event that would cause a Dam Inundation would be extremely devastating and a national emergency. Every regional facility would be impacted in this event. This site is not a critical facility and would remain closed until the waters subsided.

4.10 On-Site Septic System

The site will have an onsite septic system with the leach lines along the south east property lines. The septic tank and leach line design has already been approved by the county in a separate report. The soils over the entire site are relatively the same and minor relocations would not adversely affect the system.

5.0 CONCLUSIONS

In our opinion the soils encountered on this project site are suitable for the proposed development of the commercial development project provided recommendations contained in this report are followed.

5.1 Upper four (**4**) feet of the soils are loose to medium dense, and relatively dry. These materials are subject to settlement due to consolidation and ground vibrations. **Over-excavation** and **re-compaction** of near surface soils, and other mitigating measures are discussed in **Section 6.0** of this report.

5.2 Our investigation and testing indicate that the near surface soils are likely to exhibit very low to low expansion potential.

5.3 Seismic considerations contained in **Section 4.3** should be considered during planning and design in conjunction with requirements of latest California Building Code.

5.4 The site is situated in a high wind speed area. The design should consider wind forces meeting the current requirements of the latest California Building Code.

6.0 RECOMMENDATIONS

6.1 Site Preparation

To achieve uniform support for foundations and slab-on-grade, the site should be cleared of all vegetation, debris and any deleterious materials.

As described earlier herein, the upper four **(4)** feet of material is relatively loose to medium dense. To mitigate rapid settlement, and or expansion, we recommend that the building pad area, extending five **(5)** feet beyond the outer most limits should be **over-excavated** to a depth of at least four **(4)** feet below the existing or lowest cut grade and further scarified to a depth of twelve **(12)** inches. The scarified surface should be inspected by **ALR Engineering & Testing** prior to **re-compaction**. Upon approval of the soils engineer, the material should be **uniformly moisture conditioned** and **re-compacted** to relative compaction of at least **90** percent. All grading operation, including excavation, removal and re-compaction shall be observed by **ALR Engineering & Testing** or his/her representative.

6.2 Shrinkage and Compaction Settlement During Grading

Our field investigation and field and laboratory testing determined that the near surface soils are loose to medium dense. Accordingly, we estimate the shrinkage factor to be approximately **15** to **20** percent during **over-excavation** and **re-compaction**. Shrinkage is defined as the decrease in volume of soil due to artificial compaction, expressed as percentage of ratio of compacted dry density minus inplace density to compacted dry density. Shrinkage factors provided herein assumes an average relative compaction of **92** percent. Additionally, approximately **0.30** to **0.40** feet of compaction settlement should be considered during site grading.

6.3 Over-excavation and Re-compaction

To provide uniform consistent soil support and drainage, we recommend that the upper four **(4)** feet below the existing grade or lowest cut grade be **over-excavated** and **re-compacted**. Once the pads have been **over-excavated** the bottom should be scarified an additional twelve **(12)** inches, the scarified surface should be observed by an experienced engineer and the bottom should be tested prior to the **re-compaction**. Upon approval of the engineer, the material shall be uniformly moisture conditioned to near optimum moisture content and re-compacted to a minimum relative compaction of **90%**. The excavation then backfilled and compacted in loose lifts not exceeding eight **(8)** inches, after uniformly moisture conditioned as per compaction criteria provided herein this report.

6.4 Imported Fill

Imported fill should be free of all deleterious substances, and non-expansive. The source of the imported fill should verified by the Engineer prior to being brought to the site.

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6.5 Compaction Criteria

Following compaction criteria should be observed:

Structural Fill-Building areas extending at least 5' beyond the outermost building limit	90% or greater @ -2 to +2% of OMC
Backfill around retaining walls, Trench backfill from 1' to 4' below the subgrade	90% or greater @ -2 to +3% of OMC

All compaction and moisture content criteria are relative to ASTM D1557 Maximum Dry Density (MDD) and Optimum Moisture Content (OMC).

6.6 Foundation Design

The use of shallow, continuous and isolated footing foundation system is recommended provided other recommendations given in our report are followed. The max allowable bearing pressure and minimum footing foundation requirements are given below.

Maximum Allowable Bearing Pressure	# of Floors	Continuos Footings		Isolated Footings		Lateral Bearing Capacity	Sliding Coefficient
		Width	Depth	Width	Depth		
2000 psf	**Single Story**	**12"**	**15"**	**15"**	**15"**	**180 psf**	**0.25**

The bearing pressure can be increased by one-third for seismic or wind loading. **As a minimum**, all footings should be reinforced with one **(1)** No. 4 bar at the top and one (**1**) No. 4 bar at the bottom. Additional reinforcing should be determined by a structural engineer. A total settlement on the order of **0.75** inches should be anticipated, with differential settlement of about **0.35** inches.

Canopy Foundation Recommendation

The allowable soil pressure shall be **2,000 psf**, the lateral bearing pressure shall be **180 psf**. The concrete shall be a minimum of **2,500 psi at 28 days**. The foundations must be cured for 3 days prior to any steel erection on top of the footings. All other foundation requirements shall be provided by the manufacturer of the canopy.

Underground Fuel Tank Recommendation

The allowable soil pressure shall be **2,000 psf,** the lateral bearing pressure shall be **180 psf**. The tanks shall be encapsulated with gravel at least twelve **(12)** inches thick.

6.7 Slab on Grade

We recommend a minimum thickness of four **(4)** inches. Two **(2)** inches of granular bedding (clean sand) underneath all slabs-on-grade underlain by a **6**-mil thick Visqueen is recommended. All slabs should be reinforced with steel reinforcement of No. 3 bars twenty-four (**24)** inches on center both ways, placed at mid-height of the slab is recommended. An equivalent-welded wire mesh reinforcement, **6x6 - 6x6** may be used in lieu of No. **3** bars. We recommend construction joints at every approximately **200** square feet. Concrete works exposed to an outside environment should be air contained with an air content of four (**4**) percent at the time of placement. All concrete should be placed at a slump not to exceeding four (**4**) inches at time of placement.

6.8 Cement Type and Corrosion Potential

Based on our experience, we recommend Type II cement for all concrete works in contact with soils. Additionally, we recommend 15 to 20 % Type F Fly Ash as substitute for cement by weight.

6.9 Trench Backfill

Utility trench backfill material should be non-expansive, free of debris and any deleterious substances. Local onsite material is suitable for trench backfill. Granular bedding of one **(1)** foot underneath the water and sewer line pipes and six **(6)** inches above the pipes should be considered. The backfill should be compacted in loose lifts not exceeding six **(6)** inches to achieve relative compaction as set in **Section 6.4 Compaction Criteria**.

6.10 Surface Drainage and Landscaping

All grading should be such to direct surface runoff away from the building foundations. Roof runoff should also be directed away from the foundations.

6.11 Pavement Structure

The following pavement recommendations are based on the existing street and highway plans.

Rock Springs Road	**6.5” of AC over 9.0” of Class II Base**
Deep Creek Road	**5.0” of AC over 9.0” of Class II Base**
Onsite paving	**4.0" of AC or 6.0” of PCC over compacted native soils**

6.12 Field Observations and Testing

The recommendations contained in this report are based on the results of our limited preliminary investigation and our general experience with the similar soil conditions. It is critical that **ALR Engineering & Testing** observe the earthworks operation and test for compaction at various stages of the related construction activities. These activities include but may not be limited to:

* Over-excavation and scarification.
* Subgrade preparation
* Trench and Utility backfill
* Fill placement and backfilling.
* Placement of Base Course
* When any unusual conditions are encountered.

Based on these observations and testing, it may be necessary to modify the recommendations contained herein.

6.14 Final Report

A final report should be prepared which will contain field observations, test results and additional recommendations, as warranted.

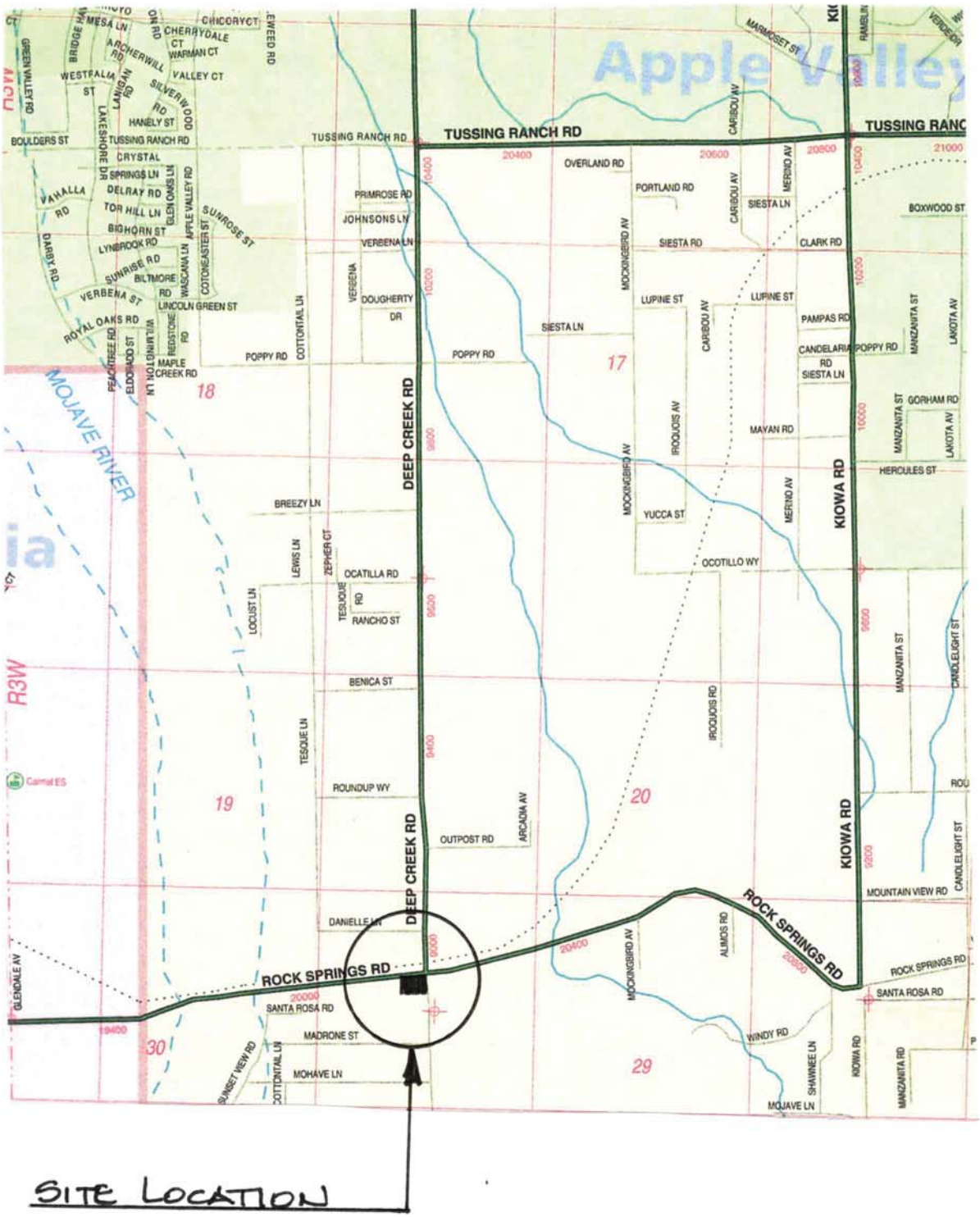
7.0 LIMITATIONS

Conclusions, recommendations and professional opinions resulting from our site observations, field investigation and laboratory testing are intended solely for the **4,500 sf *Proposed Gas Station*** *with* ***Convenience Store***.

Our conclusions and recommendations are based on our understanding of the project and consistent with the level of skill ordinarily exercised by other professional consultants under similar circumstances at the same time our services were provided.

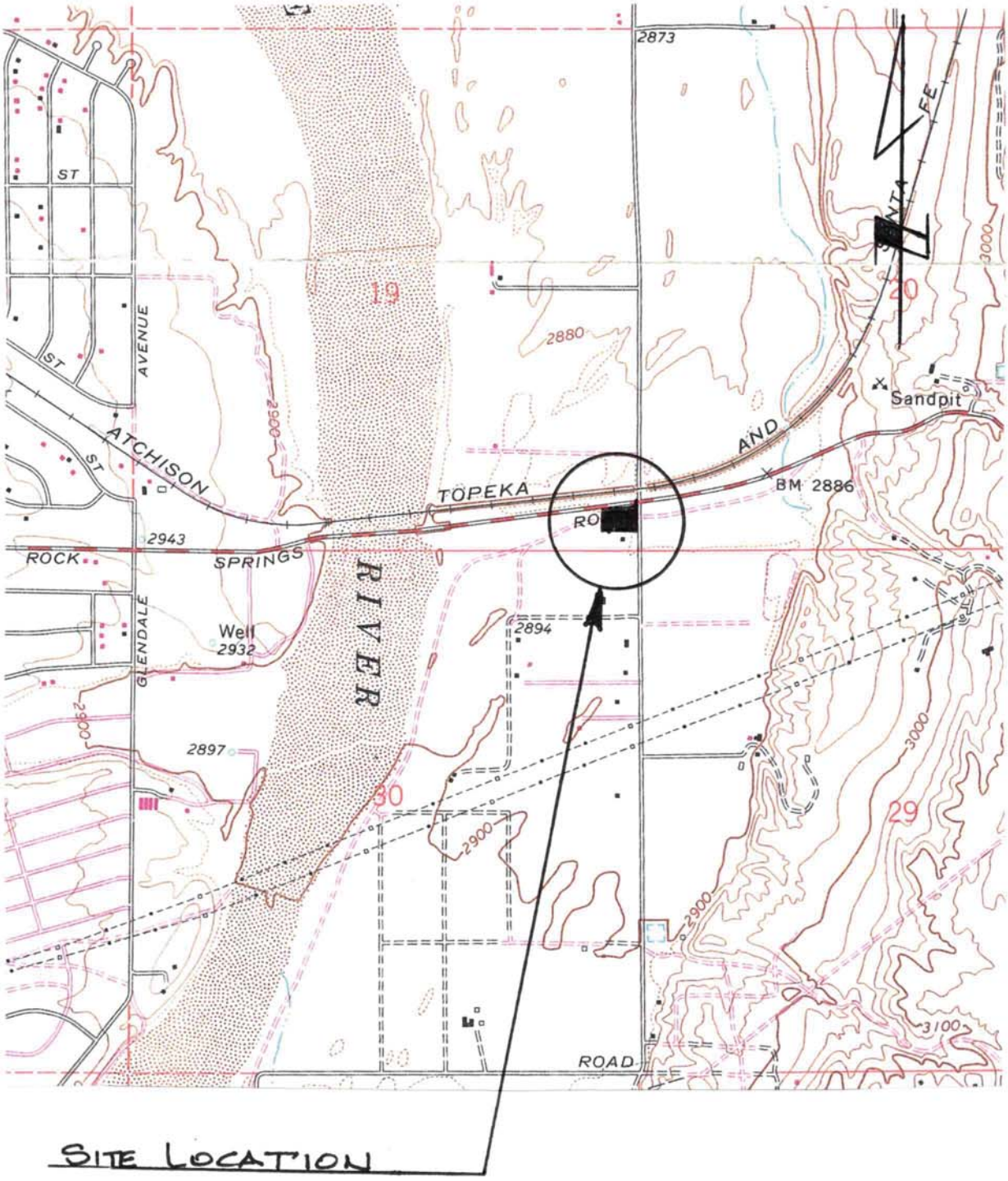
This report is exclusively prepared to assist the owner **Mark Maida** in the design of the footings and foundation support for the ***Proposed Gas Station*** *with* ***Convenience Store*** described within this report on site.

ALR Engineering & Testing should be consulted to provide written modifications to the Recommendations contained in this report, depending upon the project requirements.



SITE LOCATION

ALR ENGINEERING & TESTING	Apple Valley	Project No. 1803409
Civil & Geotechnical Engineering w/ Material Testing	Deep Creek & Rock Springs Roads	
18361 Symeron Road	APN 0438-165-33	
Apple Valley, Ca. 92307	VICINITY MAP	Figure No. 1
(760) 810-2031 Cell # (760) 242-3130 Office #		



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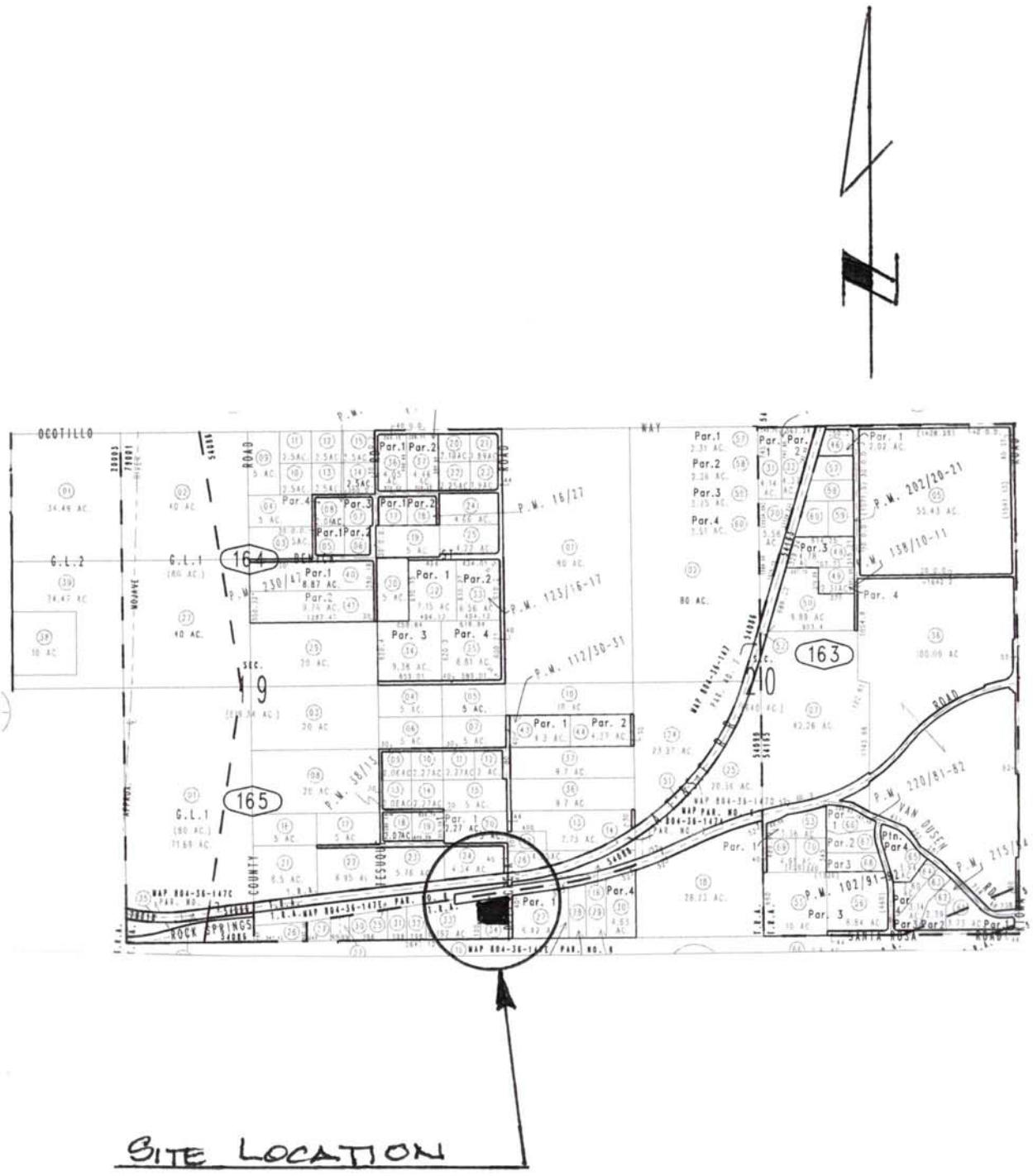
	Deep Creek & Rock Springs Roads	
	APN 0438-165-33	
	USGS TOPO	Figure No. **2**



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	Deep Creek & Rock Springs Roads	
	APN 0438-165-33	
	San Bernardino County **ASSESSOR'S MAP**	Figure No. **3**

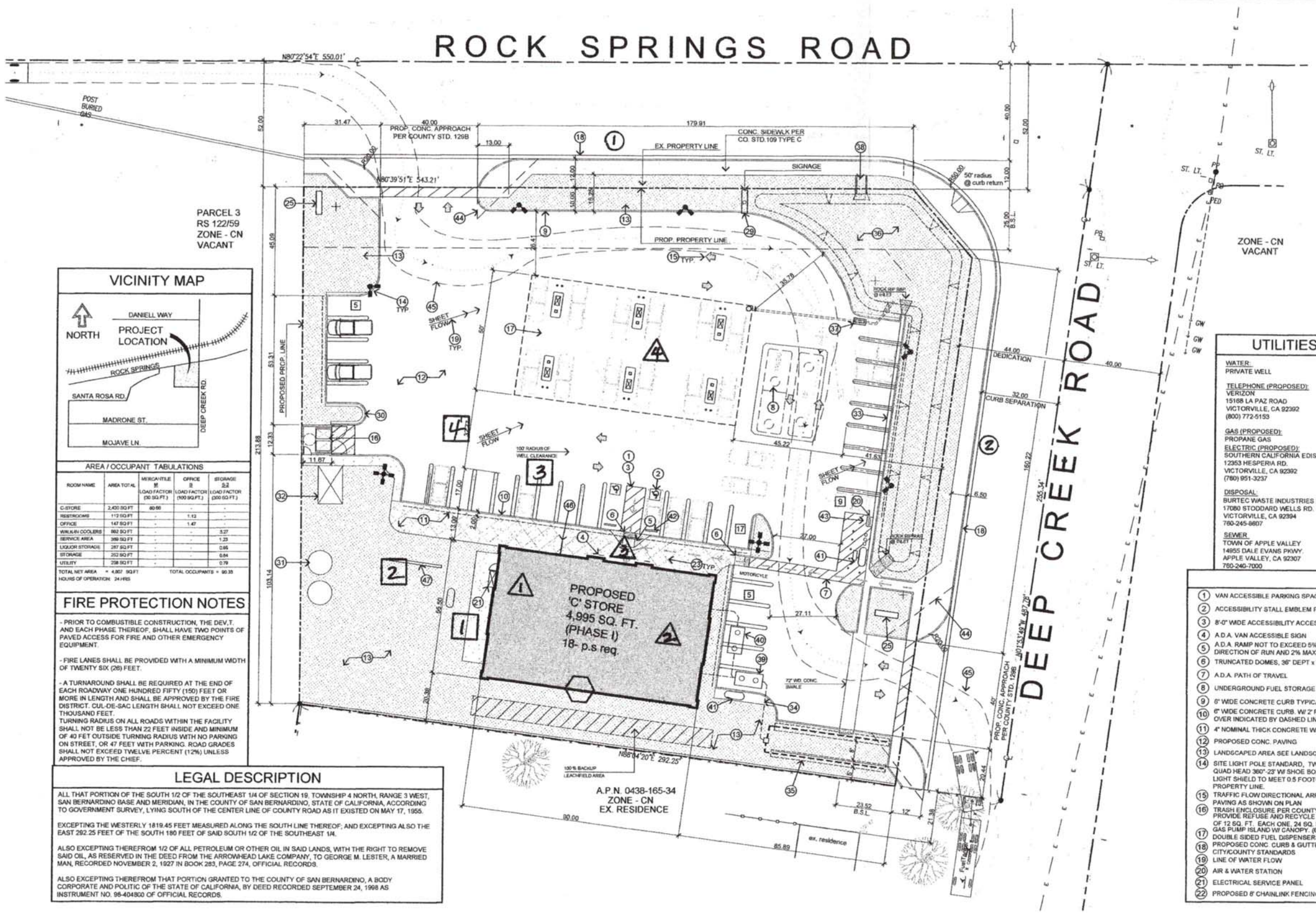
FOR OFFICIAL USE

△ DENOTES EXPLORATORY TRENCH LOCATION

⬡ INFILTROMETER TEST LOCATION

○ DENOTES "R" VALUE SAMPLE LOCATION

□ DENOTES LEACHLINE TRENCH LOCATION



VICINITY MAP

AREA / OCCUPANT TABULATIONS

ROOM NAME	AREA TOTAL	MERCANTILE M LOAD FACTOR (30 SQ.FT.)	OFFICE B LOAD FACTOR (100 SQ.FT.)	STORAGE S-2 LOAD FACTOR (300 SQ.FT.)
C-STORE	2,400 SQ.FT	80.00	-	-
RESTROOMS	112 SQ.FT	-	1.12	-
OFFICE	147 SQ.FT	-	1.47	-
WALK-IN COOLERS	882 SQ.FT	-	-	5.27
SERVICE AREA	369 SQ.FT	-	-	1.23
LIQUOR STORAGE	267 SQ.FT	-	-	0.89
STORAGE	252 SQ.FT	-	-	0.84
UTILITY	238 SQ.FT	-	-	0.79
TOTAL NET AREA = 4,807 SQ.FT			TOTAL OCCUPANTS =	90.35
HOURS OF OPERATION: 24 HRS				

FIRE PROTECTION NOTES

- PRIOR TO COMBUSTIBLE CONSTRUCTION, THE DEV.T. AND EACH PHASE THEREOF, SHALL HAVE TWO POINTS OF PAVED ACCESS FOR FIRE AND OTHER EMERGENCY EQUIPMENT.

- FIRE LANES SHALL BE PROVIDED WITH A MINIMUM WIDTH OF TWENTY SIX (26) FEET.

- A TURNAROUND SHALL BE REQUIRED AT THE END OF EACH ROADWAY ONE HUNDRED FIFTY (150) FEET OR MORE IN LENGTH AND SHALL BE APPROVED BY THE FIRE DISTRICT. CUL-DE-SAC LENGTH SHALL NOT EXCEED ONE THOUSAND FEET.
TURNING RADIUS ON ALL ROADS WITHIN THE FACILITY SHALL NOT BE LESS THAN 22 FEET INSIDE AND MINIMUM OF 40 FET OUTSIDE TURNING RADIUS WITH NO PARKING ON STREET, OR 47 FEET WITH PARKING. ROAD GRADES SHALL NOT EXCEED TWELVE PERCENT (12%) UNLESS APPROVED BY THE CHIEF.

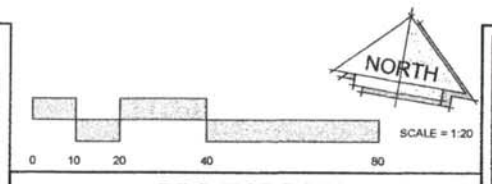
LEGAL DESCRIPTION

ALL THAT PORTION OF THE SOUTH 1/2 OF THE SOUTHEAST 1/4 OF SECTION 19, TOWNSHIP 4 NORTH, RANGE 3 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, ACCORDING TO GOVERNMENT SURVEY, LYING SOUTH OF THE CENTER LINE OF COUNTY ROAD AS IT EXISTED ON MAY 17, 1955.

EXCEPTING THE WESTERLY 1819.45 FEET MEASURED ALONG THE SOUTH LINE THEREOF; AND EXCEPTING ALSO THE EAST 292.25 FEET OF THE SOUTH 180 FEET OF SAID SOUTH 1/2 OF THE SOUTHEAST 1/4.

ALSO EXCEPTING THEREFROM 1/2 OF ALL PETROLEUM OR OTHER OIL IN SAID LANDS, WITH THE RIGHT TO REMOVE SAID OIL, AS RESERVED IN THE DEED FROM THE ARROWHEAD LAKE COMPANY, TO GEORGE M. LESTER, A MARRIED MAN, RECORDED NOVEMBER 2, 1927 IN BOOK 283, PAGE 274, OFFICIAL RECORDS.

ALSO EXCEPTING THEREFROM THAT PORTION GRANTED TO THE COUNTY OF SAN BERNARDINO, A BODY CORPORATE AND POLITIC OF THE STATE OF CALIFORNIA, BY DEED RECORDED SEPTEMBER 24, 1998 AS INSTRUMENT NO. 98-404800 OF OFFICIAL RECORDS.



PROJECT DATA

APPLICATION TYPE:	TPM/ MUP FOR THE CONSTRUCTION & OPERATION OF A 4,995 SQ. FT. C-STORE W/ 6 FUEL PUMP SERVICE STATION.
ZONE:	AV/ CN
OCCUPANCY'S:	M - MERCANTILE
CONSTRUCTION TYPE:	V- B
STORIES:	1
FIRE SPRINKLERS:	YES

OWNER:
KALLEN FAMILY TRUST
18564 HWY 18
APPLE VALLEY, CA 92307
PH: 760.403.3000

ARCHITECT / REPRESENTATIVE:
STEENO DESIGN STUDIO, INC.
ARCHITECT: TOM STEENO
11774 HESPERIA RD. SUITE B-1
PH: 760.244.5001 FX: 760.244.1948

SITE DATA

A.P.N:
0438-165-33

LEGAL DESCRIPTION:
PORTION OF SECTION 19, T.4N., R.3W., S.B.M., AS SHOWN ON RS 122/59, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA.

ASSESSOR'S PARCEL NO.: APN 0438-165-33

APPROXIMATE AREA: 273,788 S.F., 6.285 ACRES

SITE AREA	
AREA	SQ. FOOTAGE
GROSS LAND AREA (6.29 ACRES)	273,788 S.F.
NET LAND AREA (6.12 ACRES)	266,546 S.F.
NOT A PART (4.62 ACRES)	201,089 S.F.
PROJECT NET LAND AREA (1.50 ACRES)	65,457 S.F.

PROPOSED LAND AREA & COVERAGE

AREA	SQ. FOOTAGE	% COVERAGE
BUILDING AREA (TOTAL)	4,995	7.6%
FUELING CANOPY AREA	4,599	7.0%
A/C PAVING	33,095	50.4%
CONCRETE HARDSCAPE & CURBING	3,728	5.6%
LANDSCAPED AREA	16,374	25.0%
RETENTION BASIN	2,886	4.4%
TOTAL NET LAND AREA COVERAGE =	65,679	100%
LANDSCAPED AREA (BEYOND PROPERTY LINE)	1,813	NOT A PART
40,763 SQ. FT. OF IMPERVIOUS AREA		

UTILITIES

WATER:
PRIVATE WELL

TELEPHONE (PROPOSED):
VERIZON
15168 LA PAZ ROAD
VICTORVILLE, CA 92392
(800) 772-5153

GAS (PROPOSED):
PROPANE GAS

ELECTRIC (PROPOSED):
SOUTHERN CALIFORNIA EDISON CO.
12353 HESPERIA RD.
VICTORVILLE, CA 92392
(760) 951-3237

DISPOSAL:
BURTEC WASTE INDUSTRIES INC.
17080 STODDARD WELLS RD.
VICTORVILLE, CA 92394
760-245-8607

SEWER
TOWN OF APPLE VALLEY
14955 DALE EVANS PKWY
APPLE VALLEY, CA 92307
760-240-7000

SCOPE OF WORK

TO PARCEL OFF A 1.5 ACRES LAND AREA OF THE 6.12 ACRES NET SITE AREA FOR A PROPOSED GAS STATION AND C-STORE.

PARKING DATA

REQUIRED PARKING PER G.F.A.			
AREA	RATIO	S.F.	# SPACES
CONVENIENCE STORE	1:250	4,995	20
	TOTAL REQUIRED		20

PROVIDED PARKING:		
9'x19' ACCESSIBLE PARKING STALLS	=	2 SPACES
9'x18' STANDARD PARKING STALLS	=	34 SPACES
TOTAL PROVIDED	=	36 SPACES

KEYED NOTES

1. VAN ACCESSIBLE PARKING SPACE
2. ACCESSIBILITY STALL EMBLEM PAINTED AS SHOWN
3. 8'-0" WIDE ACCESSIBILITY ACCESS W/ BLUE STRIPES
4. A.D.A. VAN ACCESSIBLE SIGN
5. A.D.A. RAMP NOT TO EXCEED 5% SLOPE IN DIRECTION OF RUN AND 2% MAX CROSS SLOPE
6. TRUNCATED DOMES, 36" DEPT x WIDTH OF RAMP
7. A.D.A. PATH OF TRAVEL
8. UNDERGROUND FUEL STORAGE TANKS
9. 6" WIDE CONCRETE CURB TYPICAL.
10. 6" WIDE CONCRETE CURB. W/ 2' PARKING NOSE OVER INDICATED BY DASHED LINE TYPICAL.
11. 4" NOMINAL THICK CONCRETE WALKWAYS
12. PROPOSED CONC. PAVING
13. LANDSCAPED AREA SEE LANDSCAPE PLANS
14. SITE LIGHT POLE STANDARD, TWIN HEAD 90°-23'/ QUAD HEAD 360°-23' W/ SHOE BOX STYLE FIXTURES & LIGHT SHIELD TO MEET 0.5 FOOTCANDLE LEVELS AT ALL PROPERTY LINE.
15. TRAFFIC FLOW DIRECTIONAL ARROWS PAINTED ON PAVING AS SHOWN ON PLAN
16. TRASH ENCLOSURE PER COUNTY STANDARDS PROVIDE REFUSE AND RECYCLE MATERIAL STORAGE OF 12 SQ. FT. EACH ONE, 24 SQ. FT. TOTAL [CDC 84.24.040.]
17. GAS PUMP ISLAND W/ CANOPY. (6 - DOUBLE SIDED FUEL DISPENSERS)
18. PROPOSED CONC. CURB & GUTTER PER CITY/COUNTY STANDARDS
19. LINE OF WATER FLOW
20. AIR & WATER STATION
21. ELECTRICAL SERVICE PANEL
22. PROPOSED 6' CHAINLINK FENCING
23. CONCRETE SCREED LINES IN A 5' SQUARE GRID PATTERN
24. 123 LINEAR FT. OF DRIVE THRU - 8 CARS STACKED
25. GAS PRICING MONUMENT SIGN
26. FIRE HYDRANT
27. CONC. SPILLWAY FOR RETENTION BASIN OVERFLOW
28. NOT USED
29. 30' HIGH ILLUMINATED TENANT SITE SIGNAGE
30. CONCRETE 12" WIDE AT END PARKING STALLS
31. 10,000 GAL. WATER STORAGE TANK (TYP. OF 2)
32. WATER PUMP HOUSE
33. CONC. GUTTER FOR SITE DRAINAGE
34. 4" DIA. DRAIN FROM SEPTIC TANK TO LEACH FIELD
35. PROPOSED 95' LINEAR LENGTH LEACH FIELD SYSTEM WITH 100% BACKUP AREA
36. PROPOSED RETENTION BASIN
37. C 1 AGENT HYDROCARBON FILTER VAULT
38. PROPOSED UNDERSIDEWALK DRAIN SEE CITY STANDARD
39. PROPOSED 1500 GAL SEPTIC TANK
40. PROPOSED 1000 GAL GREASE TRAP AND SAMPLE BOX
41. PROPANE TANK
42. WHEEL STOPS PER CITY STANDARD
43. FUEL VENT SYSTEM
44. LINE OF CLEAR SIGHT TRIANGLE
45. LINE OF TRUCK TURN MANEUVER
46. SHORT TERM BIKE RACK (MOD. RB240-EM)
47. HORSE AREA W/ HITCHING POST & WATER TROUGH

STEENO DESIGN STUDIO INC.
ARCHITECTURE • DESIGN • PLANNING
11774 HESPERIA ROAD, SUITE B • HESPERIA, CA 92345
PHONE (760) 244-5001 • FAX (760) 244-1948
www.steenodesign.com

DATE FINISHED
OCTOBER 2018

REVISIONS
NOV. 7, 2018

PROJECT: C-STORE

DEEP CREEK COUNTRY MARKET

CONTACT INFO
KALLEN FAMILY TRUST
18564 HWY 18
APPLE VALLEY, CA 92307

PROJECT ADDRESS:
APN: 0438-165-33
DEEP CREEK ROAD
APPLE VALLEY, CA 92308

JOB NO.
C17-430

SHEET NAME:
SITE PLAN

PAGE
A-0

IN THE COUNTY OF SAN BERNARDINIO

TENTATIVE
PARCEL MAP NO. 19991

PORTION OF THE SOUTH 1/2 OF THE SOUTHEAST 1/4 OF SECTION 19, TOWNSHIP 4 NORTH, RANGE 3 WEST, S.B.B.&M, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA.

SITETECH, INC.

DECEMBER, 2018

NOTES:

1. THIS PARCEL MAP CONTAINS 4 PARCELS ON 6.28 GROSS ACRES FOR AN OVERALL DENSITY OF APPROXIMATELY 1.57 ACRES PER PARCEL.
2. EXISTING AND PROPOSED LAND USE DISTRICT IS: CN – NEIGHBORHOOD COMMERCIAL
3. THE LAND USE OF THE SURROUNDING PROPERTY TO THIS PROJECT IS AS FOLLOWS
   TO THE NORTH: AT&SF RAILROAD
   TO THE SOUTH: S.F.R. / RURAL LIVING (RL)
   TO THE EAST: VACANT/ NEIGHBORHOOD COMMERCIAL (CN)
   TO THE WEST: VACANT/ RURAL LIVING (RL)
4. LEGAL DESCRIPTION:

   PORTION OF THE SOUTH 1/2 OF THE SOUTHEAST 1/4 OF SECTION 19, TOWNSHIP 4 NORTH, RANGE 3 WEST, S.B.B.&M, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA.

   A.P.N.: 0438-165-33

   SEE TITLE REPORT FOR FULL DESCRIPTION.
5. ALL PROPOSED BUILDING SHALL MEET SAN BERNARDINO COUNTY DEVELOPMENT CODE REQUIREMENTS.
6. ALL PROPOSED INFRASTRUCTURE IMPROVEMENTS SHALL MEET SAN BERNARDINO COUNTY DEVELOPMENT CODE REQUIREMENTS PER CHAPTER 83.10.
7. NO KNOWN PROTECTED PLANTS EXIST ON SITE.
8. GRADING IS PROPOSED AS A PART OF THIS PROJECT.
9. NO KNOWN EASEMENTS EXIST ON SITE.
10. LOT COVERAGE: BUILDING LOT COVERAGE FOR THIS PROJECT IS LESS THAN 10%.
11. SEE SITE PLAN/ARCHITECTURAL PLANS FOR ADDITIONAL DETAILS.
12. THERE ARE NO NEW ROADS PROPOSED AS A PART OF THIS PROJECT.
13. THIS TENTATIVE MAP INCLUDES THE ENTIRE CONTIGUOUS OWNERSHIP OF THE SUBDIVIDER.

EASEMENT NOTES:

ITEM #5 – AN EASEMENT FOR DITCHES AND CANALS PER DOCUMENT RECORDED IN BOOK H, PAGE 338 OF PATENTS, RECORDS OF SAN BERNARDINO COUNTY – ITEM IS BLANKET IN NATURE – DOCUMENT NOT AVAILABLE

ITEM #7 – AN EASEMENT FOR WATER LINES PER DOCUMENT RECORDED IN BOOK 283, PAGE 274, O.R., RECORDS OF SAN BERNARDINO COUNTY – EASEMENT CANNOT BE LOCATED FROM RECORD

UTILITY COMPANIES FOR THIS PROJECT:

TELEPHONE:	ELECTRIC:	SEWER:
VERIZON P.O. BOX 641 SAN BERNARDINO, CA. 92401 PH: (909) 482-6711	SOUTHERN CALIFORNIA EDISON CO. 287 TENNESSEE STREET REDLANDS, CA. 92373 PH: (909) 335-7191	PRIVATE SEPTIC
CABLE TELEVISION:	**GAS:**	**WATER:**
SATELLITE SYSTEM	PROPANE	PRIVATE WELL

OWNER:
CONTACT INFO:
KALLEN FAMILY TRUST
18564 HWY 18
APPLE VALLEY, CA 92307
PH: 760-403-3000
E: bdkallen@gmail.com

APPLICANT:
MUNEM MAIDA
13302 RANCHERO ROAD
OAK HILLS, CA 92344
PH: 760-964-7936
E: madia5150@gmail.com

ARCHITECT / REPRESENTATIVE:
STEENO DESIGN STUDIO, INC.
ARCHITECT: TOM STEENO
11774 HESPERIA RD, SUITE B-1
HESPERIA, CA 92345
PH: 760.244.5001 FX: 760.244.1948

A.P.N.: 0438-165-33

REGISTERED PROFESSIONAL ENGINEER BERNHARD K. MAYER NO. 36866 Exp. 6-30-20 CIVIL STATE OF CALIFORNIA

SITETECH INC.
8061 CHURCH ST. HIGHLAND CA 92346 PO BOX 592
PH: (909)864-3180, FAX: (909)864-0850

BERNHARD K. MAYER — R.C.E. 36866 L.S. 7319 — 12/17/2018 DATE

SITE — ROCK SPRINGS ROAD — SANTA ROSA ROAD — DEEP CREEK ROAD — HACIENDA RD — HACIENDA RD

VICINITY MAP
NO SCALE

N

SCALE: 1"=40'
40 0 40 80

APPROX. RAILROAD R/W

ROCK SPRINGS ROAD

N 80°22'54" E 275.91'
PROP. CURB GUTTER AND SIDEWALK
DEDICATION
PROPOSED R/W
N 80°22'54" E 502.05'
25' BUILDING SETBACK LINE
N 80°39'51" E 750.68'
EXISTING R/W
RADIUS=20.0'
543.21'
248.63'
PROPOSED R/W
25' BUILDING SETBACK LINE
PROP. CURB GUTTER AND SIDEWALK
50' CURB RETURN RADIUS
FOUND 1"IP PLUG LS 5803
N 00°15'28" W 40.64'
FOUND 1"IP TAG SBCO
DEEP CREEK ROAD
N 01°53'49" W 255.34'
PROPOSED R/W
PROP. CURB GUTTER AND SIDEWALK
RADIUS=20.0'
N 01°53'49" W 218.45'
25' BUILDING SETBACK LINE
CN VACANT
PAR 1 P.M. 3496 P.M.B. 32/54

FOUND 1"IP PLUG LS 5803
25' BUILDING SETBACK LINE
(0.4%)
S 01°49'36" E 280.76'
S 01°49'36" E 303.73'
S 01°49'36" E 326.69'
N 01°53'49" W 213.87'
N 01°53'49" W 136.00'
N 01°53'49" W 180.00'
(0.5%)
(1.4%)
(5.9%)

PARCEL 1
1.51 ACRES (GROSS)
1.14 ACRES (NET)

PARCEL 2
1.54 ACRES (GROSS)
1.23 ACRES (NET)

PARCEL 3
1.58 ACRES (GROSS)
1.38 ACRES (NET)

PARCEL 4
1.65 ACRES (GROSS)
1.39 ACRES (NET)

CN
REC. OF SURVEY
03-227
RS 122/59

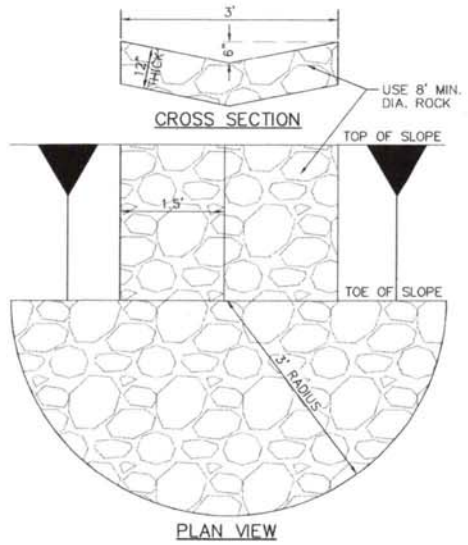
FOUND 1"IP OPEN
N 88°04'20" E 292.25'
FOUND 1"IP PLUG LS 5803
EX. HOUSE
CN S.F.R.
A.P.N. 0438-165-34

A.P.N. 0438-165-32
RL VACANT
377.25'
170.00'
PROPOSED R/W
170.00'
186.59'
FOUND 1"IP PLUG LS 5803
EXISTING R/W
N 88°04'20" E 526.64'
FOUND 3" BRASS CAP SE COR SEC 19 RCE 23327
SANTA ROSA ROAD
45'

PAR 1 P.M. 3523 P.M.B. 32/44 RL S.F.R.
PAR 2 P.M. 3523 P.M.B. 32/44 RL S.F.R.

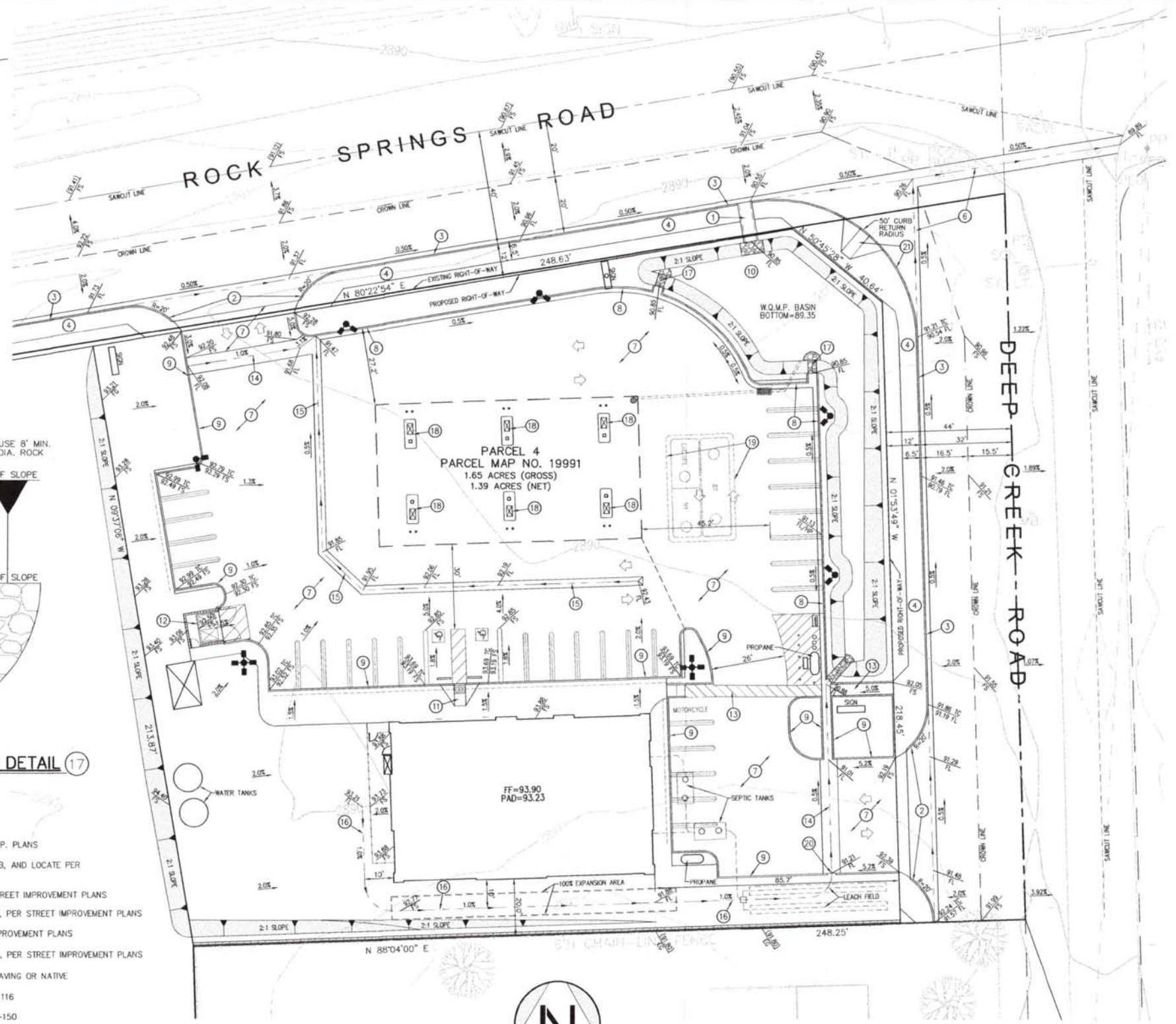
VICINITY MAP

NO SCALE



ROCK DOWNDRAIN/SPLASH PAD DETAIL (17)

NO SCALE



CONSTRUCTION NOTES:

1. PARKWAY DRAIN PER A.P.W.A. STD. 151-2, PER STREET IMP. PLANS
2. COMMERCIAL DRIVE APPROACH PER S.B. COUNTY STD. 129B, AND LOCATE PER S.B. COUNTY STD. 130, PER STREET IMP. PLANS
3. 8" CURB AND GUTTER PER S.B. COUNTY STD. 115, PER STREET IMPROVEMENT PLANS
4. CONCRETE TYPE "C" SIDEWALK PER S.B. COUNTY STD. 109, PER STREET IMPROVEMENT PLANS
5. 8" A.C. BERM PER S.B. COUNTY STD. 117, PER STREET IMPROVEMENT PLANS
6. CROSS GUTTER AND SPANDREL PER S.B. COUNTY STD. 119, PER STREET IMPROVEMENT PLANS
7. CONSTRUCT ASPHALT PAVING OVER BASE OR CONCRETE PAVING OR NATIVE
8. CONSTRUCT 6" CURB AND GUTTER PER S.B. COUNTY STD. 116
9. CONSTRUCT 6" CURB PER S.P.P.W.C. STD. 120-1 TYPE A1-150
10. CONSTRUCT 12" THICK RIP-RAP, USE 8" MIN. DIA. ROCK
11. CASE "A" TYPE 1 CURB RAMP PER A.P.W.A. STD. 111-5
12. CONSTRUCT TRASH ENCLOSURE PER ARCHITECTURAL PLANS
13. ADA ACCESS - SLOPE & 5% MAX GRADE AND 2% MAX CROSS SLOPE
14. CROSS GUTTER PER S.B. COUNTY STD. 119
15. CONSTRUCT 3' WIDE LONGITUDINAL GUTTER PER S.P.P.W.C. STD. 122-1
16. CONSTRUCT GRADED DRAINAGE SWALE AT 1.0% MINIMUM
17. CONSTRUCT ROCK DOWNDRAIN AND SPLASH PAD PER DETAIL
18. GAS FUELING STATION
19. UNERGROUND FUEL TANKS
20. 4' OPENING IN CURB FOR DRAINAGE
21. CONSTRUCT CURB RETURN AND RAMP PER S.B. COUNTY STD. 110 (RADIUS = 50') AND CALTRANS STD. A88A, PER STREET IMPROVEMENT PLANS.

UTILITY COMPANIES FOR THIS PROJECT:

TELEPHONE:
VERIZON
P.O. BOX 641
SAN BERNARDINO, CA. 92401
PH: (909) 482-6711

ELECTRIC:
SOUTHERN CALIFORNIA EDISON CO.
287 TENNESSEE STREET
REDLANDS, CA. 92373
PH: (909) 335-7191

CABLE TELEVISION:
SATELLITE SYSTEM

GAS:
PROPANE

WATER:
PRIVATE WELL

SEWER:
PRIVATE SEPTIC

EASEMENT NOTES:

ITEM #5 - AN EASEMENT FOR DITCHES AND CANALS PER DOCUMENT RECORDED IN BOOK H, PAGE 338 OF PATENTS, RECORDS OF SAN BERNARDINO COUNTY - ITEM IS BLANKET IN NATURE - DOCUMENT NOT AVAILABLE

ITEM #7 - AN EASEMENT FOR WATER LINES PER DOCUMENT RECORDED IN BOOK 283, PAGE 274, O.R., RECORDS OF SAN BERNARDINO COUNTY - EASEMENT CANNOT BE LOCATED FROM RECORD

N

SCALE: 1"=20'

20' 0 20'

GENERAL NOTES:

1) ALL GRADING WORK SHOWN ON THIS PLAN SHALL BE DONE IN COMPLIANCE WITH THE CALIFORNIA BUILDING CODE, LATEST EDITION.

2) A PERMIT WILL BE REQUIRED FROM THE COUNTY OF SAN BERNARDINO BUILDING AND SAFETY DEPARTMENT PRIOR TO BEGINNING OF ANY GRADING WORK. THE GRADING INSPECTOR IS TO BE CONTACTED TO SCHEDULE A PRE-GRADING MEETING 48 HOURS PRIOR TO BEGINNING OF GRADING.

3) THE PROPOSED STARTING AND COMPLETION DATES FOR THE ROUGH GRADING ON THIS PROJECT ARE AUGUST 15, 2014, AND NOVEMBER 15, 2014, RESPECTIVELY.

4) ANY CONTRACTOR PERFORMING WORK ON THIS PROJECT SHALL FAMILIARIZE HIMSELF WITH THE SITE AND SHALL BE SOLEY RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES RESULTING DIRECTLY OR INDIRECTLY FROM HIS OPERATION, WHETHER OR NOT SUCH FACILITIES ARE SHOWN ON THESE PLANS.

5) ALL GRADING OPERATIONS, INCLUDING BUILDING PAD SUBEXCAVATION SHALL BE PERFORMED AS REQUIRED BY THE PRELIMINARY SOILS REPORT, IF APPLICABLE, OR AS DIRECTED BY THE SOILS ENGINEER.

6) PRIOR TO PLACING ANY FILLS, THE SITE SHALL BE CLEARED OF ALL VEGETATION, AND IRRIGATION LINES. ANY OBSTRUCTIONS WHICH MAY BE REVEALED DURING GRADING SHALL BE REMOVED AND THE CAVITIES CREATED BROUGHT TO GRADE WITH PROPERLY COMPACTED FILL (90%). ALL EXISTING IRRIGATION LINES WHICH ARE EITHER CRUSHED IN PLACE OR REMOVED, SHALL BE SEALED WITH CONCRETE PLUG AT BOTH ENDS OF THE REMAINING PIPE.

7) THE SUBEXCAVATION SURFACE AND SURFACES TO RECEIVE FILL SHALL BE SCARIFIED OR BLADE MIXED, TO A DEPTH OF AT LEAST 6 INCHES. THE SCARIFIED SOILS SHALL BE MOISTENED TO A NEAR OPTIMUM MOISTURE CONTENT AND COMPACTED TO A NEAR RELATIVE COMPACTION OF AT LEAST 90% (ASTM D 1557-91). NO FILL TO BE PLACED UNTIL PREPARATION OF THE ORIGINAL GROUND IS APPROVED.

8) FILL SHALL BE SPREAD IN 8" OR LESS LIFTS, EACH LIFT MOISTENED TO A NEAR OPTIMUM MOISTURE CONTENT, AND COMPACTED TO A RELATIVE COMPACTION OF AT LEAST 90% (ASTM D 1557-91) BY SHEEPS FOOT ROLLER OR ANY EQUIVALENT COMPACTING EQUIPMENT. NO ROCK GREATER THAN 6 INCHES IN DIAMETER OR GREATER THAN IS ACCEPTABLE TO THE SOILS ENGINEER, MAY BE PLACED IN FILL.

9) NUMBER OF COMPACTION TESTS SHALL BE 1 TEST FOR EACH 2 FEET OF FILL OR 1,000 C.Y., WHICHEVER IS GREATER.

10) CUT SLOPES EQUAL TO OR GREATER THAN 5' IN VERTICAL HEIGHT AND FILL SLOPES EQUAL TO OR GREATER THAN 3' IN VERTICAL HEIGHT SHALL BE PLANTED WITH GRASS OR GROUND COVER TO PROTECT THE SLOPE FROM EROSION.

11) ROCK MAY BE PLACED IN THE ROCK DISPOSAL AREA IF SO INDICATED ON THE PLAN. ROCK SHALL BE PLACED A MINIMUM OF 3' BELOW FINISH GRADE AND CARE SHALL BE TAKEN TO INSURE THAT ANY VOIDS AROUND THE ROCKS ARE PROPERLY BACKFILLED AND COMPACTED. ALTERNATELY, ROCKS MAY BE DISPOSED OF AT SAN BERNARDINO COUNTY DUMP SITE. SUBMIT VERIFIED RECEIPT TO THE GRADING INSPECTOR.

12) A TRANSPORTATION DEPARTMENT PERMIT IS REQUIRED FOR ANY CONSTRUCTION, TEMPORARY OR PERMANENT, ON COUNTY RIGHT-OF-WAY FOR USE OF COUNTY MAINTAINED ROADS BY OVERLOAD EQUIPMENT.

13) THE ENGINEER MUST SET GRADE STAKES FOR ALL DRAINAGE DEVICES. OBTAIN INSPECTION BEFORE POURING.

14) DESIRED FOUNDATION BEARING VALUE IS 1500 P.S.F. FOR 12" DEEP FOOTINGS AND 1800 P.S.F. FOR 18" DEEP FOOTINGS. A COMPACTION REPORT SHALL BE SUBMITTED AND APPROVED BY THE BUILDING AND SAFETY DEPARTMENT PRIOR TO FOUNDATION INSPECTION.

15) TOPOGRAPHIC MAPPING OBTAINED FROM FIELD SURVEY PERFORMED BY SITETECH, INC., ON JULY 17, 2012.

16) CUT AND FILL SLOPES TO BE PLANTED WITH AN APPROVED GROUND COVER. SLOPES ARE TO BE PLANTED AND GROUND COVER GROWING PRIOR TO OCCUPANCY OF BLDG(S).

17) ANY SLOPES WITH DISTURBED SOILS OR DENUDED OF VEGETATION MUST BE STABILIZED AS TO INHIBIT EROSION BY WIND AND WATER

18) SEDIMENTS AND OTHER MATERIALS MAY NOT BE TRACED FROM THE SITE BY VEHICLE TRAFFIC. THE CONSTRUCTION ENTRANCE ROADWAYS MUST BE STABILIZED SO AS TO INHIBIT SEDIMENTS FROM BEING DEPOSITED INTO PUBLIC INTO THE PUBLIC WAY. ACCIDENTAL DEPOSITIONS MUST BE SWEPT UP IMMEDIATELY AND MAY NOT BE WASHED DOWN BY RAIN OR OTHER MEANS.

19) CONSTRUCTION SITES SHALL BE MAINTAINED BY IMPLEMENTATION OF BEST MANAGEMENT PRACTICES (BMPs) IN SUCH A MANNER THAT POLLUTANTS ARE NOT DISCHARGED FROM THE SITE TO THE MAXIMUM EXTENT PRACTICABLE.

20) ERODED SEDIMENTS AND OTHER POLLUTANTS MUST BE RETAINED ON SITE AND MAY NOT BR TRANSPORTED FROM THE SITE VIA SHEETFLOW, SWALES, AREA DRAINS, NATURAL DRAINAGE OR WIND.

21) STOCKPILES OF EARTH AND OTHER CONSTRUCTION RELATED MATERIALS MUST BE PROTECTED FROM BEING TRANSPORTED FROM THE SITE BY THE FORCES OF WIND AND WATER.

22) FUELS, OILS, SOLVENTS AND OTHER TOXIC MATERIALS MUST BE STORED IN ACCORDANCE WITH THEIR LISTING AND ARE NOT TO CONTAMINATE SOIL AND SURFACE WATERS. ALL APPROVED STORAGE CONTAINERS ARE TO BE PROTECTED FROM THE WEATHER. SPILLS MUST BE CLEANED UP IMMEDIATELY AND DISPOSED IN A PROPER MANNER. SPILLS MAY NOT BE WASHED INTO THE DRAINAGE SYSTEM.

23) EXCESS OR WASTE CONCRETE MAY NOT BE WASHED INTO THE PUBLIC RIGHT-OF-WAY OR ANY OTHER DRAINAGE SYSTEM. PROVISIONS SHALL BE MADE TO RETAIN CONCRETE WASTES ON SITE UNTIL THEY CAN BE DISPOSED OF AS SOLID WASTE.

24) ALL NON-STORMWATER DISCHARGES , UNLESS EXPECTED OR AUTHORIZED BY AN NPDES PERMIT REQUIRE PRIOR APPROVAL BY THE STATE WATER RESOURCES CONTROL BOARD.

25) TRASH AND CONSTRUCTION RELATED SOLID WASTES MUST BE DEPOSITED INTO A COVERED RECEPTACLE TO PREVENT CONTAMINATION OF RAINWATER AND DISPERSAL BY WIND.

LEGAL DESCRIPTION:

PORTION OF THE SOUTH 1/2 OF THE SOUTHEAST 1/4 OF SECTION 19, TOWNSHIP 4 NORTH, RANGE 3 WEST, S.B.B.&M, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA.

A.P.N.: 0438-165-33

SEE TITLE REPORT FOR FULL DESCRIPTION.

OWNER:
CONTACT INFO:
KALLEN FAMILY TRUST
18564 HWY 18
APPLE VALLEY, CA 92307
PH: 760-403-3000
E: bdkallen@gmail.com

APPLICANT:
MUNEM MAIDA
13302 RANCHERO ROAD
OAK HILLS, CA 92344
PH: 760-964-7936
E: madia5150@gmail.com

ARCHITECT / REPRESENTATIVE:
STEENO DESIGN STUDIO, INC.
ARCHITECT: TOM STEENO
11774 HESPERIA RD. SUITE B-1
HESPERIA, CA 92345
PH: 760.244.5001 FX: 760.244.1948

REGISTERED PROFESSIONAL ENGINEER BERNARD K. MAYER NO. 36866 Exp. 6-30-20 CIVIL STATE OF CALIFORNIA

SITETECH INC.
8061 CHURCH ST. HIGHLAND CA 92346 PO BOX 592
PH: (909)864-3180, FAX: (909)864-0850

BERNARD K. MAYER R.C.E. 36866 — 11/20/2018 DATE

COUNTY OF SAN BERNARDINO

GRADING AND DRAINAGE PLAN

PREPARED FOR: DEEP CREEK ROAD - GAS STATION

DATE: NOVEMBER 20, 2018

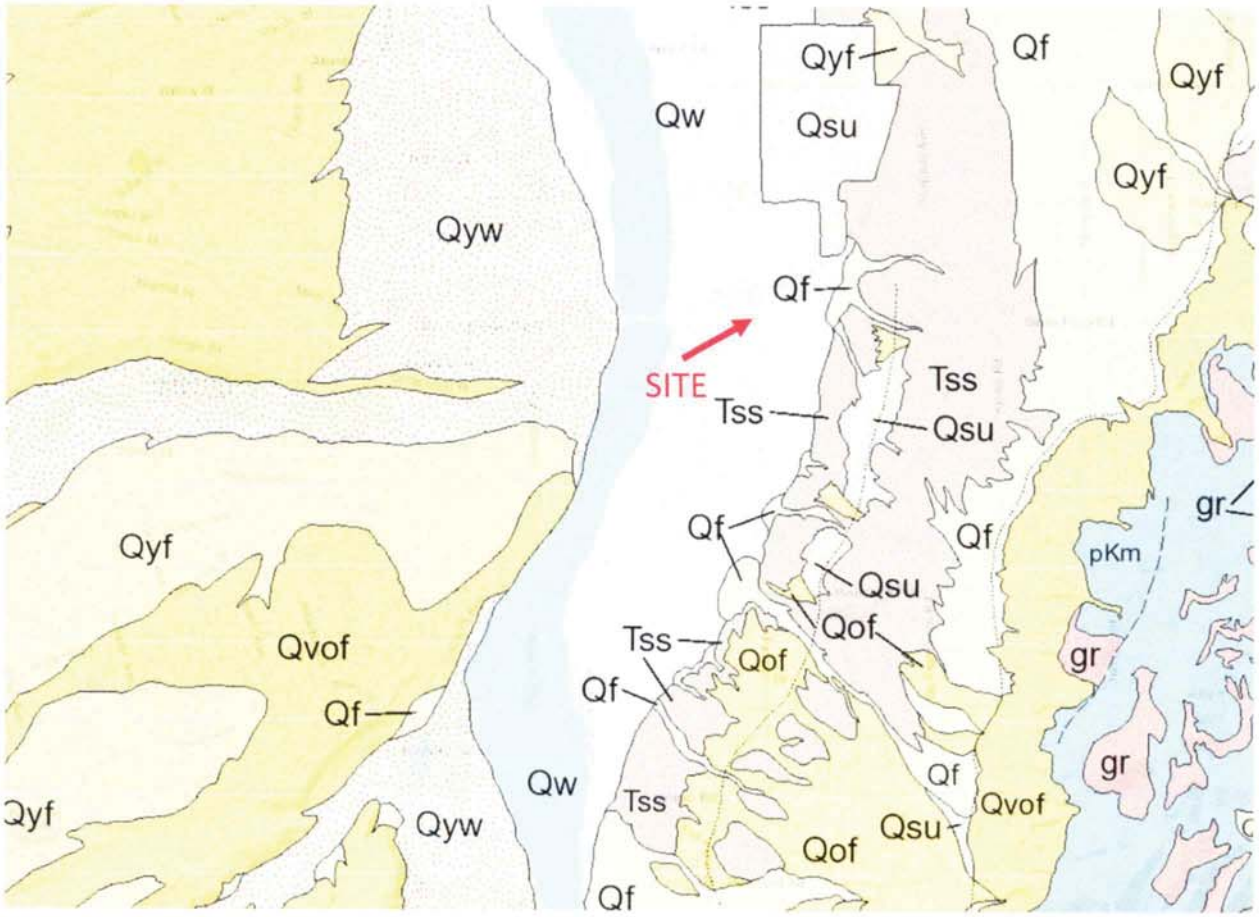
MAILING AND SITE ADDRESS:

A.P.N.: 0438-165-33

PHONE:

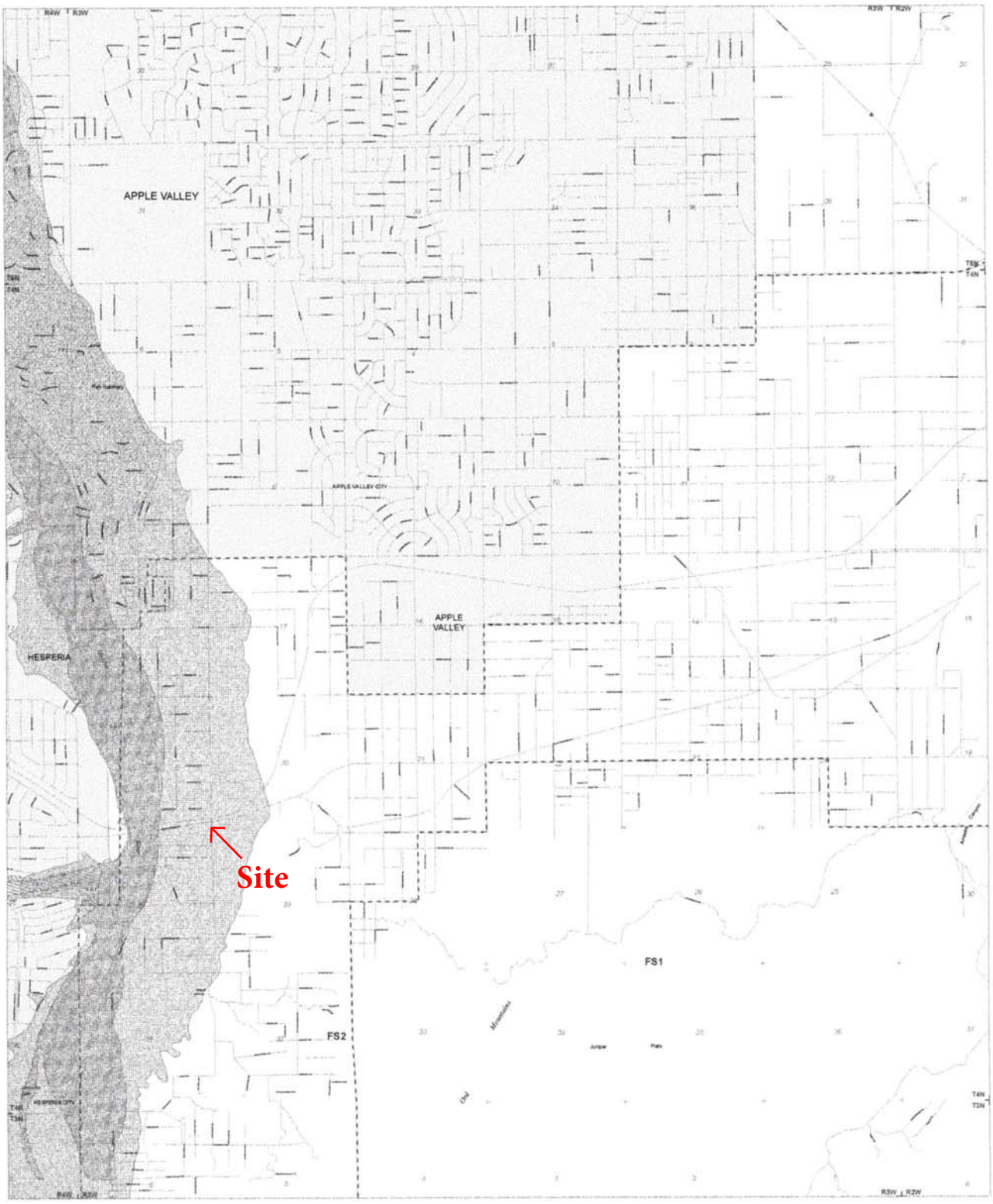
SCALE: 1"=20'

SHEET: 1 OF 1



The site is within Qw – Alluvial Wash Deposits

The site will incorporate a detention basin that will mitigate the storm runoff. The double ring infiltrometer was utilized to determine the infiltration rate of the basin for WQMP and hydrology studies within other reports.



San Bernardino County Land Use Plan
GENERAL PLAN
Hazard Overlays

Dam Inundation

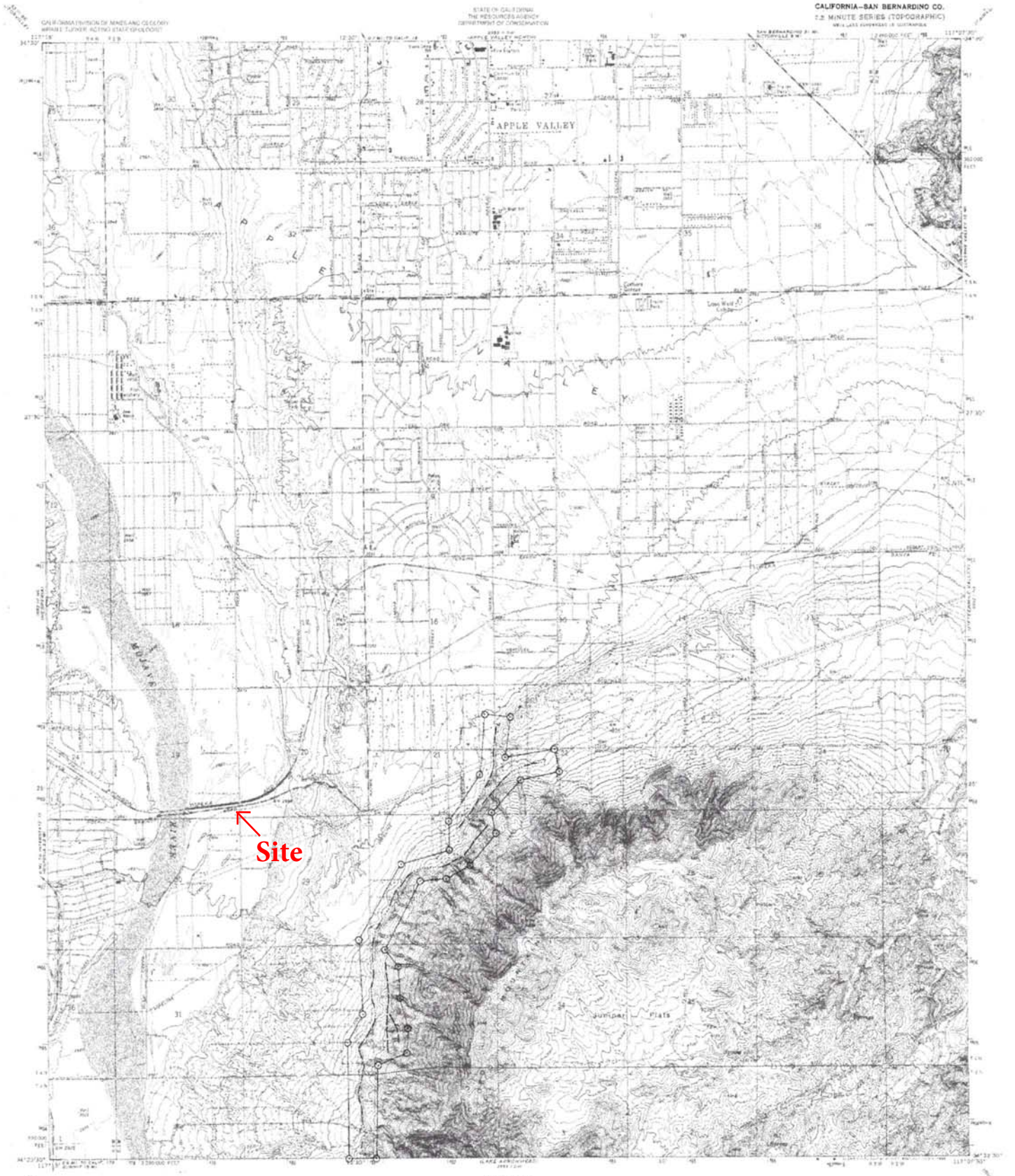
Flood Plain Safety (FP) Overlay District

Noise Hazard (NH) Overlay District
Noise Contour in LDN
Runway Location

Fire Safety (FS) Overlay District
Fire Safety Boundary
FS1 Fire Safety Area 1
FS2 Fire Safety Area 2

Airport Safety Review
AR3 (Airport Safety Review Area 3)
AR4 (Airport Safety Review Area 4)

FH07 B
Apple Valley South



CALIFORNIA—SAN BERNARDINO CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

SCALE 1:24,000

CONTOUR INTERVAL 20 FEET
DASHED LINES REPRESENT 10-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

MAP EXPLANATION

Potentially Active Faults

1906 C

Faults considered to have been active during Holocene time and to have a relatively high potential for surface rupture; 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.

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
(Alquist-Priolo Special Studies Zones Act)

APPLE VALLEY SOUTH QUADRANGLE

OFFICIAL MAP
Effective: March 1, 1988

Acting State Geologist

REFERENCES USED TO COMPILE FAULT DATA

Apple Valley South quadrangle

Bryant, W.A., 1984, Western San Bernardino County fault zone and related faults: California Division of Mines and Geology Fault Evaluation Report FER-159 (unpublished).

Dibblee, T.W., Jr., 1974, Geologic map of the Lake Arrowhead quadrangle, San Bernardino County, California: U.S. Geological Survey Open File Map 73-134, scale 1:62,500.

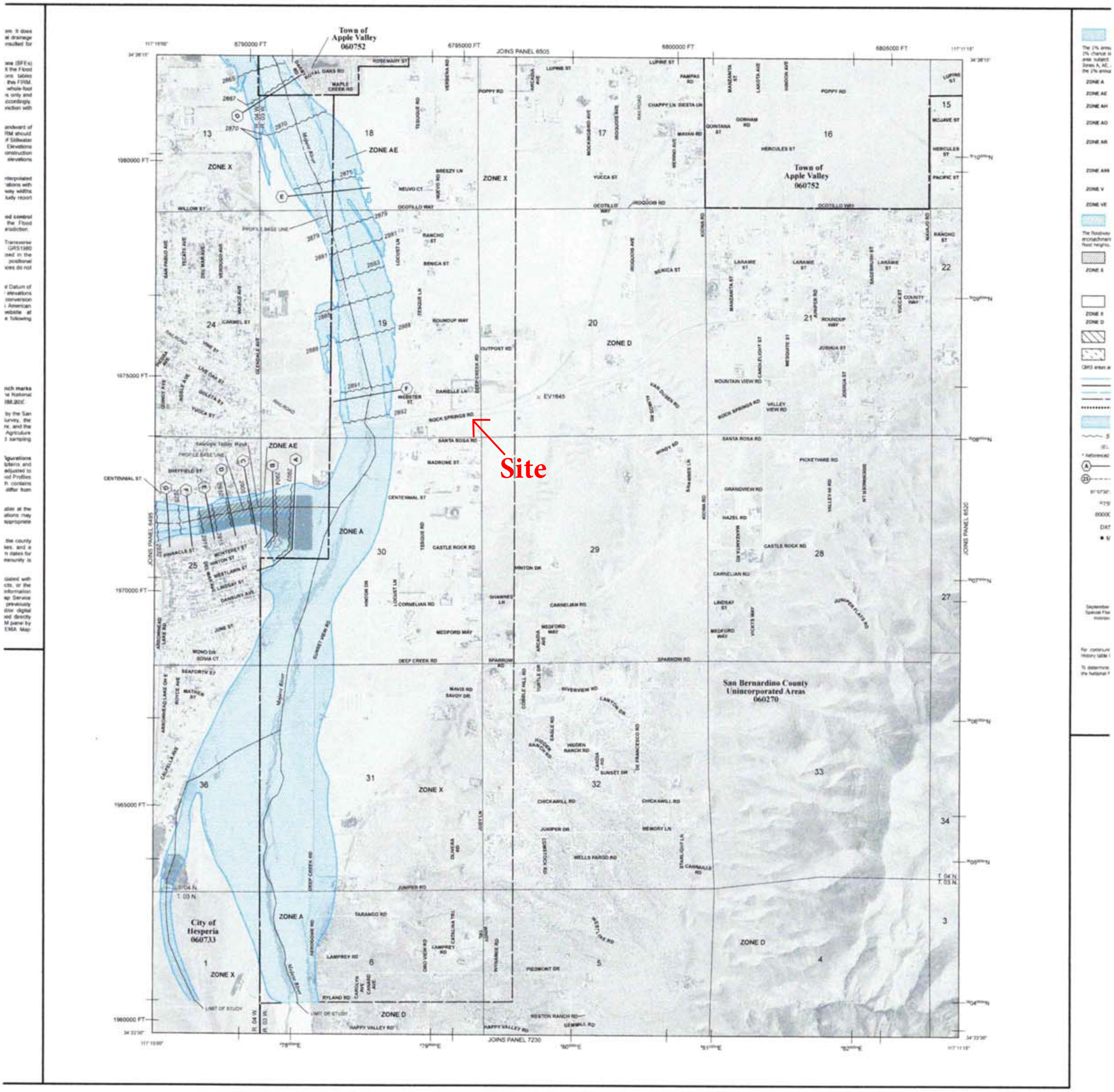
Hoisington, D.B., 1988, Neotectonics of the North Frontal fault system of the San Bernardino Mountains, southern California, Cajon Pass to Lucerne Valley: California Institute of Technology, unpublished MS.S. thesis, 184 p., 1 plate, map scale 1:24,000.

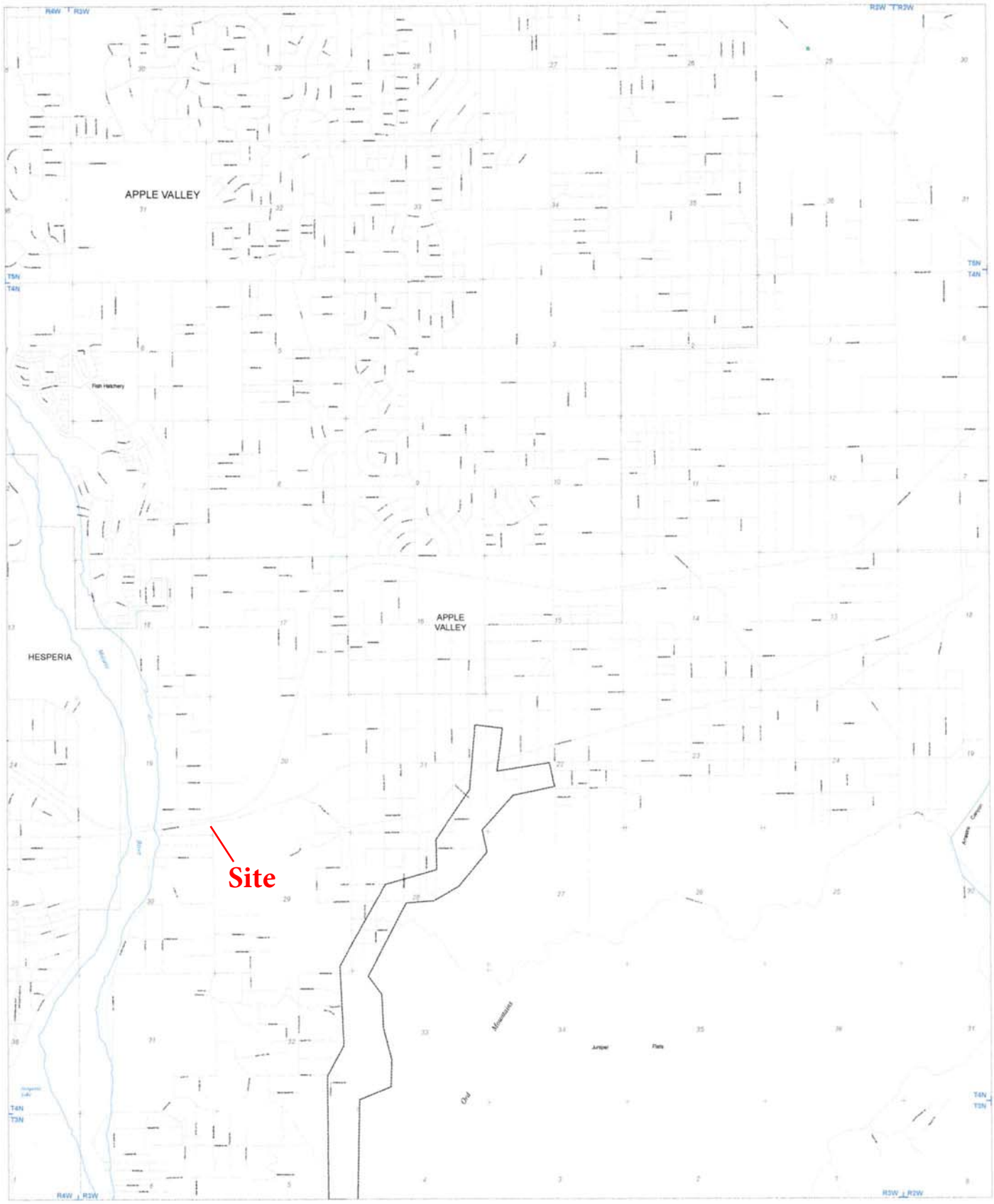
Miller, F.K., 1987, Reverse-fault system bounding the north side of the San Bernardino Mountains in Mesozoic terrane faulting in the Transverse Ranges, California: U.S. Geological Survey Professional Paper 1538, p. 63-65, plate 1..., scale 1:48,000.

For additional information on faults in this map area, the rationale used for mapping, and additional references consulted, refer to unpublished Fault Evaluation Reports on file at regional offices of DMG.

IMPORTANT – PLEASE NOTE

1) *This map may not show all faults that have the potential for surface fault rupture, 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 and location of these faults are based on the best available data. However, the quality of data used is varied. Traces have been drawn as accurately as possible at this map scale.
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 of Division 2 of the California Public Resources Code.


Town of Apple Valley 060752
JOINS PANEL 6505
ZONE AE
ZONE X
ZONE D
ZONE A
Site
EV1645
ROCK SPRINGS RD
San Bernardino County Unincorporated Areas 060270
City of Hesperia 060733
JOINS PANEL 6495
JOINS PANEL 6520
JOINS PANEL 7230
Mojave River
LIMIT OF STUDY
1980000 FT
1975000 FT
1970000 FT
1965000 FT
1960000 FT
6790000 FT
6795000 FT
6800000 FT
6805000 FT



San Bernardino County Land Use Plan
GENERAL PLAN
Geologic Hazard Overlays

Generalized Landslide Susceptibility
Low to moderate
Moderate to high
Mapped, Existing Landslide
Rockfall/Debris Flow Hazard Area
(Forest Falls Only)

Generalized Liquefaction Susceptibility
Low
Medium
High

Earthquake Fault Zones
Earthquake Fault Zone Boundary
County Designated Fault Zones
Other

FH07 C
Apple Valley South

San Bernardino County, California, Mojave River Area

119—CAJON-WASCO, COOL COMPLEX, 2 TO 9 PERCENT SLOPES*

Map Unit Setting

National map unit symbol: hkrr
Elevation: 2,300 to 3,200 feet
Mean annual precipitation: 3 to 6 inches
Mean annual air temperature: 59 to 66 degrees F
Frost-free period: 180 to 290 days
Farmland classification: Not prime farmland

Map Unit Composition

Cajon and similar soils: 65 percent
Wasco, gravelly, and similar soils: 30 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cajon

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite sources

Typical profile

H1 - 0 to 8 inches: sand
H2 - 8 to 60 inches: sand

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: Sandy (R030XF012CA)
Hydric soil rating: No

Description of Wasco, Gravelly

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite sources

Typical profile

H1 - 0 to 7 inches: sandy loam
H2 - 7 to 60 inches: sandy loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: COARSE LOAMY (R030XF003CA)
Hydric soil rating: No

Minor Components

Cajon, sloping

Percent of map unit: 2 percent
Hydric soil rating: No

Wasco

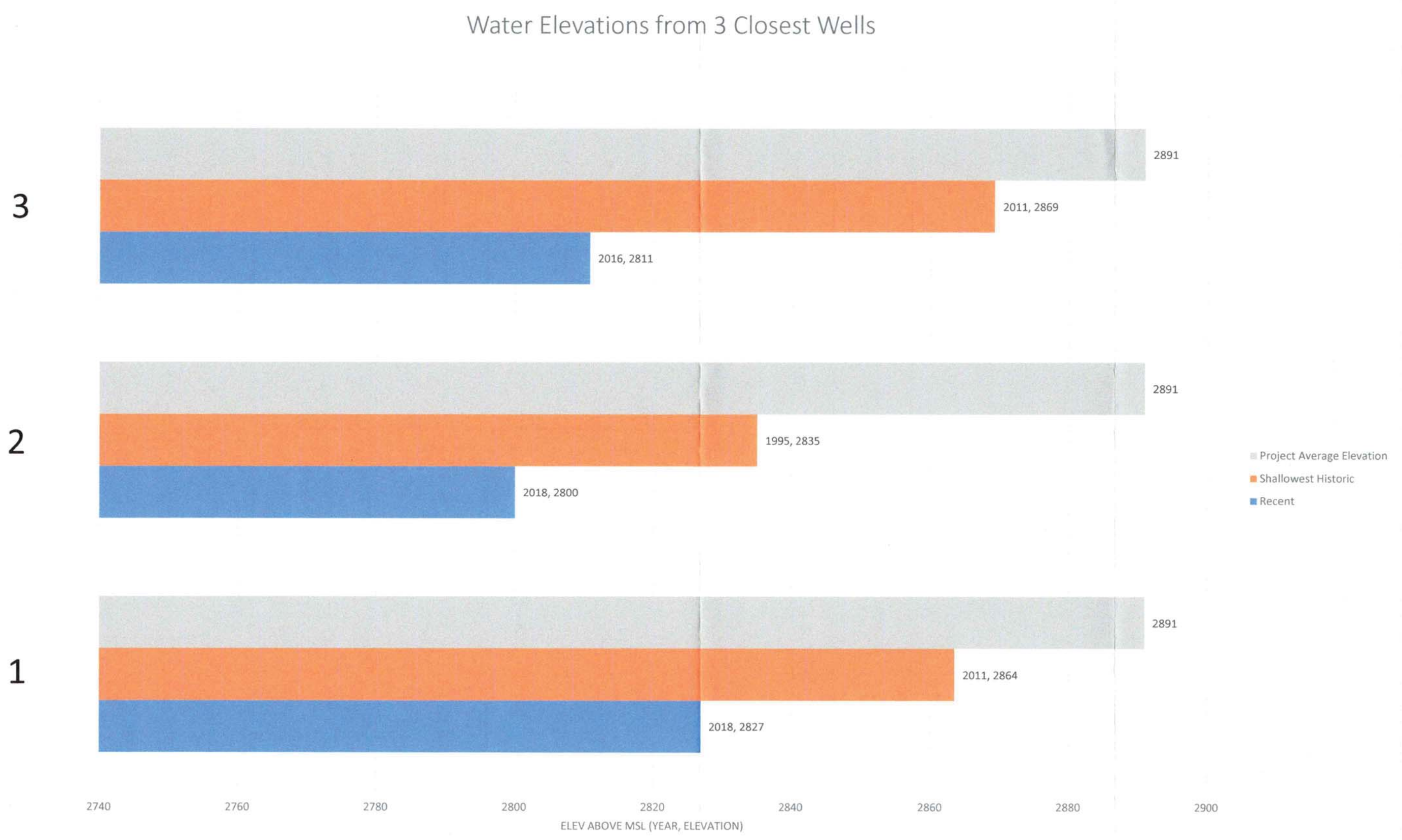
Percent of map unit: 2 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 1 percent
Landform: Channels
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: San Bernardino County, California, Mojave River Area
Survey Area Data: Version 9, Sep 11, 2017


Water Elevations from 3 Closest Wells
3
2891
2011, 2869
2016, 2811
2
2891
1995, 2835
2018, 2800
1
2891
2011, 2864
2018, 2827
2740
2760
2780
2800
2820
2840
2860
2880
2900
ELEV ABOVE MSL (YEAR, ELEVATION)
Project Average Elevation
Shallowest Historic
Recent

APPENDIX -A

TABLE 1 Soil Classification Chart

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil Classification	
				Group Symbol	Group Name[B]
Coarse-Grained Soils More than 50 % retained on No. 200 sieve	**Gravels** More than 50 % of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5 % fines[C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$[E]	GW	Well-graded gravel[F]
			$Cu < 4$ and/or $1 > Cc > 3$[E]	GP	Poorly graded gravel[F]
		Gravels with Fines More than 12 % fines[C]	Fines classify as ML or MH	GM	Silty gravel[F,G,H]
			Fines classify as CL or CH	GC	Clayey gravel[F,G,H]
	Sands 50 % or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5 % fines[D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$[E]	SW	Well-graded sand
			$Cu < 6$ and/or $1 > Cc > 3$[E]	SP	Poorly graded sand[I]
		Sands with Fines More than 12 % fines[D]	Fines classify as ML or MH	SM	Silty sand[G,H,I]
			Fines classify as CL or CH	SC	Clayey sand[G,H,I]
Fine-Grained Soils 50 % or more passes the No. 200 sieve	**Silts and Clays** Liquid limit less than 50	Inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay[K,L,M]
			PI < 4 or plots below "A" line[J]	ML	Silt[K,L,M]
		Organic	$\frac{\text{Liquid limit - oven dried}}{\text{Liquid limit - not dried}} < 0.75$	OL	Organic clay[K,L,M,N] / Organic silt[K,L,M,O]
	Silts and Clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line	CH	Fat clay[K,L,M]
			PI plots below "A" line	MH	Elastic silt[K,L,M]
		Organic	$\frac{\text{Liquid limit - oven dried}}{\text{Liquid limit - not dried}} < 0.75$	OH	Organic clay[K,L,M,P] / Organic silt[K,L,M,Q]
Highly organic soils	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-in. (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12 % fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

[D] Sands with 5 to 12 % fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad \frac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15 % sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15 % gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29 % plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30 % plus No. 200, predominantly sand, add "sandy" to group name.

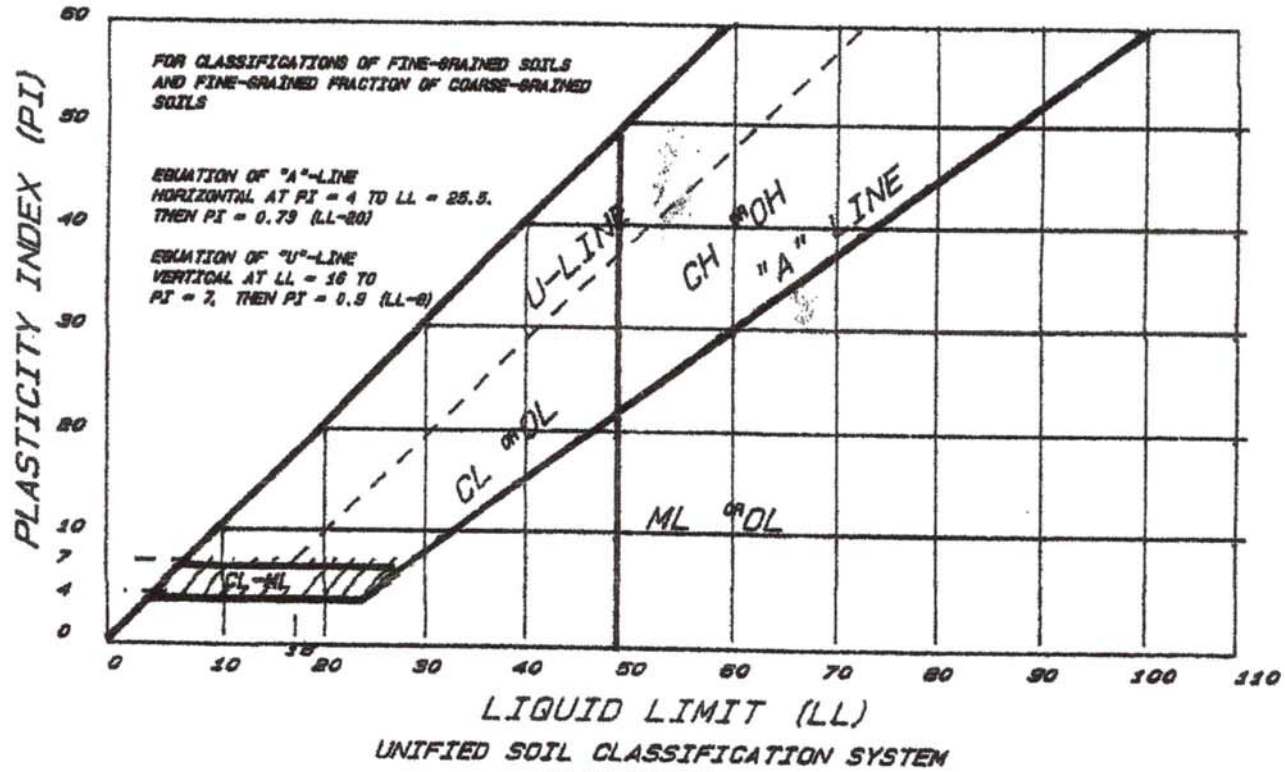
[M] If soil contains ≥ 30 % plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



UNIFIED SOIL CLASSIFICATION SYSTEM
ASTM D2487

TEST PIT NO. TP-1

Project: APN 0438-165-33 **Project # 1803409**

Client: APPLE VALLEY C-STORE **Date: 3-25-18**

Depth Feet	Sample Type	Moisture Content %	Dry Density pcf.	Lab Test Type	Soil Class		Geotechnical Description
1.0'	BAG			SIEVE SE	SP-SM		Poorly graded SAND with silts and traces of gravel, Tan, Damp, Medium Dense to Loose
2.0'	BAG			MAX SIEVE SE	SP		Poorly graded SAND with some gravel, Tan, Damp, Loose
4.0'	BAG			SIEVE SE	SP		Poorly graded SAND with much gravel, Tan, Damp, Loose
15.0'							Bottom of Exploratory Trench

TEST PIT NO. TP-2

Project: APN 0438-165-33 **Project # 1803409**

Client: APPLE VALLEY C-STORE **Date: 3-25-18**

Depth Feet	Sample Type	Moisture Content %	Dry Density pcf.	Lab Test Type	Soil Class		Geotechnical Description
1.0'					SP-SM		Poorly graded SAND with silts, Dark Tan, Damp, Medium Dense
1.5'	**BAG**			**MAX SIEVE SE**			
4.0'	BAG			SIEVE SE	SW-SM		Well graded SAND with silts and much gravel, Dark Tan, Dry, Loose
6.0'	**BAG**			**SIEVE SE**	**SW**		Well graded SAND with some gravel, Tan, Dry, Loose
							Bottom of Exploratory Trench

TEST PIT NO. TP-3

Project: APN 0438-165-33 **Project # 1803409**

Client: APPLE VALLEY C-STORE **Date: 3-25-18**

Depth Feet	Sample Type	Moisture Content %	Dry Density pcf.	Lab Test Type	Soil Class		Geotechnical Description
1.0'					SP-SM		Poorly graded SAND with silts, Dark Tan, Damp, Medium Dense
4.0'					SW-SM		Well graded SAND with silts and much gravel, Dark Tan, Dry, Loose
6.0'					SW		Well graded SAND with some gravel, Tan, Dry, Loose
15.0'							Bottom of Exploratory Trench

TEST PIT NO. TP-4

Project: APN 0438-165-33 **Project # 1803409**

Client: APPLE VALLEY C-STORE **Date: 3-25-18**

Depth Feet	Sample Type	Moisture Content %	Dry Density pcf.	Lab Test Type	Soil Class		Geotechnical Description
1.0'					SP-SM		Poorly graded SAND with silts, Dark Tan, Damp, Medium Dense
4.0'					SW-SM		Well graded SAND with silts and much gravel, Dark Tan, Dry, Loose
6.0'					SW		Well graded SAND with some gravel, Tan, Dry, Loose
15.0'							Bottom of Exploratory Trench

ALR ENGINEERING TESTING

BORING LOG NO. B-1

Project: APN 0438-165-33 **Project #** 1803409

Client: MAIDA HOLDINGS **Date:** 1-20-19

Depth Feet	Sample Type	Blows per Foot	Sand Equivalent SE	Percent passing No. 200	Soil Class		Geotechnical Description
					SP-SM		Poorly graded coarse to medium SAND with silts, Light Brown, Damp, Medium Dense
5'		6			SW-SM		Well graded coarse to medium SAND with silts and traces of gravel, Dark Tan, Dry, Medium Dense
10'		12			SW		Well graded coarse to medium SAND with traces of gravel, Dark Tan, Dry, Medium Dense
15'		14					
20'		15					
25'		21					
30'		22					
35'		20					
40'		23					
45'		31					
50'		31					Bottom of Exploratory Boring No Groundwater Present

Boring No. B-1

Figure A-5

ALR ENGINEERING TESTING

BORING LOG NO. B-2

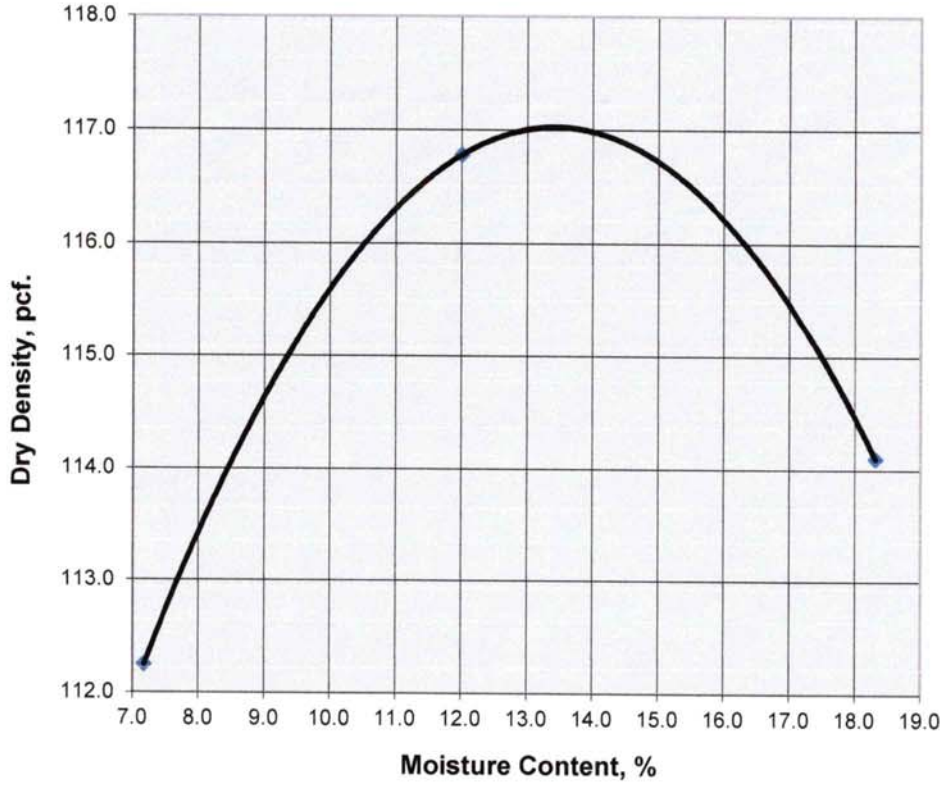
Project: APN 0438-165-33 **Project #** 1803409

Client: MAIDA HOLDINGS **Date:** 1-20-19

Depth Feet	Sample Type	Blows per Foot	Sand Equivalent SE	Percent passing No. 200	Soil Class		Geotechnical Description
					SP-SM		Poorly graded coarse to medium SAND with silts, Dark Tan, Damp, Medium Dense
5'		12			SW-SM		Well graded coarse to medium SAND with silts and traces of small gravel, Dark Tan, Dry, Medium Dense
10'		12			SW		Well graded SAND with traces of small gravel, Dark Tan, Dry, Medium Dense
15'		18					
20'		18					
25'		22					
30'		24					
							Bottom of Exploratory Boring **No Groundwater Present**
35'							
40'							
45'							
50'							

APPENDIX-B

Dry Density - Moisture Content Relationship



Date: 3/25/2018 Location : TP-1

Field Density Test No. 1 Depth: 2.0'

Soil Type: SM

Method of Compaction: ASTM D 1557A

Maximum Dry Density: 117.0 pcf

Optimum Moisture Content: 13.50%

ALR ENGINEERING & TESTING

Civil & Geotechnical Engineering w/ Material Testing

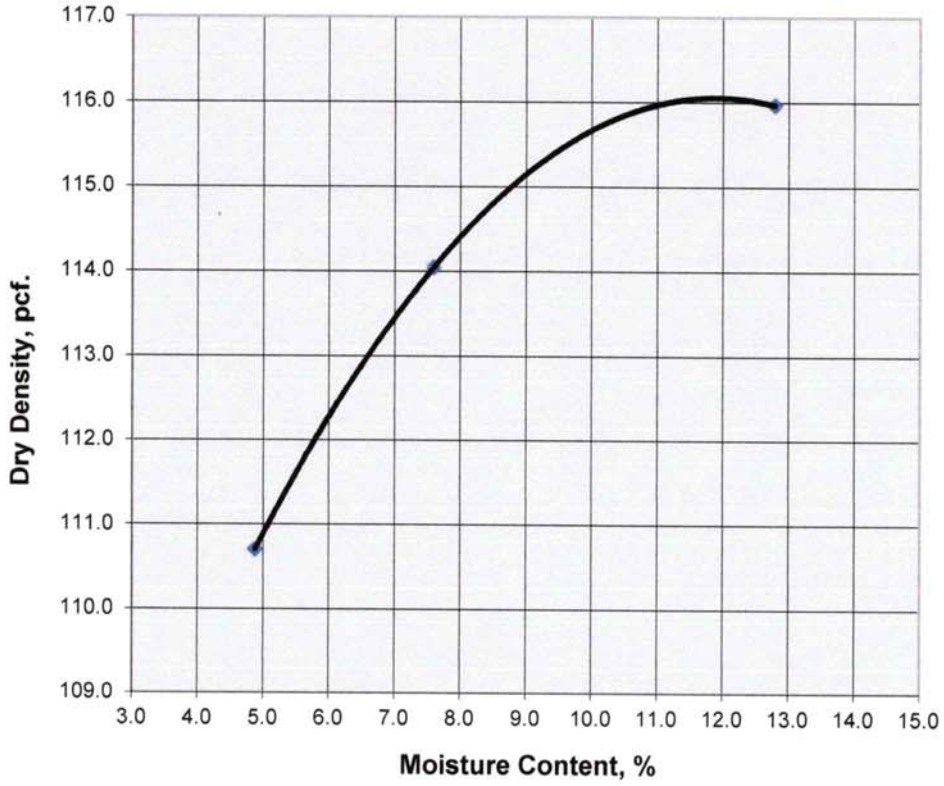
18361 Symeron Road

Apple Valley, Ca. 92307

(760) 810-2031 Cell # (760) 242-3130 Office #

Apple Valley	Project No. 1803409
APN 0438-165-33	
PLATE B - 1	

Dry Density - Moisture Content Relationship



Date: 3/25/2018 Location : TP-2

Field Density Test No. 2 Depth: 1.5'

Soil Type: SM

Method of Compaction: ASTM D 1557A

Maximum Dry Density: 116.0 pcf

Optimum Moisture Content: 12.00%

ALR ENGINEERING & TESTING

Civil & Geotechnical Engineering w/ Material Testing

18361 Symeron Road

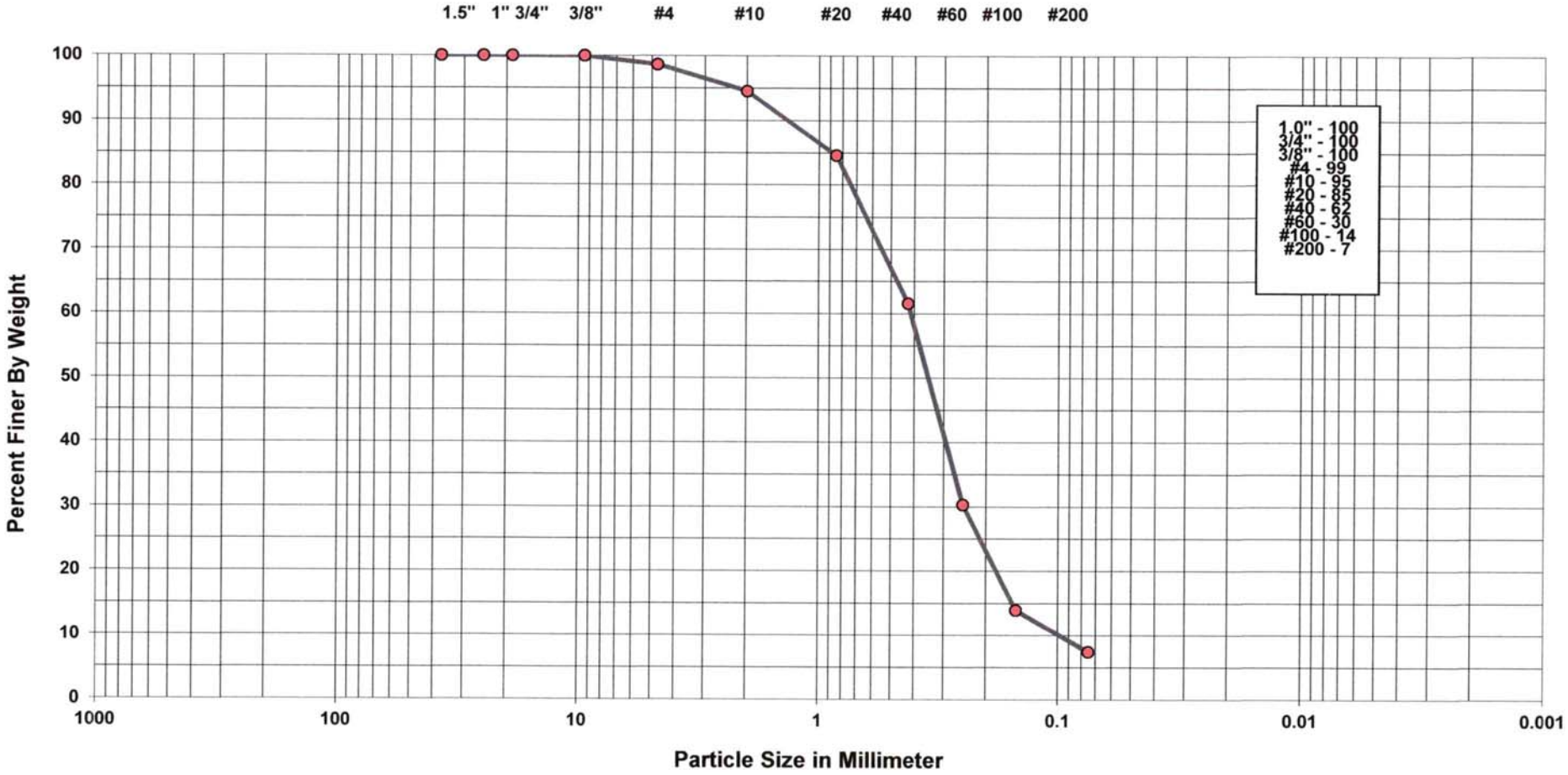
Apple Valley, Ca. 92307

(760) 810-2031 Cell # (760) 242-3130 Office #

Apple Valley	Project No. 1803409
APN 0438-165-33	
PLATE B - 2	

U.S. STANDARD SIEVE SIZE

HYDROMETER ANALYSIS



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Location	Type	Depth, ft.			SE		Soil Classification
TP-1	BAG	1.0			74		Poorly graded SAND with silts (SP-SM)

PARTICLE SIZE ANALYSIS

ALR ENGINEERING & TESTING

Civil & Geotechnical Engineering w/ Material Testing

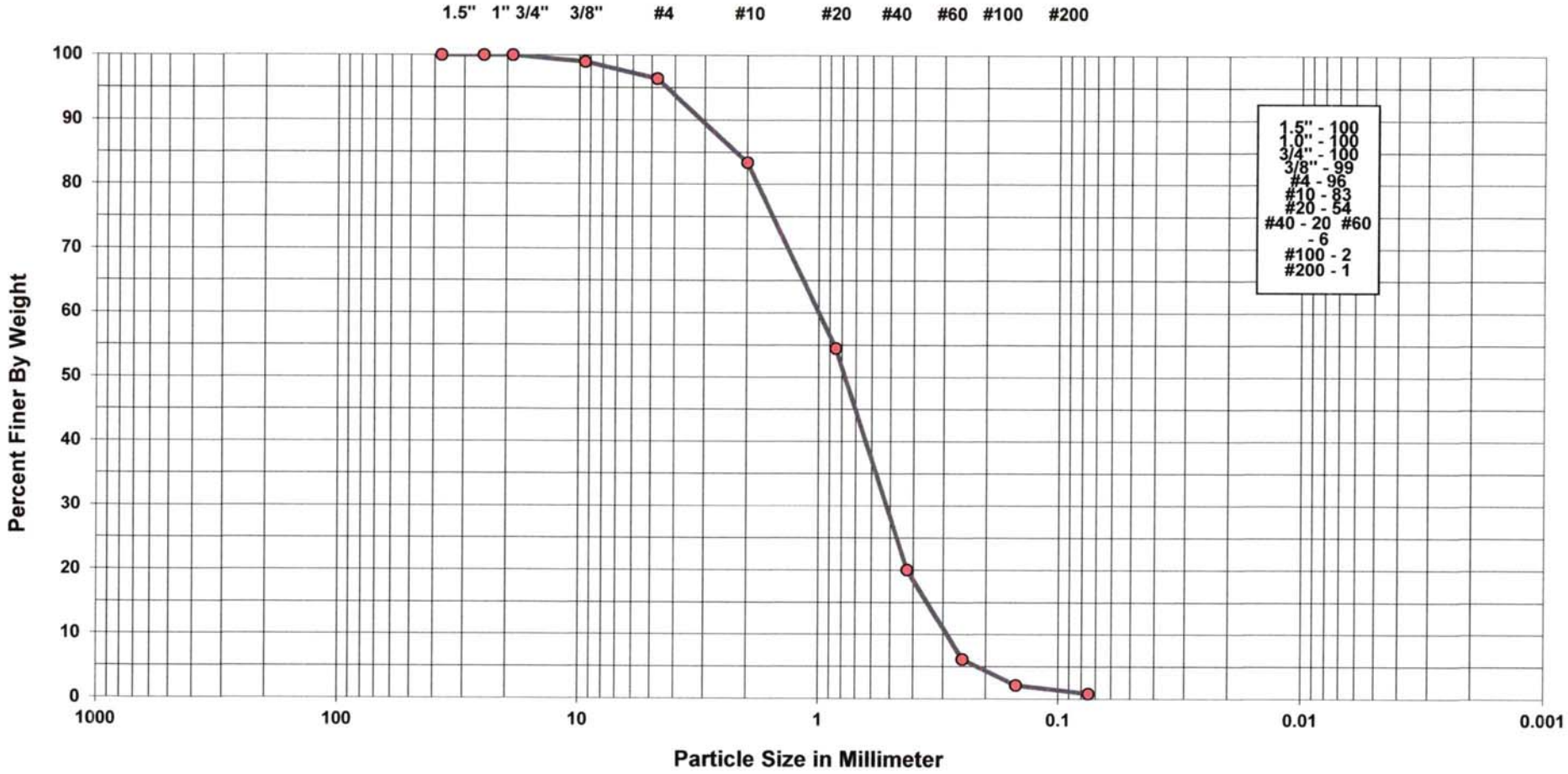
18361 Symeron Road, Apple Valley, Ca. 92307

(760) 810-2031 Cell # - (760) 242-3130 Office

Apple Valley	Project No. 1803409
APN 0438-165-33	
MAIDA - APPLE VALLEY C-STORE	
PLATE B-3	

U.S. STANDARD SIEVE SIZE

HYDROMETER ANALYSIS



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Location	Type	Depth, ft.	MDD, PCF	Opt H2O	SE		Soil Classification
TP-1	BAG	2.0	117.00	13.50%	94		Poorly graded SAND (SP)

PARTICLE SIZE ANALYSIS

ALR ENGINEERING & TESTING

Civil & Geotechnical Engineering w/ Material Testing

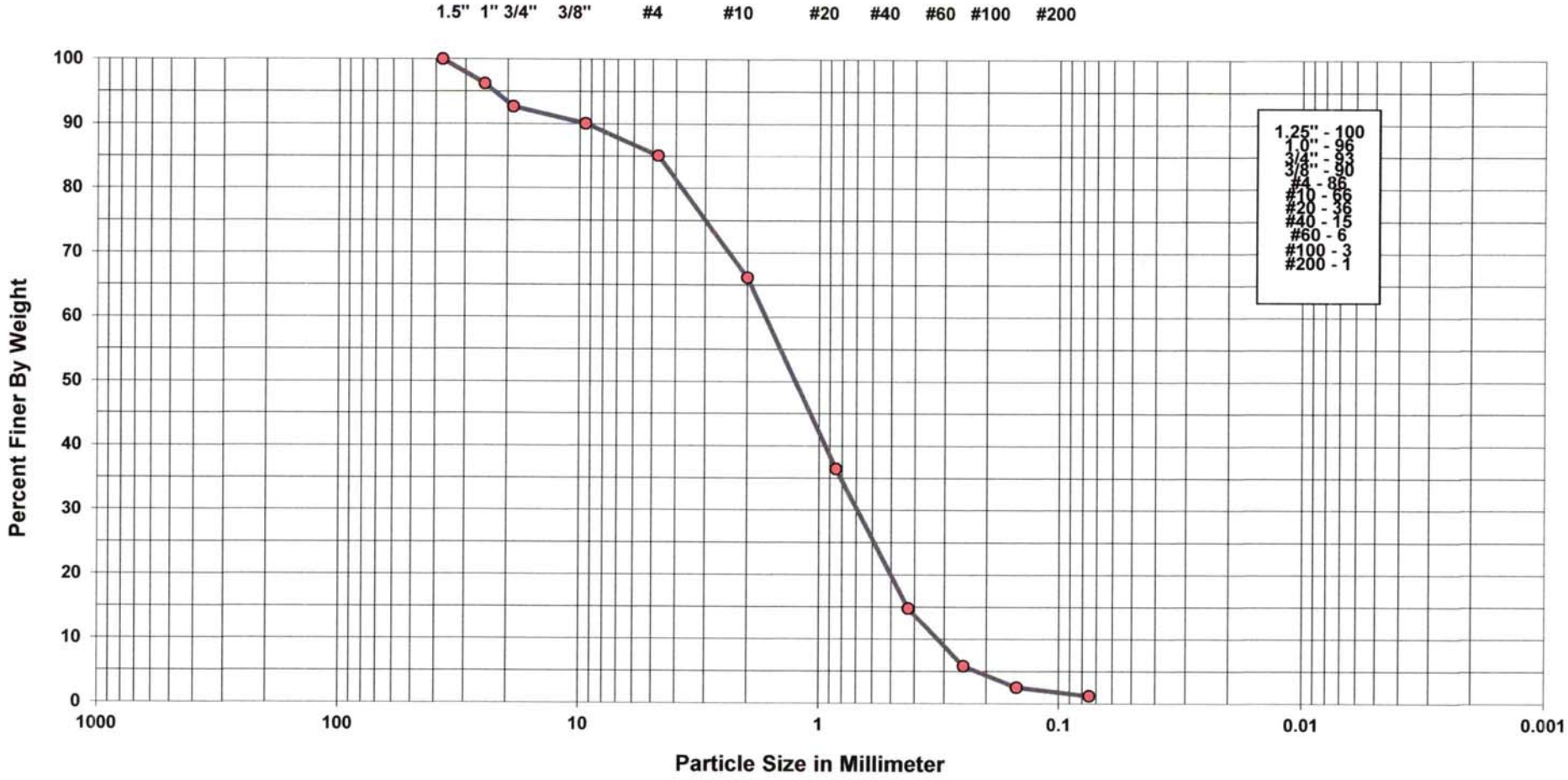
18361 Symeron Road, Apple Valley, Ca. 92307

(760) 810-2031 Cell # - (760) 242-3130 Office

Apple Valley	Project No.	1803409
APN 0438-165-33		
MAIDA - APPLE VALLEY C-STORE		
PLATE B-4		

U.S. STANDARD SIEVE SIZE

HYDROMETER ANALYSIS



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Location	Type	Depth, ft.			SE		Soil Classification
TP-1	BAG	4.0			95		Poorly graded SAND (SP)

PARTICLE SIZE ANALYSIS

ALR ENGINEERING & TESTING

Civil & Geotechnical Engineering w/ Material Testing

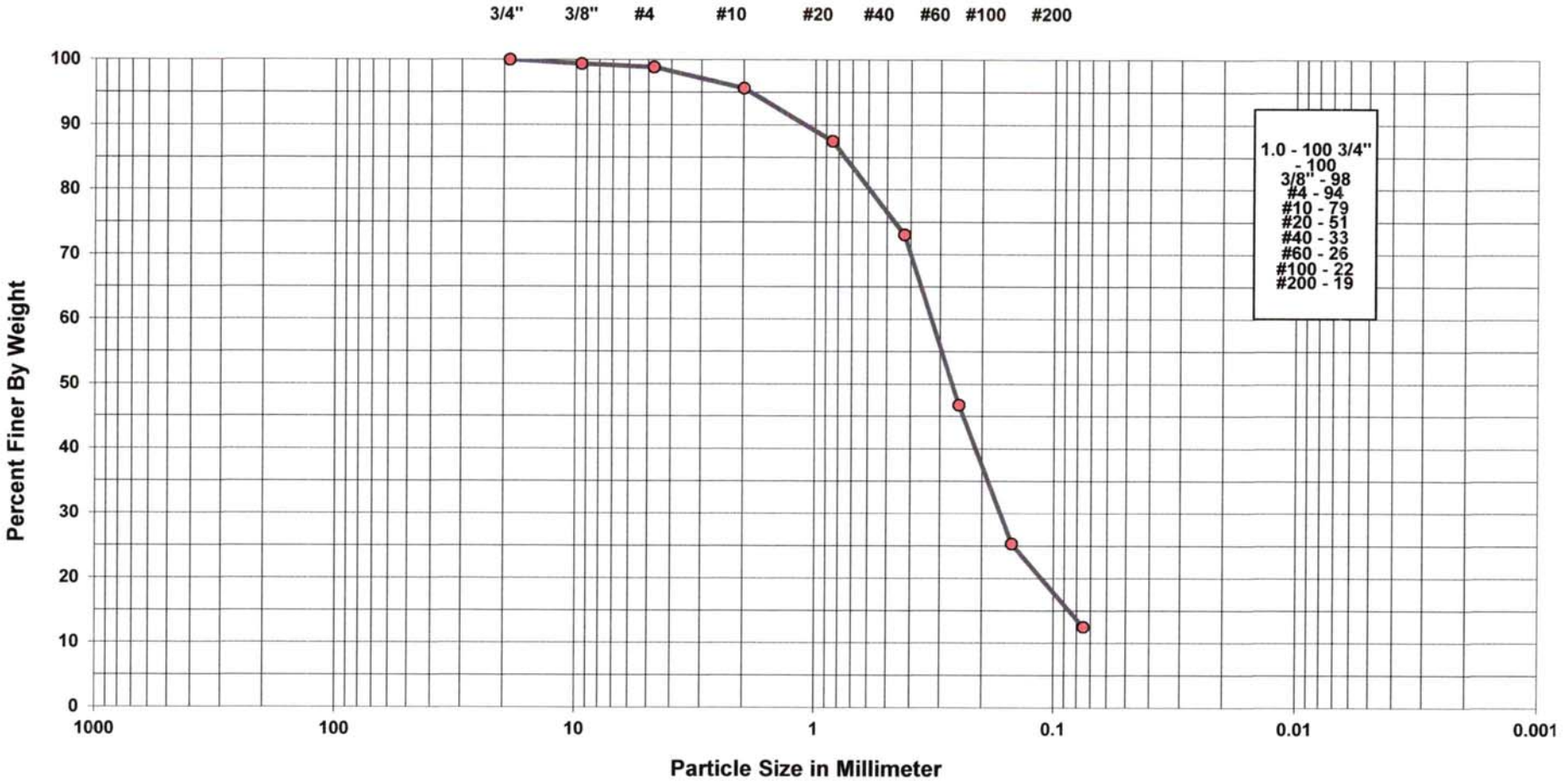
18361 Symeron Road, Apple Valley, Ca. 92307

(760) 810-2031 Cell # - (760) 242-3130 Office

Apple Valley	Project No.	1803409
APN 0438-165-33		
MAIDA - APPLE VALLEY C-STORE		
PLATE B-5		

U.S. STANDARD SIEVE SIZE

HYDROMETER ANALYSIS



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Location	Type	Depth, ft.			SE		Soil Classification
TP-2	BAG	1.5			47		Poorly graded SAND with silts (SP-SM)

PARTICLE SIZE ANALYSIS

ALR ENGINEERING & TESTING

Civil & Geotechnical Engineering w/ Material Testing

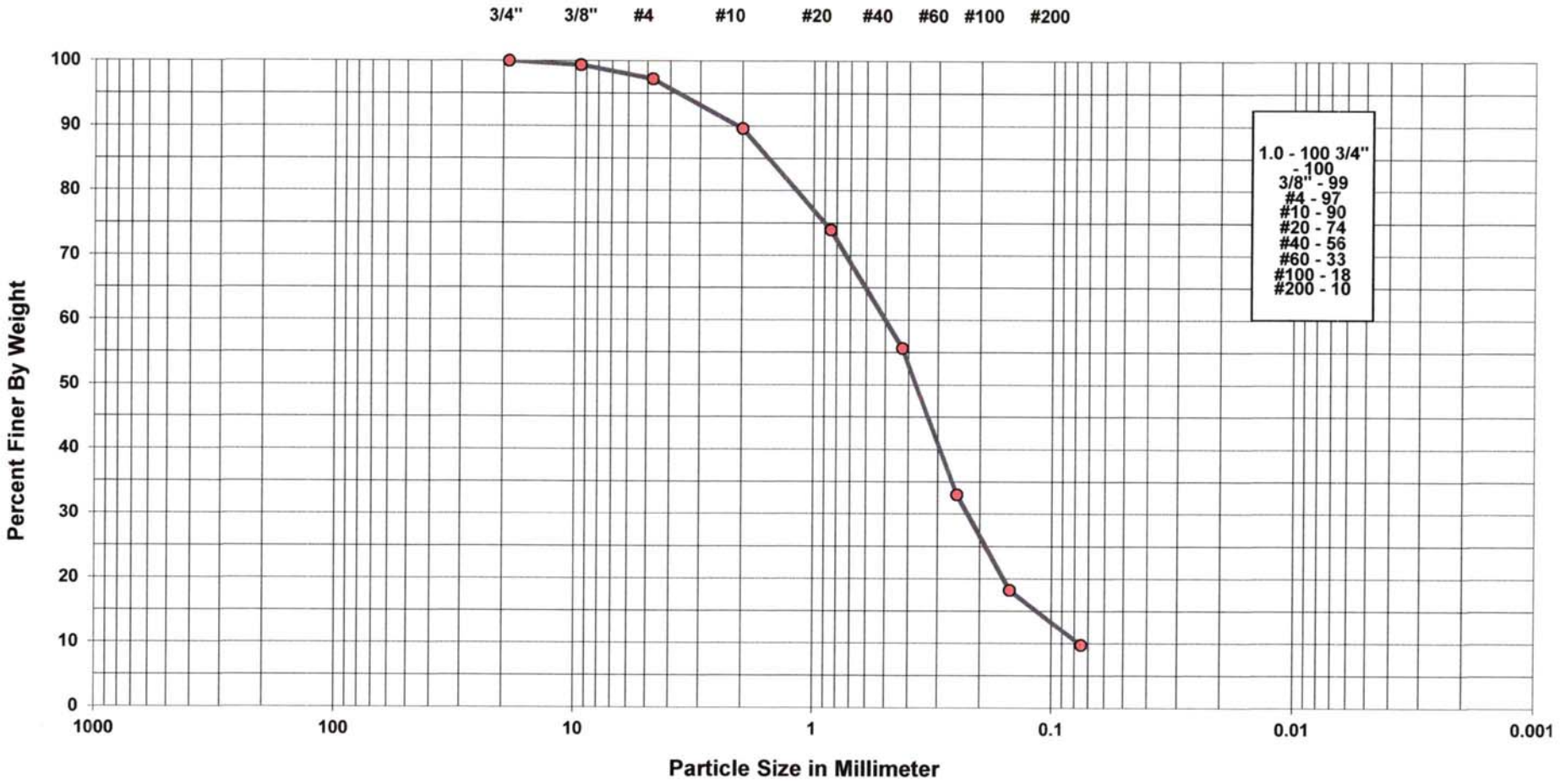
18361 Symeron Road, Apple Valley, Ca. 92307

(760) 810-2031 Cell # - (760) 242-3130 Office

Apple Valley	Project No.	1803409
APN 0438-165-33		
MAIDA - APPLE VALLEY C-STORE		
PLATE B-6		

U.S. STANDARD SIEVE SIZE

HYDROMETER ANALYSIS



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Location	Type	Depth, ft.			SE		Soil Classification
TP-2	BAG	4.0			69		Well graded SAND with silts (SW-SM)

PARTICLE SIZE ANALYSIS

ALR ENGINEERING & TESTING

Civil & Geotechnical Engineering w/ Material Testing

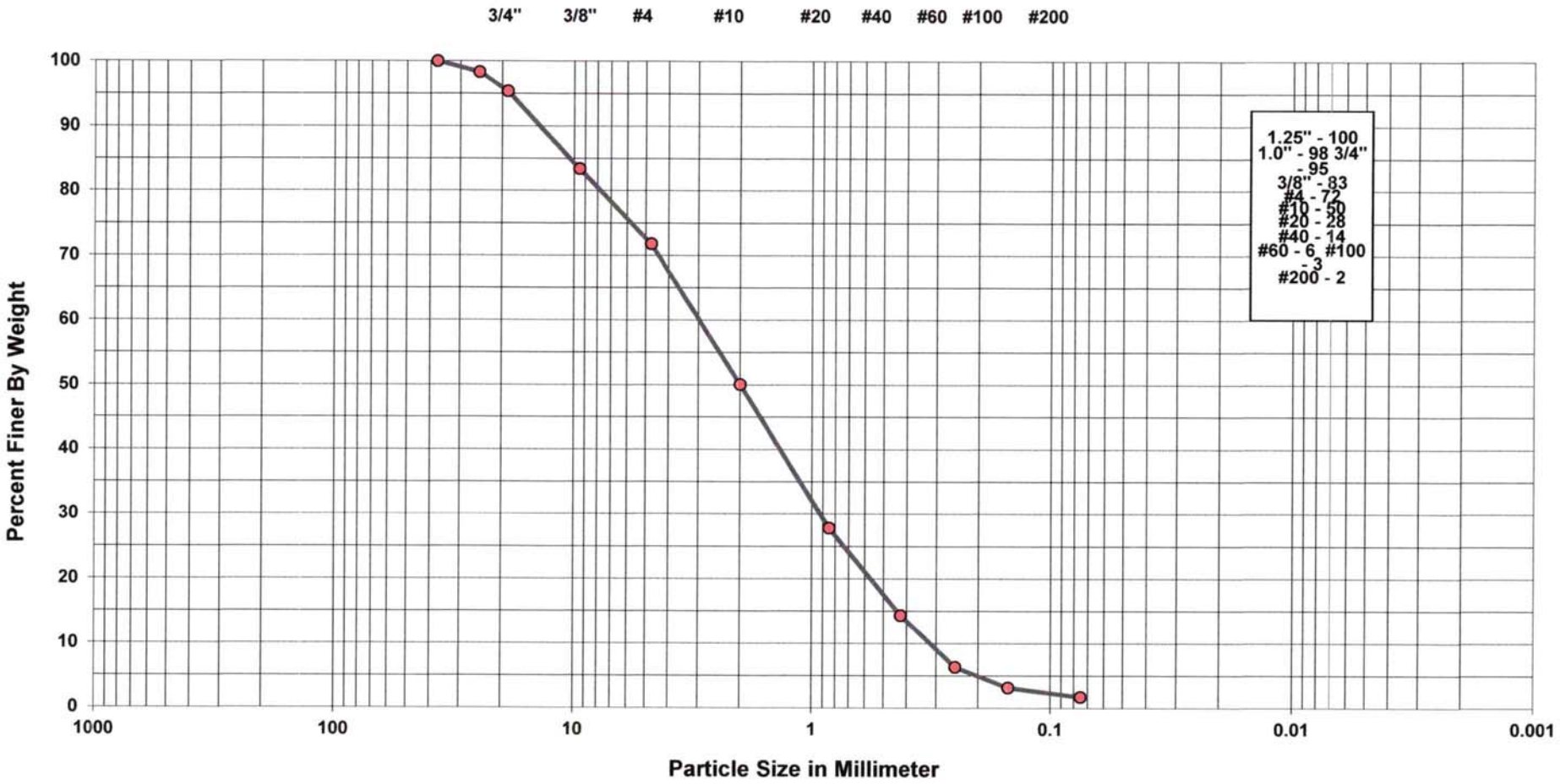
18361 Symeron Road, Apple Valley, Ca. 92307

(760) 810-2031 Cell # - (760) 242-3130 Office

Apple Valley	Project No. 1803409
APN 0438-165-33	
MAIDA - APPLE VALLEY C-STORE	
PLATE B-7	

U.S. STANDARD SIEVE SIZE

HYDROMETER ANALYSIS



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Location	Type	Depth, ft.			SE		Soil Classification
TP-2	BAG	6.0			90		Well graded SAND (SW)

PARTICLE SIZE ANALYSIS

ALR ENGINEERING & TESTING

Civil & Geotechnical Engineering w/ Material Testing

18361 Symeron Road, Apple Valley, Ca. 92307

(760) 810-2031 Cell # - (760) 242-3130 Office

Apple Valley	Project No.	1803409
APN 0438-165-33		
MAIDA - APPLE VALLEY C-STORE		
PLATE B-8		

APPENDIX-C

APPENDIX C

GUIDELINE TECHNICAL SPECIFICATIONS FOR EARTHWORKS

1.0 INTRODUCTION

The purpose of these guideline technical specifications is to supplement geotechnical report and the project requirements including the following pertinent code requirements. In case of conflict, recommendations provided in the report and interpretations of the engineer (civil engineer, geotechnical engineer or his/her representative) will govern. Additionally, the specifications are subject to modification if the site subsurface conditions change during the construction.

2.0 TERMS AND DEFINITIONS

2.1 **Earth Materials**: Natural soils encountered at the site or imported, free of organics, vegetation matter and deleterious materials.

2.2 **Suitable Materials**: Local excavated materials are suitable except organic materials, trash, debris, pit, highly-expansive clays. Suitable materials are generally classified as: Sand (SP, SW), silty, gravely or clayey sand (SM- SC), and silty and/or sandy clays (CL) with low plasticity. The classifications of soils are in accordance with United Soil Classification System, (USCS), ASTM D2487.

2.3 **Unsuitable Materials**: Organic soils, debris, trash, pit and highly expansive clays (fat clays) are not suitable. Expansive soils shall require special treatment to be used as foundation support.

2.4 **Unstable Materials**: Unstable materials are generally termed as collapsing and expansive soils. These soils require special treatment including removal and re-compaction, also the material cannot be properly compacted or will not support construction equipment due to high moisture content or very loose is considered to be unstable.

2.5 **Backfill**: Earth material meeting requirements of Section 2.2 "Suitable Materials".

2.6 **ASTM**: American Society for Testing and Materials, latest edition.

2.7 **I.B.C.**: International Building Code, latest edition.

2.8 **Maximum Dry Density (MDD):** is the laboratory maximum dry density determined in a soil sample in conformance with testing procedures of ASTM D1557 unless otherwise specified in the geotechnical report.

2.9 **Optimum Moisture Content (OMC):** is the moisture content corresponding maximum dry density as determined by test procedures conforming to ASTM D1557.

2.10 **Moisture Content (MC):** is the ratio of the weight of water to the weight of the dry solid material expressed as a percentage and determined by ASTM D2216, D3017 or the method approved by the engineer.

2.11 **Field Dry Density (FDD):** is the dry density of natural or compacted material as determined by ASTM D1556 - Sand Cone Method or ASTM D2922 - Nuclear Methods or ASTM D2937 - Drive-Cylinder Method.

2.12 **Relative Compaction**: is the ratio of the field dry density to the maximum dry density, expressed as a percentage.

3.0 GENERAL NOTES

3.1 The Owner shall retain the Soil Engineer for quality assurance and testing services.

3.2 The Contractor shall be responsible for quality control through out the prosecution of the work.

3.3 Contractor shall visit the project site and become familiar with the site conditions prior to the bidding.

3.4 Contractor shall verify the site and subsurface conditions at no cost to the owner. The preliminary soil engineering report does not constitute the actual subsurface conditions at the time of constructions or at the locations different from the excavated test pits/borings.

3.5 All excavations and foundations for the structures shall be inspected and approved by the soil engineer, prior to the preparations of sub-grade, and backfill.

3.6 All foundation soils underneath the retaining wall footings shall be scarified to a depth of at least one (1') foot, brought to uniform moisture content near optimum moisture content and re-compacted to a minimum relative compaction of 95% and as specified in the report.

4.0 FIELD OBSERVATIONS AND TESTING

Field observations and testing shall be performed by an experienced and qualified engineer (civil engineer, geotechnical engineer and their representatives). The engineer will observe and perform adequate amount of testing to meet the project and regulatory requirements. It will be the contractor's responsibility to assist the engineer, allow sufficient time and provide adequate notice to carry out the testing and schedule the personnel.

5.0 PREPARATION OF FILL AREAS

5.1 **Clearing, Over-excavation and Re-compaction**: All areas receiving fill and used as foundation support shall be cleared of topsoil, vegetation, trash, debris and other deleterious materials. After clearing and grubbing, the over excavating, as stated in the preliminary geotechnical report, the area should be scarified as recommended in the report or to a minimum depth of 12 inches.

The over-excavation should extend to a depth recommended in the report or until stable ground is reached. The material scarified will be uniformly moisture conditioned to near optimum moisture content and re-compacted to a relative compaction of 90 percent or greater. The placement of fill will commence upon completion of preparation and approved by the engineer.

5.2 **Benching**: Prior to the construction of fill slopes (embankments) and placement of fill on ground surface sloping steeper than 5 horizontal: 1 vertical, the ground shall be cut in benches. The lowest bench should be at least 12 feet wide to facilitate the fill placement in horizontal lifts. Under certain circumstances and if approved by the engineer, the width may be reduced to the size of the widest equipment (i.e., scraper, compactor or tractor) to be used. The lowest bench shall be at least two (2) feet deep. Other benches will be excavated to a firm material for a minimum width of four (4) feet.

6.0 EXCAVATION AND FILL MATERIAL

6.1 **Excavation**: All excavations should be carried out as per project documents. In general, all channel excavations can be accomplished by conventional heavy earth-moving equipment.

6.2 **Fill Materials**:

6.2.1 **Structural Fill**: The fill material shall be suitable material as defined in Section 2.2 and shall be approved by the engineer. Cobbles (rocks) six (6) inches or greater in size should not be used as structural fill. In general, the fill for structural fill shall be no-to-low in expansion potential meeting the following criteria:

a) **Liquid Limit** **<35**

b) **Plasticity Index** **<15**

c) **Expansion Index Under 200 psf Surcharge Load** **<20**

This material should extend to a minimum depth of five (5) feet below the foundation footing.

6.2.2 **Bedding Material Underneath Pipes and Culverts**: A one (1') foot thick class 2 aggregate base course shall be constructed underneath all culvert slabs and footing foundations for the retaining walls. The base course shall be placed over the prepared sub-grade and shall meet the requirements of "Class 2 Aggregate Base (3/4" max.)" , Section 26 of Standard Specifications. The base course shall meet the placement and compaction requirements of sections 26-1.035, 26-1.04, and 26-1.05 of the Standard Specifications.

6.2.3 **Backfill Behind Retaining Structures**: All backfill material behind the retaining structures and box culverts shall be classified as sands (SP, SW) to silty Sand (SM), and meet the requirements of Section 2.2 "Suitable Materials" and shall be approved by the Civil Engineer. Excavated materials from the site meeting the requirements of Section 2.2 shall be used as backfill.

6.2.4 The pervious material (SP, SW) behind the retaining structures shall be hard, durable and free of any organics, vegetation, clay, and other deleterious materials. Contractor shall identify the source of material and furnish 30 days in advanced at least 50 pounds of material for testing and approval. The pervious granular material shall meet the following gradation criteria.

SIEVE SIZE	PERCENT PASSING
3/4 inch	100
3/8 inch	85-100
#4	60-80
#10	30-70
#40	0-30
#100	0-5

6.2.5 **Aggregate Base Course**: Aggregate base shall be Class 2 conforming to Section 26 "Standard Specifications:, California Department of Transportation, and shall be approved by the Engineer.

6.2.6 **Imported Material**: Import material to be used as structural fill shall meet the criteria as per Section 6.2.1.

7.0 FILL PLACEMENT

7.1 **General**: Suitable material to be used as fill shall be uniformly moisture conditioned either in stockpile or in-place. Prior to the placement, the area to receive fill shall be prepared as described in Section 4.0 and scarified to provide bond between existing compacted surface and new lift.

7.2 **Fill Placement**: Fill material shall be placed in uniform horizontal lifts not exceeding eight (8) inches, measured loose. The material shall be uniformly spread and should not contain any large rock particles, clods of clay lumps. Clods and clay lumps shall be broken down and thoroughly mixed. Large rock particles greater than six (6) inches shall be removed from the fill area. Fill material shall have uniform moisture content, near optimum as specified under Compaction Criteria, Section 7.4.

7.3 **Compaction**: Each loose lift shall be compacted using proper compaction equipment well suited to the type of material being compacted to produce uniform compaction. After the layer has been compacted, the compacted surface shall be scarified prior to the placement of another lift. Fill slopes should be compacted by back rolling. It may be necessary to overbuild the slopes and trimmed to achieve final finished slope.

7.4 **Compaction Criteria**: In general the compaction criteria given below should be followed. All compaction is relative to ASTM D1557 unless otherwise specifically stated.

Area	Relative Moisture Content Compaction at the time of (Relative Compaction to MDD) (Relative to OMC)
a) Structural fill	90% or greater-2 to +2% of OMC
b) Backfill around retaining walls	90% or greater-2 to +2% of OMC
c) Embankment Fill (levees)	90% or greater-2 to +2% of OMC
d) Trench backfill from 1' below the sub-grade to 4' below the sub-grade	90% or greater-2 to +2% of OMC
e) Trench backfill upper 1'	95% or greater-2 to +2% of OMC
f) Paved areas, both concrete & asphaltic aggregate base & upper 1' of sub-grade	95% or greater-2 to +2% of OMC
g) Sub-grade below concrete slabs at wet crossing, upper 1'	95% or greater-2 to +2% of OMC
h) General nonstructural backfill, (i.e., landscape area)	85% or greater-1 to +3% of OMC

7.5 **Quality Assurance and Testing**: As quality assurance, Engineer will observe over-excavation and placement of fill and conduct field density tests. Field density testing will be performed in conformance with ASTM D1556 - Sand Cone Method and ASTM D2922 - Nuclear Methods. Test location and frequency of testing will be at the discretion of the engineer. However, in general, field density tests will be performed at every two-foot compacted lift and/or every 1,000 cubic yards of fill placed. Additional testing will be performed at the discretion of the engineer. When test results and/or observations indicate, as determined by the engineer, that compaction is not as specified, the material shall be removed, replaced and re-compacted to meet the specifications. It is the contractor's responsibility that both moisture content and relative compaction are met in a consistent manner.

8.0 TRENCH EXCAVATION AND BACKFILLS

8.1 **General**: Excavations for utility trenches greater than five (5) feet deep may require shoring. All excavations should be carried out in accordance with applicable standard specifications, Cal-OSHA requirements and local government agency requirements. Backfill shall be observed and tested by the engineer.

8.2 **Bedding Material**: Bedding material shall conform to applicable requirements of standard specifications and local government agency requirements. In general, granular bedding comprising of coarse sand and gravel is ideally suitable as bedding material. Local sandy soils may be used if acceptable to the governing agency.

8.3 **Backfill Material**: Granular backfill one (1) foot above the pipe is ideally suitable. Local sandy soil may be used if acceptable to the governing agency. Remainder of the trench shall be backfilled with local suitable material.

8.4 **Placement, Moisture Conditioning and Compaction**: Backfill shall be uniformly moisture conditioned and compacted. Compaction criteria provided in Section 6.4 should be followed. Upper one (1) foot of backfill should be compacted to 95 percent relative compaction.

9.0 EXCAVATIONS

Excavations and over-excavations shall be performed in accordance with plans and recommendations contained in the preliminary geotechnical investigation report. All excavations will be observed by the engineer. If unsuitable soils are discovered, the engineer will determine the extent of over-excavation. No fill placement over cut area will commence prior to approval by the engineer. Prior to placement of fill, cut surface shall be scarified and uniformly moisture conditioned and re-compacted.

10.0 UNDER DRAINS

Under drains, if required, shall be constructed in accordance with plans and project requirements. Location of under drains will be surveyed to provide as-built location. Engineer may modify the location and requirement of the under drain depending upon the field condition.

APPENDIX-D

OSHPD

Latitude, Longitude: 34.41416648, -117.22528039

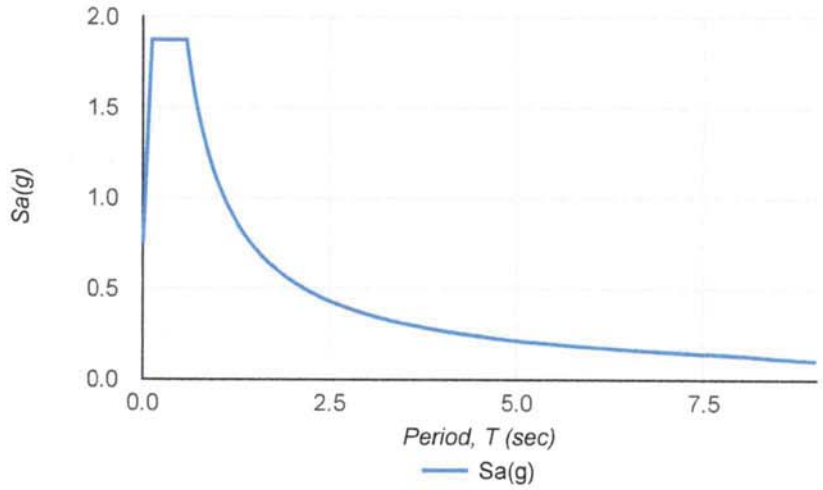
Google Map data ©2019 Google

Date	1/18/2019, 11:12:44 AM
Design Code Reference Document	ASCE7-10
Risk Category	II
Site Class	D - Stiff Soil

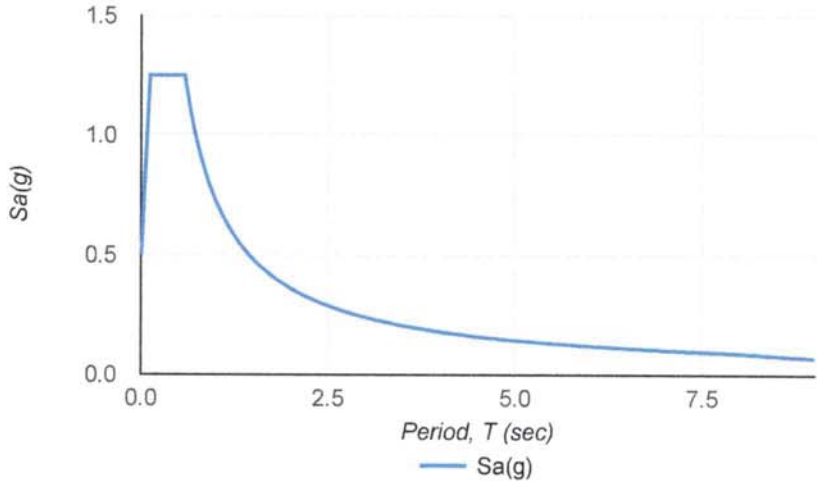
Type	Value	Description
S_S	1.874	MCE_R ground motion. (for 0.2 second period)
S_1	0.722	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.874	Site-modified spectral acceleration value
S_{M1}	1.083	Site-modified spectral acceleration value
S_{DS}	1.249	Numeric seismic design value at 0.2 second SA
S_{D1}	0.722	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	D	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	1.5	Site amplification factor at 1.0 second
PGA	0.676	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.676	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	1.874	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.803	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	2.236	Factored deterministic acceleration value. (0.2 second)
S1RT	0.722	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.705	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.905	Factored deterministic acceleration value. (1.0 second)
PGAd	0.85	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	1.039	Mapped value of the risk coefficient at short periods
C_{R1}	1.025	Mapped value of the risk coefficient at a period of 1 s

MCER Response Spectrum



Design Response Spectrum



APPENDIX-E

CALIFORNIA BUILDING CODE – MATRIX ADOPTION TABLE
CHAPTER 18 – SOILS AND FOUNDATIONS

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	BSC-CG	SFM	HCD			DSA			OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
				1	2	1/AC	AC	SS	SS/CC	1	2	3	4								
Adopt entire chapter	X																				
Adopt entire chapter as amended (amended sections listed below)				X	X						X										
Adopt only those sections that are listed below																					
Chapter / Section																					
1801.2				X																	
1803.1.1– 1803.1.1.5				X																	
1803.2											X										
1803.6											X										
1803.7											X										
1804.4.1				X																	
1805.4.1				X																	
1805.4.3				X	X																
1810.3.1.5.1											X										
1810.3.10.4.1											X										
1810.3.10.4	X																				

The state agency does not adopt sections identified with the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

CHAPTER 18
SOILS AND FOUNDATIONS

User note: Code change proposals to this chapter will be considered by the IBC – Structural Code Development Committee during the 2016 (Group B) Code Development Cycle. See explanation on page ix.

SECTION 1801
GENERAL

1801.1 Scope. The provisions of this chapter shall apply to building and foundation systems.

1801.2 Design basis. Allowable bearing pressures, allowable stresses and design formulas provided in this chapter shall be used with the allowable stress design load combinations specified in Section 1605.3. The quality and design of materials used structurally in excavations and foundations shall comply with the requirements specified in Chapters 16, 19, 21, 22 and 23 of this code. Excavations and fills shall also comply with Chapter 33.

[HCD 1] For limited-density owner-built rural dwellings, pier foundations, stone masonry footings and foundations, pressure-treated lumber, poles or equivalent foundation materials or designs may be used, provided that the bearing is sufficient for the purpose intended.

SECTION 1802
DEFINITIONS

1802.1 Definitions. The following words and terms are defined in Chapter 2:

DEEP FOUNDATION.

DRILLED SHAFT.

Socketed drilled shaft.

HELICAL PILE.

MICROPILE.

SHALLOW FOUNDATION.

SECTION 1803
GEOTECHNICAL INVESTIGATIONS

1803.1 General. Geotechnical investigations shall be conducted in accordance with Section 1803.2 and reported in accordance

with Section 1803.6. Where required by the building official or where geotechnical investigations involve in-situ testing, laboratory testing or engineering calculations, such investigations shall be conducted by a registered design professional.

1803.1.1 General and where required for applications listed in Section 1.8.2.1.1 regulated by the Department of Housing and Community Development. [HCD 1] *Foundation and soils investigations shall be conducted in conformance with Health and Safety Code Sections 17953 through 17957 as summarized below.*

1803.1.1.1 Preliminary soil report. *Each city, county, or city and county shall enact an ordinance which requires a preliminary soil report, prepared by a civil engineer who is registered by the state. The report shall be based upon adequate test borings or excavations, of every subdivision, where a tentative and final map is required pursuant to Section 66426 of the Government Code.*

The preliminary soil report may be waived if the building department of the city, county, or city and county, or other enforcement agency charged with the administration and enforcement of the provisions of Section 1803.1.1, shall determine that, due to the knowledge such department has as to the soil qualities of the soil of the subdivision or lot, no preliminary analysis is necessary.

1803.1.1.2 Soil investigation by lot, necessity, preparation, and recommendations. *If the preliminary soil report indicates the presence of critically expansive soils or other soil problems which, if not corrected, would lead to structural defects, such ordinance shall require a soil investigation of each lot in the subdivision.*

The soil investigation shall be prepared by a civil engineer who is registered in this state. It shall recommend corrective action which is likely to prevent structural damage to each dwelling proposed to be constructed on the expansive soil.

1803.1.1.3 Approval, building permit conditions, appeal. *The building department of each city, county, or city and county, or other enforcement agency charged with the administration and enforcement of the provisions of Section 1803.1.1, shall approve the soil investigation if it determines that the recommended action is likely to prevent structural damage to each dwelling to be constructed. As a condition to the building permit, the ordinance shall require that the approved recommended action be incorporated in the construction of each dwelling. Appeal from such determination shall be to the local appeals board.*

1803.1.1.4 Liability. *A city, county, city and county, or other enforcement agency charged with the administration and enforcement of the provisions of Section 1803.1.1, is not liable for any injury which arises out of any act or omission of the city, county, city and county, other enforcement agency, or a public employee or any other person under Section 1803.1.1.*

1803.1.1.5 Alternate procedures. *The governing body of any city, county, or city and county may enact an ordinance prescribing an alternate procedure which is equal to or more restrictive than the procedure specified in Section 1803.1.1.*

1803.2 Investigations required. Geotechnical investigations shall be conducted in accordance with Sections 1803.3 through 1803.5.

Exception: The building official shall be permitted to waive the requirement for a geotechnical investigation where satisfactory data from adjacent areas is available that demonstrates an investigation is not necessary for any of the conditions in Sections 1803.5.1 through 1803.5.6 and Sections 1803.5.10 and 1803.5.11.

[OSHPD 2] Geotechnical reports are not required for one-story, wood-frame and light-steel-frame buildings of Type V construction and 4,000 square feet (371 m^2) or less in floor area, not located within Earthquake Fault Zones or Seismic Hazard Zones as shown in the most recently published maps from the California Geological Survey (CGS). Allowable foundation and lateral soil pressure values may be determined from Table 1806.2.

1803.3 Basis of investigation. Soil classification shall be based on observation and any necessary tests of the materials disclosed by borings, test pits or other subsurface exploration made in appropriate locations. Additional studies shall be made as necessary to evaluate slope stability, soil strength, position and adequacy of load-bearing soils, the effect of moisture variation on soil-bearing capacity, compressibility, liquefaction and expansiveness.

1803.3.1 Scope of investigation. The scope of the geotechnical investigation including the number and types of borings or soundings, the equipment used to drill or sample, the in-situ testing equipment and the laboratory testing program shall be determined by a registered design professional.

1803.4 Qualified representative. The investigation procedure and apparatus shall be in accordance with generally accepted engineering practice. The registered design professional shall have a fully qualified representative on site during all boring or sampling operations.

1803.5 Investigated conditions. Geotechnical investigations shall be conducted as indicated in Sections 1803.5.1 through 1803.5.12.

1803.5.1 Classification. Soil materials shall be classified in accordance with ASTM D2487.

1803.5.2 Questionable soil. Where the classification, strength or compressibility of the soil is in doubt or where a load-bearing value superior to that specified in this code is claimed, the building official shall be permitted to require that a geotechnical investigation be conducted.

1803.5.3 Expansive soil. In areas likely to have expansive soil, the building official shall require soil tests to determine where such soils do exist.

Soils meeting all four of the following provisions shall be considered expansive, except that tests to show compliance with Items 1, 2 and 3 shall not be required if the test prescribed in Item 4 is conducted:

1. Plasticity index (PI) of 15 or greater, determined in accordance with ASTM D4318.
2. More than 10 percent of the soil particles pass a No. 200 sieve (75 μm), determined in accordance with ASTM D422.
3. More than 10 percent of the soil particles are less than 5 micrometers in size, determined in accordance with ASTM D422.
4. Expansion index greater than 20, determined in accordance with ASTM D4829.

1803.5.4 Ground-water table. A subsurface soil investigation shall be performed to determine whether the existing ground-water table is above or within 5 feet (1524 mm) below the elevation of the lowest floor level where such floor is located below the finished ground level adjacent to the foundation.

Exception: A subsurface soil investigation to determine the location of the ground-water table shall not be required where waterproofing is provided in accordance with Section 1805.

1803.5.5 Deep foundations. Where deep foundations will be used, a geotechnical investigation shall be conducted and shall include all of the following, unless sufficient data upon which to base the design and installation is otherwise available:

1. Recommended deep foundation types and installed capacities.
2. Recommended center-to-center spacing of deep foundation elements.
3. Driving criteria.
4. Installation procedures.
5. Field inspection and reporting procedures (to include procedures for verification of the installed bearing capacity where required).
6. Load test requirements.
7. Suitability of deep foundation materials for the intended environment.
8. Designation of bearing stratum or strata.
9. Reductions for group action, where necessary.

1803.5.6 Rock strata. Where subsurface explorations at the project site indicate variations in the structure of rock upon which foundations are to be constructed, a sufficient number of borings shall be drilled to sufficient depths to assess the competency of the rock and its load-bearing capacity.

1803.5.7 Excavation near foundations. Where excavation will reduce support from any foundation, a registered design professional shall prepare an assessment of the structure as determined from examination of the structure, the review of available design documents and, if necessary, excavation of test pits. The registered design professional shall determine the requirements for underpinning and protection and prepare site-specific plans, details and sequence of work for submission. Such support shall be provided by underpinning, sheeting and bracing, or by other means acceptable to the building official.

1803.5.8 Compacted fill material. Where shallow foundations will bear on compacted fill material more than 12 inches (305 mm) in depth, a geotechnical investigation shall be conducted and shall include all of the following:

1. Specifications for the preparation of the site prior to placement of compacted fill material.
2. Specifications for material to be used as compacted fill.
3. Test methods to be used to determine the maximum dry density and optimum moisture content of the material to be used as compacted fill.
4. Maximum allowable thickness of each lift of compacted fill material.
5. Field test method for determining the in-place dry density of the compacted fill.
6. Minimum acceptable in-place dry density expressed as a percentage of the maximum dry density determined in accordance with Item 3.
7. Number and frequency of field tests required to determine compliance with Item 6.

1803.5.9 Controlled low-strength material (CLSM). Where shallow foundations will bear on controlled low-strength material (CLSM), a geotechnical investigation shall be conducted and shall include all of the following:

1. Specifications for the preparation of the site prior to placement of the CLSM.
2. Specifications for the CLSM.
3. Laboratory or field test method(s) to be used to determine the compressive strength or bearing capacity of the CLSM.
4. Test methods for determining the acceptance of the CLSM in the field.
5. Number and frequency of field tests required to determine compliance with Item 4.

1803.5.10 Alternate setback and clearance. Where setbacks or clearances other than those required in Section 1808.7 are desired, the building official shall be permitted to require a geotechnical investigation by a registered design professional to demonstrate that the intent of Section 1808.7 would be satisfied. Such an investigation shall include consideration of material, height of slope, slope gradient, load intensity and erosion characteristics of slope material.

1803.5.11 Seismic Design Categories C through F. For structures assigned to Seismic Design Category C, D, E or

F, a geotechnical investigation shall be conducted, and shall include an evaluation of all of the following potential geologic and seismic hazards:

1. Slope instability.
2. Liquefaction.
3. Total and differential settlement.
4. Surface displacement due to faulting or seismically induced lateral spreading or lateral flow.

1803.5.12 Seismic Design Categories D through F. For structures assigned to Seismic Design Category D, E or F, the geotechnical investigation required by Section 1803.5.11 shall also include all of the following as applicable:

1. The determination of dynamic seismic lateral earth pressures on foundation walls and retaining walls supporting more than 6 feet (1.83 m) of backfill height due to design earthquake ground motions.
2. The potential for liquefaction and soil strength loss evaluated for site peak ground acceleration, earthquake magnitude and source characteristics consistent with the maximum considered earthquake ground motions. Peak ground acceleration shall be determined based on one of the following:
    2.1. A site-specific study in accordance with Section 21.5 of ASCE 7.
    2.2. In accordance with Section 11.8.3 of ASCE 7.
3. An assessment of potential consequences of liquefaction and soil strength loss including, but not limited to, the following:
    3.1. Estimation of total and differential settlement.
    3.2. Lateral soil movement.
    3.3. Lateral soil loads on foundations.
    3.4. Reduction in foundation soil-bearing capacity and lateral soil reaction.
    3.5. Soil downdrag and reduction in axial and lateral soil reaction for pile foundations.
    3.6. Increases in soil lateral pressures on retaining walls.
    3.7. Flotation of buried structures.
4. Discussion of mitigation measures such as, but not limited to, the following:
    4.1. Selection of appropriate foundation type and depths.
    4.2. Selection of appropriate structural systems to accommodate anticipated displacements and forces.
    4.3. Ground stabilization.
    4.4. Any combination of these measures and how they shall be considered in the design of the structure.

1803.6 Reporting. Where geotechnical investigations are required, a written report of the investigations shall be submitted to the building official by the permit applicant at the time of permit application. This geotechnical report shall include, but need not be limited to, the following information:

1. A plot showing the location of the soil investigations.
2. A complete record of the soil boring and penetration test logs and soil samples.
3. A record of the soil profile.
4. Elevation of the water table, if encountered.
5. Recommendations for foundation type and design criteria, including but not limited to: bearing capacity of natural or compacted soil; provisions to mitigate the effects of expansive soils; mitigation of the effects of liquefaction, differential settlement and varying soil strength; and the effects of adjacent loads.
6. Expected total and differential settlement.
7. Deep foundation information in accordance with Section 1803.5.5.
8. Special design and construction provisions for foundations of structures founded on expansive soils, as necessary.
9. Compacted fill material properties and testing in accordance with Section 1803.5.8.
10. Controlled low-strength material properties and testing in accordance with Section 1803.5.9.
11. *[OSHPD 2] The report shall consider the effects of seismic hazard in accordance with Section 1803.7.*

1803.7 Geohazard reports. [OSHPD 2] *Geohazard reports shall be required for all proposed construction.*

Exceptions:

1. *Reports are not required for one-story, wood-frame and light-steel-frame buildings of Type V construction and 4,000 square feet (371 m^2) or less in floor area, not located within Earthquake Fault Zones or Seismic Hazard Zones as shown in the most recently published maps from the California Geological Survey (CGS); nonstructural, associated structural or voluntary structural alterations and incidental structural additions or alterations, and structural repairs for other than earthquake damage.*
2. *A previous report for a specific site may be resubmitted, provided that a reevaluation is made and the report is found to be currently appropriate.*

The purpose of the geohazard report shall be to identify geologic and seismic conditions that may require project mitigations. The reports shall contain data which provide an assessment of the nature of the site and potential for earthquake damage based on appropriate investigations of the regional and site geology, project foundation conditions and the potential seismic shaking at the site. The report shall be prepared by a California-certified engineering geologist in consultation with a California-registered geotechnical engineer.

APPENDIX-F

ALR ENGINEERING & TESTING

Civil & Geotechnical Engineering w/ Material Testing

18361 Symeron Road, Apple Valley, Ca. 92307

760-810-2031 Cell # - 760-242-3130 Office #

(alrengineeringtesting@gmail.com)

April 10, 2018

STRUCTURAL SECTION DESIGN

APN 0438-165-33

PROPOSED GAS STATION w/ CONVENIENCE STORE

Located on the Southwest corner of Rock Springs Road and Deep Creek Road, in Apple Valley, San Bernardino County, California

Prepared for

MAIDA HOLDING, LLC.

Project No. 1803409

ALR ENGINEERING & TESTING

Civil & Geotechnical Engineering w/ Material Testing
18361 Symeron Road, Apple Valley, Ca. 92307
760-810-2031 Cell # - 760-242-3130 Office #
(alrengineeringtesting@gmail.com)

April 10, 2018

Project No. 1803409

MARK MAIDA
13302 Ranchero Road
Oak Hills, CA. 92344

Attention: Mr. Mark Maida,

Subject: Pavement Structure Recommendations for Rock Springs Road and Deep Creek Road, for the proposed Gas Station and Convenience Store located on the Southwest corner of Rock Springs Road and Deep Creek Road, County of San Bernardino, California

According to your authorization, **ALR Engineering & Testing**, obtained a sub-grade soil sample from approximately **(0.5 – 1.5)** feet below sub-grade on the edge of the existing roads.

SAMPLE APPROXIMATE LOCATION:

The locations are shown on Plot Plan, **Figure 3.**

LABORATORY TESTING:

The ***Gradation-Sieve Analysis*** results of the soils classified as well graded SAND with silts (SW-SM), in accordance with Unified Soil Classification System **(U.S.C.S.)**, attached figures B-5 and B-6. Generally, these materials are considered to be good sub-grade materials

Sand Equivalent Tests was tested as shown on Figures B-5 and B-6.

Two ***R-Value tests*** were performed by **Merrell Johnson Engineering Testing**, determined an R-Value of **76** for **Rock Springs Road** and **75** for **Deep Creek Road.** The test results are attached herewith.

FLEXIBLE PAVEMENT STRUCTURE CONSIDERATIONS:

Design of the flexible pavement structure should consider several factors which could include:

- 1) Traffic Index
- 2) Strength properties of the sub-grade soils as determined by the **"R" Value**,
- 3) Grain size distribution of the sub-grade soils,
- 4) Climatic conditions of the region,
- 5) Life Cycle Costs.

ALR ENGINEERING & TESTING

Civil & Geotechnical Engineering w/ Material Testing

18361 Symeron Road, Apple Valley, Ca. 92307

760-810-2031 Cell # - 760-242-3130 Office #

(alrengineeringtesting@gmail.com)

Project No. 1803409

SUBGRADE PREPARATION:

The sub-grade of the roadways should be cleared of all weeds and deleterious materials prior to sub-grade preparation. We recommend that the upper twelve **(12)** inches of the sub-grade material should be scarified, uniformly moisture conditioned to near Optimum Moisture Content (OMC) (-2 to +2% points from OMC) and re-compacted to a minimum relative compaction of **95%,** relative to **ASTM D 1557** before the Class II Base is placed**.**

DESIGN RECOMMENDATIONS:

- Based on the test results and soil classifications following recommendations are made.

Deep Creek Rd: **T.I.= 8.0: "R" Value=50:** 5.0 inches of Asphalt Concrete over 7.0 inches of Class II Base at 95% relative compaction.

Deep Creek Rd: **T.I.= 8.0: "R" Value=72:** 5.5 inches of Asphalt Concrete over compacted native soils

Rock Springs Rd: **T.I.=10.0: "R" Value=50:** 6.0 inches of Asphalt Concrete over 10.0 inches of Class II Base at 95% relative compaction.

Rock Springs Rd: **T.I.=10.0: "R" Value=72:** 6.5 inches of Asphalt Concrete over compacted native soils

- **PG 64-16** asphalt and aggregates for asphalt concrete materials should conform to all state, and local requirements, and shall meet the requirements of all applicable subsections of **Section 26** and **39** of the **Standard Specifications** for **Caltrans**.
- Asphalt concrete shall meet the **Section 39** of Caltrans, Project specifications, and the County of San Bernardino. The asphalt concrete shall be compacted to a minimum of **95%** relative compaction, relative to maximum designed density.
- All paved surfaces should be appropriately crowned to facilitate the surface drainage without ponding.

Our design recommendations are based on our visual observations, sampling of sub-grade materials at the approximate location stated here in, laboratory testing of sample tested, and Caltrans design procedure. **ALR Engineering & Testing should test the compaction of the sub-grade and class II base.**

We sincerely appreciate the opportunity of being service to you on this aspect of the project. Please do not hesitate to call us, if you have any questions regarding the content of this report.

ALR ENGINEERING & TESTING

John Longoria, EIT, QSP, NICET III, CESSWI, ICC
Senior Associate Engineer

Stephan M. Longoria, RCE 74782, QSD/P
Registered Civil Engineer

REGISTERED PROFESSIONAL ENGINEER STEPHAN M. LONGORIA No. 74782 CIVIL STATE OF CALIFORNIA

TABLE 1 Soil Classification Chart

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil Classification	
				Group Symbol	Group Name[B]
Coarse-Grained Soils More than 50 % retained on No. 200 sieve	Gravels More than 50 % of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5 % fines[C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$[E]	GW	Well-graded gravel[F]
			$Cu < 4$ and/or $1 > Cc > 3$[E]	GP	Poorly graded gravel[F]
		Gravels with Fines More than 12 % fines[C]	Fines classify as ML or MH	GM	Silty gravel[F,G,H]
			Fines classify as CL or CH	GC	Clayey gravel[F,G,H]
	Sands 50 % or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5 % fines[D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$[E]	SW	Well-graded sand
			$Cu < 6$ and/or $1 > Cc > 3$[E]	SP	Poorly graded sand[I]
		Sands with Fines More than 12 % fines[D]	Fines classify as ML or MH	SM	Silty sand[G,H,I]
			Fines classify as CL or CH	SC	Clayey sand[G,H,I]
Fine-Grained Soils 50 % or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay[K,L,M]
			PI < 4 or plots below "A" line[J]	ML	Silt[K,L,M]
		organic	$\frac{\text{Liquid limit – oven dried}}{\text{Liquid limit – not dried}} < 0.75$	OL	Organic clay[K,L,M,N] / Organic silt[K,L,M,O]
	Silts and Clays Liquid limit 50 or more	inorganic	PI plots on or above "A" line	CH	Fat clay[K,L,M]
			PI plots below "A" line	MH	Elastic silt[K,L,M]
		organic	$\frac{\text{Liquid limit – oven dried}}{\text{Liquid limit – not dried}} < 0.75$	OH	Organic clay[K,L,M,P] / Organic silt[K,L,M,Q]
Highly organic soils		Primarily organic matter, dark in color, and organic odor		PT	Peat

[A] Based on the material passing the 3-in. (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12 % fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

[D] Sands with 5 to 12 % fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15 % sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15 % gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29 % plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30 % plus No. 200, predominantly sand, add "sandy" to group name.

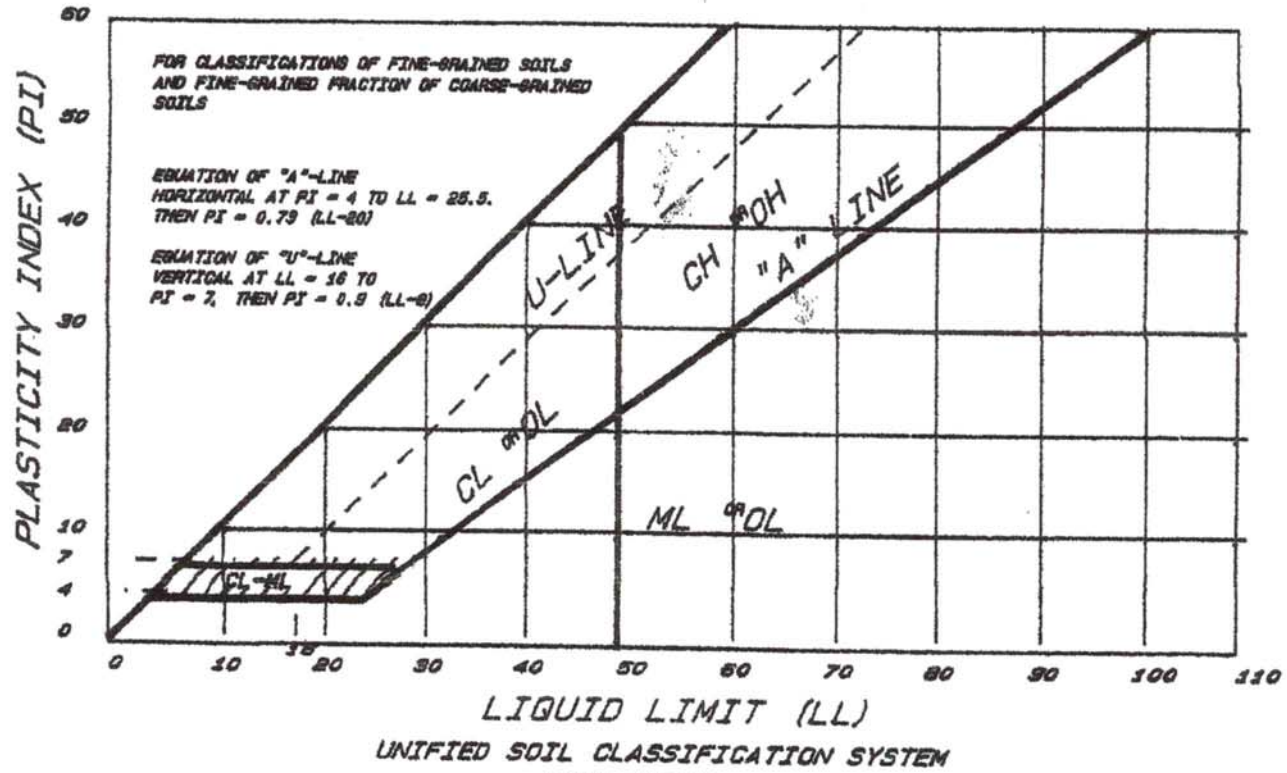
[M] If soil contains ≥ 30 % plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.

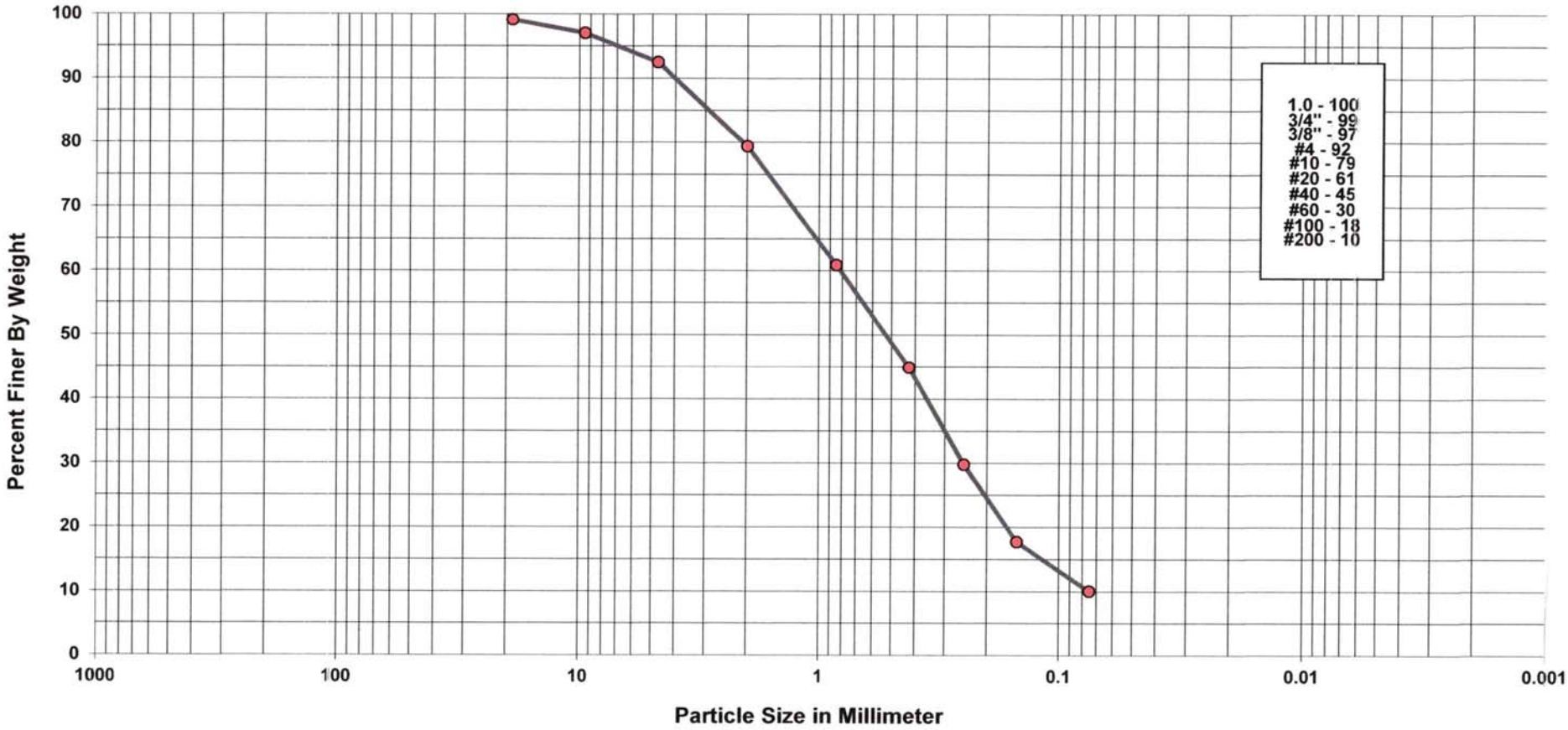


UNIFIED SOIL CLASSIFICATION SYSTEM
ASTM D2487

U.S. STANDARD SIEVE SIZE

HYDROMETER ANALYSIS

3/4" 3/8" #4 #10 #20 #40 #60 #100 #200



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Location	Type	Depth, ft.			SE	"R" Value	Soil Classification
Rock Springs	BAG	12-18"			51	76	Well graded SAND with silts (SW-SM)

PARTICLE SIZE ANALYSIS

ALR ENGINEERING & TESTING

Civil & Geotechnical Engineering w/ Material Testing

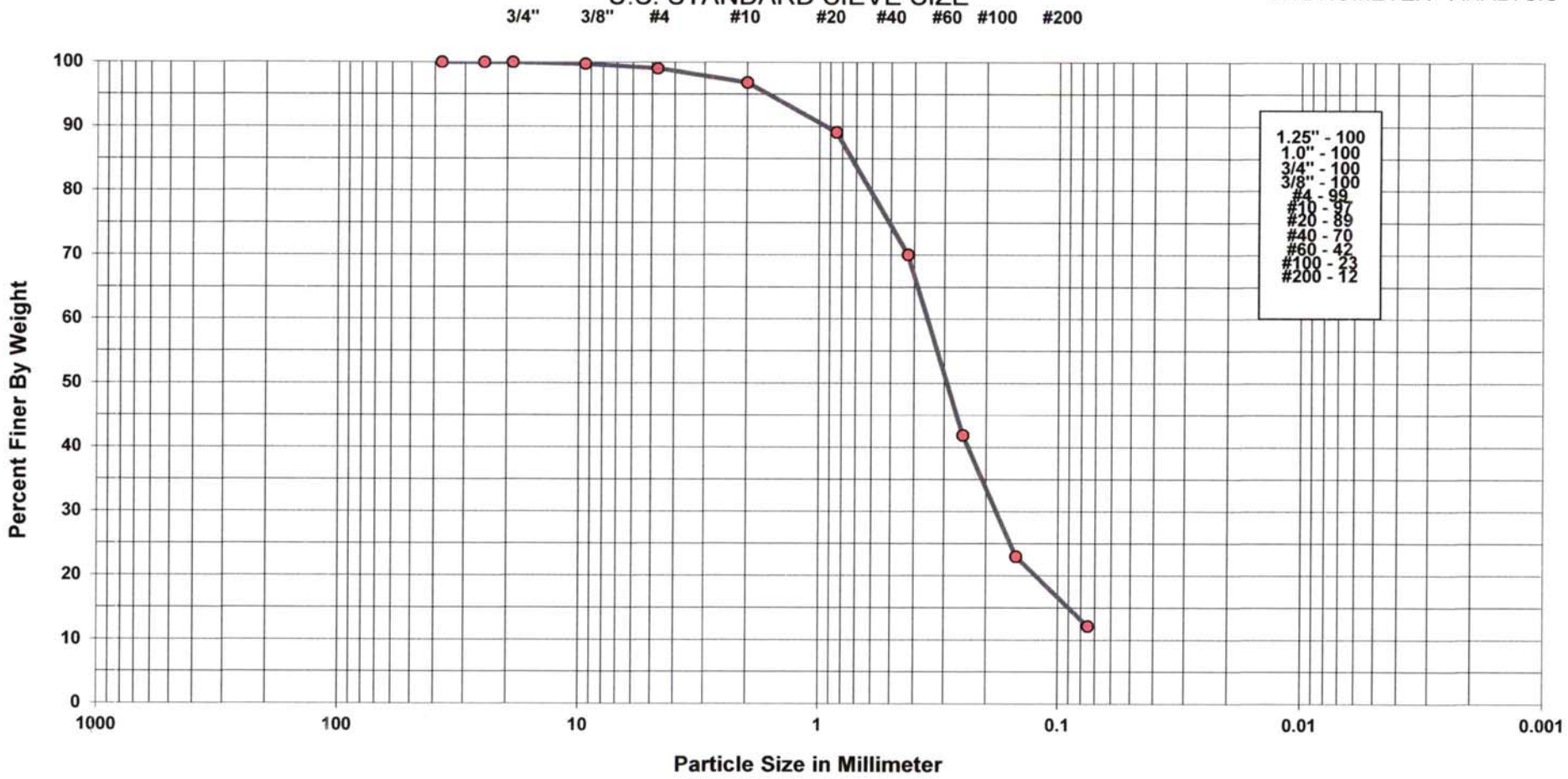
18361 Symeron Road, Apple Valley, Ca. 92307

(760) 810-2031 Cell # - (760) 242-3130 Office

Apple Valley	Project No.	1803409
APN 0438-165-33		
MAIDA - APPLE VALLEY C-STORE		
PLATE B-5		

U.S. STANDARD SIEVE SIZE

HYDROMETER ANALYSIS



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Location	Type	Depth, ft.			SE	"R" Value	Soil Classification
Deep Creek	BAG	12-18"			58	75	Well graded SAND with silts (SW-SM)

PARTICLE SIZE ANALYSIS

ALR ENGINEERING & TESTING

Civil & Geotechnical Engineering w/ Material Testing

18361 Symeron Road, Apple Valley, Ca. 92307

(760) 810-2031 Cell # - (760) 242-3130 Office

Apple Valley	Project No.	1803409
APN 0438-165-33		
MAIDA - APPLE VALLEY C-STORE		
PLATE B-6		

PAVEMENT THICKNESS DESIGN

Project Name: **DEEP CREEK CONVENIENCE STORE**

Project Number: 1803409

Street Name/s: *DEEP CREEK ROAD*

Classification of Subgrade Soils: Well graded SAND with silts (SW-SM)

				Design		
Traffic Index, T.I.:	8.0		**R-Value:**	50		H13
Total Gravel Equivalent, G.E.	[.0032*(100-R)T.I.]			**1.28**		H15
G.E. For AC Layer	[.0032*(100-R)T.I.]+0.2(FS)	Base R=78		**0.7632**		H17
Gravel Factor for AC, Gf	[5.67/sqrtT.I.]	sqrt T.I. =	***2.8284***	**2.00**		H19
CALCULATED Thickness of AC	[G.E./Gf, Ft]=H17/H19			**0.38**	**Ft**	H21
Thickness of AC layer, INCHES				**4.57**	**In.**	H23
USE 5.0" THICK AC=5.0"/12				**0.420**	**Ft.**	H25
Use 5.0 inches thick AC, GE=H26*H18				**0.842**		H27
AB THICKNESS REQUIRED = H15+0.2-H27+((H21-H25)/H19				**0.618**		H29
Base Course Thickness = H29/1.1*12				**6.7**	**Inches**	H31
				0.562	**feet**	

Design: *5.00 inches of Asphalt Concrete over 7.00 inches of Class II Base*

Notes:
Computations are based on the Caltran's design procedure
ALR Engineering must observe preparation of subgrade and perform field density testing.
Subgrade materials should be compacted to 95% of relative density, relative to Maximum Density as obtained by laboratory test method ASTM 1557 to a depth of at least one (1) foot below the finished subgrade.
Clay soil should be removed and replaced with sandy soil, if encountered.
ALR Engineering must observe preparation of class II base and perform field density testing.

ALR ENGINEERING & TESTING
Civil & Geotechnical Engineering w/ Material Testing
18361 Symeron Road
Apple Valley, Calif. 92307
(760) 810-2031 Cell # - (760) 242-3130 Office #

CITY OF HESPERIA

Deep Creek Road
Pavement Thickness Design

FIGURE B-1

PAVEMENT THICKNESS DESIGN

Project Name: DEEP CREEK CONVENIENCE STORE

Project Number: 1803409

Street Name/s: *DEEP CREEK ROAD*

Classification of Subgrade Soils: Well graded SAND with silts (SW-SM)

				Actual		
Traffic Index, T.I.:	8.0	**R-Value:**		72		H13
Total Gravel Equivalent, G.E.	[.0032*(100-R)T.I.]			0.7168		H15
G.E. For AC Layer	[.0032*(100-R)T.I.]+0.2(FS)	Base R=78		0.7632		H17
Gravel Factor for AC, Gf	[5.67/sqrtT.I.]	sqrt T.I. =	*2.8284*	2.00		H19
CALCULATED Thickness of AC	[G.E./Gf, Ft]=H17/H19			0.38	Ft	H21
Thickness of AC layer, INCHES				4.57	In.	H23
USE 5.5" THICK AC=5.5"/12				0.45	Ft.	H25
Use 5.5 inches thick AC, GE=H26*H20				0.90		H27
AB THICKNESS REQUIRED = H15+0.2-H27+((H21-H25)/H19				-0.02		H29
Base Course Thickness = H29/1.1*12				-0.2	Inches	H31
				-0.018	feet	

Design: *5.50 inches of Asphalt Concrete over compacted native soils*

Notes:
Computations are based on the Caltran's design procedure
ALR Engineering must observe preparation of subgrade and perform field density testing.
Subgrade materials should be compacted to 95% of relative density, relative to Maximum Density as obtained by laboratory test method ASTM 1557 to a depth of at least one (1) foot below the finished subgrade.
Clay soil should be removed and replaced with sandy soil, if encountered.
ALR Engineering must observe preparation of class II base and perform field density testing.

ALR ENGINEERING & TESTING	CITY OF HESPERIA	FIGURE
Civil & Geotechnical Engineering w/ Material Testing 18361 Symeron Road Apple Valley, Calif. 92307 (760) 810-2031 Cell # - (760) 242-3130 Office #	Deep Creek Road Pavement Thickness Design	B-2

PAVEMENT THICKNESS DESIGN

Project Name: **DEEP CREEK CONVENIENCE STORE**

Project Number: 1803409

Street Name/s: *Rock Springs Road*

Classification of Subgrade Soils: Silty SAND (SM)

Traffic Index, T.I.:	10.0	**R-Value:**	Design 72		H13
Total Gravel Equivalent, G.E.	[.0032*(100-R)T.I.]		0.896		H15
G.E. For AC Layer	[.0032*(100-R)T.I.]+0.2(FS)	Base R=78	0.904		H17
Gravel Factor for AC, Gf	[5.67/sqrtT.I.]	sqrt T.I. = *3.1623*	1.79		H19
CALCULATED Thickness of AC	[G.E./Gf, Ft]=H17/H19		0.50	Ft	H21
Thickness of AC layer, INCHES			6.50	In.	H23
USE 6.5" THICK AC=6.5"/12			0.542	Ft.	H25
Use 6.5 inches thick AC, GE=H26*H20			0.972		H27
AB THICKNESS REQUIRED = H15+0.2-H27+((H21-H25)/H19			0.103		H29
Base Course Thickness = H29/1.1*12			0.0	Inches	H31

Design: *6.50 inches of Asphalt Concrete over compacted native soil*

Notes:
Computations are based on the Caltran's design procedure
ALR Engineering must observe preparation of subgrade and perform field density testing.
Subgrade materials should be compacted to 95% of relative density, relative to Maximum Density as obtained by laboratory test method ASTM 1557 to a depth of at least one (1) foot below the finished subgrade.
Clay soil should be removed and replaced with sandy soil, if encountered.
ALR Engineering & Testing must observe preparation of base course and perform field density testing.

ALR ENGINEERING & TESTING
Civil & Geotechnical Engineering w/ Material Testing
18361 Symeron Road
Apple Valley, Calif. 92307
(760) 810-2031 Cell # - (760) 242-3130 Office #

CITY OF HESPERIA

Rock Springs Road
Pavement Thickness Design

FIGURE B-3

PAVEMENT THICKNESS DESIGN

Project Name: DEEP CREEK CONVENIENCE STORE

Project Number: 1803409

Street Name/s: *ROCK SPRINGS ROAD*

Classification of Subgrade Soils: Well graded SAND with silts (SW-SM)

Traffic Index, T.I.:	10.0	**R-Value:**	Design 50		H13
Total Gravel Equivalent, G.E.	[.0032*(100-R)T.I.]		1.6		H15
G.E. For AC Layer	[.0032*(100-R)T.I.]+0.2(FS)	Base R=78	0.904		H17
Gravel Factor for AC, Gf	[5.67/sqrtT.I.]	sqrt T.I. = *3.1623*	1.79		H19
CALCULATED Thickness of AC	[G.E./Gf, Ft]=H17/H19		0.50	Ft	H21
Thickness of AC layer, INCHES			6.05	In.	H23
USE 6.0" THICK AC=6.0"/12			0.500	Ft.	H25
Use 6.0 inches thick AC, GE=H26*H20			0.897		H27
AB THICKNESS REQUIRED = H15+0.2-H27+((H21-H25)/H19			0.906		H29
Base Course Thickness = H29/1.1*12			9.9	Inches	H31
			0.823	feet	

Design: *6.00 inches of Asphalt Concrete over 10.0 inches of Class II Base*

Notes:
Computations are based on the Caltran's design procedure
ALR Engineering must observe preparation of subgrade and perform field density testing.
Subgrade materials should be compacted to 95% of relative density, relative to Maximum Density as obtained by laboratory test method ASTM 1557 to a depth of at least one (1) foot below the finished subgrade.
Clay soil should be removed and replaced with sandy soil, if encountered.
ALR Engineering & Testing must observe preparation of base course and perform field density testing.

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Civil & Geotechnical Engineering w/ Material Testing
18361 Symeron Road
Apple Valley, Calif. 92307
(760) 810-2031 Cell # - (760) 242-3130 Office #

CITY OF HESPERIA

Rock Springs Road
Pavement Thickness Design

FIGURE B-4

R-Value and Expansion Pressure of Compacted Soils

ASTM D2844

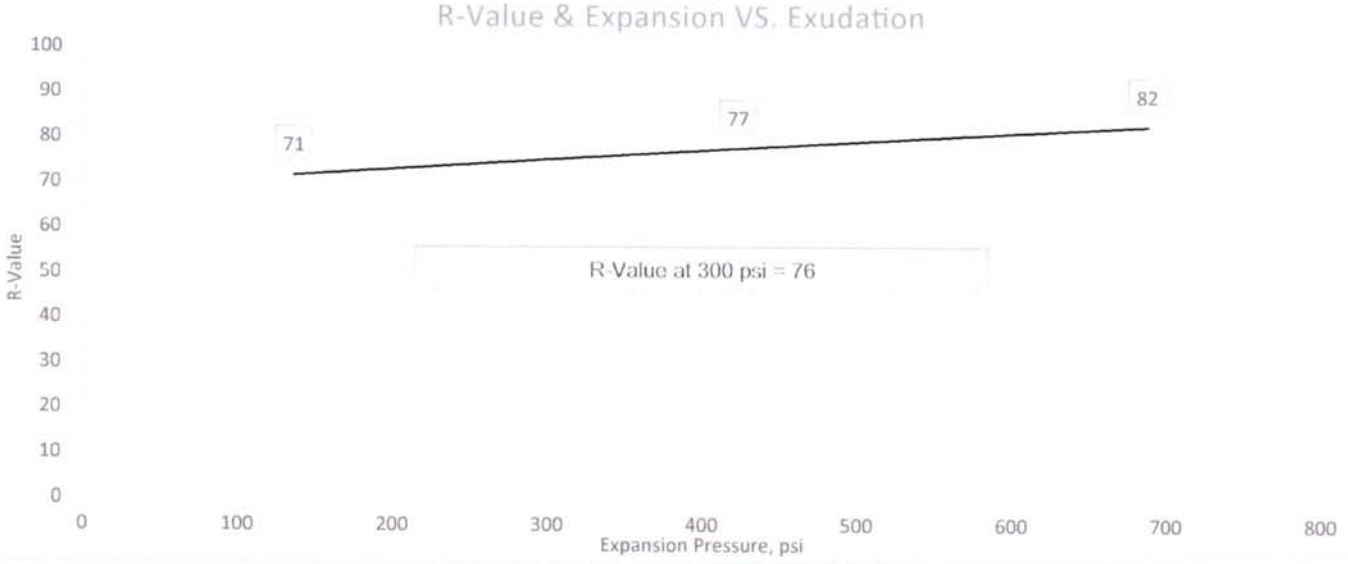
Report Date:	04/11/18
Sheet:	1 *of* 1
Attachment:	SS02
Permit No.:	
Client Project No.:	
Other:	
DSA File No.:	
DSA Application No.:	
DSA LEA No.:	

Project Number:	16.0066.0843
Project Title:	Material Testing
Project Location:	Apple Valley, CA
Client:	ALR Engineering

Sample ID: CLT03301802 ☐ General Compliance ☐ Non-Compliance ☒ Not Specified

Desription:	SP-SM
Sample Origin:	Client sampled at Rock Springs 12" to 18"
Tested By:	Cheyenne Oravets

Briguette Number:	1	2	3
Moisture Content (%):	6.0	8.3	9.2
Dry Density (pcf):	127.8	121.5	122.9
Exudation Pressure (psi):	688	423	136
Expansion Pressure (psf):	0	0	0
R-Value:	82	77	71



The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewed By (Signature)

Clayton Garrison / Laboratory Manager
Name / Title

Merrell Johnson COMPANIES

concept to completion
ENGINEERING | SURVEYING | TESTING | INSPECTION

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R-Value and Expansion Pressure of Compacted Soils

ASTM D2844

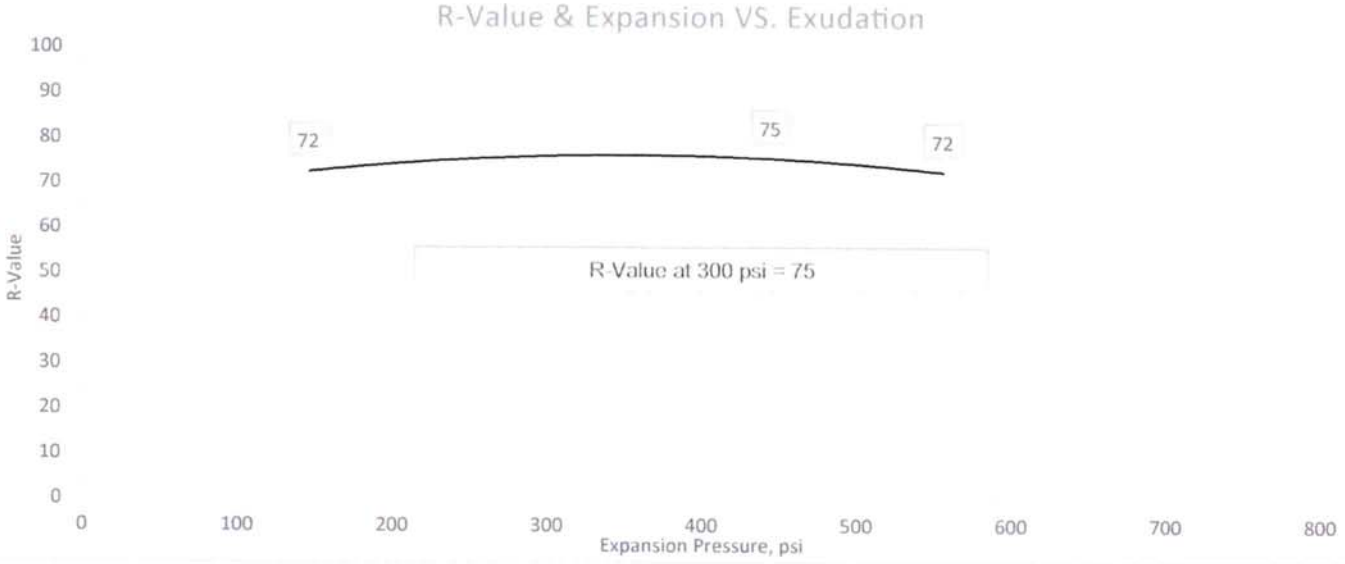
Report Date:	04/11/18
Sheet:	1 *of* 1
Attachment:	SS01
Permit No.:	
Client Project No.:	
Other:	
DSA File No.:	
DSA Application No.:	
DSA LEA No.:	

Project Number:	16.0066.0843
Project Title:	Material Testing
Project Location:	Apple Valley, CA
Client:	ALR Engineering

Sample ID: CLT03301801 ☐ General Compliance ☐ Non-Compliance ☒ Not Specified

Desription:	SP-SM
Sample Origin:	Client Sampled at Deep Creek at 12" to 18"
Tested By:	Cheyenne Oravets

Briguette Number:	1	2	3
Moisture Content (%):	10.6	11.4	12.3
Dry Density (pcf):	112.4	110.0	111.2
Exudation Pressure (psi):	556	444	146
Expansion Pressure (psf):	113	273	108
R-Value:	72	75	72



The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewed By (Signature)

Clayton Garrison / Laboratory Manager
Name / Title