EXHIBIT G
PRELIMINARY SOILS REPORT

SITE PLAN NO. PLAN 19-00029

November 2019

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

ALTEC ENGINEERING CORP.

19531 US Highway 18
Apple Valley, CA 92307
760-242-9900

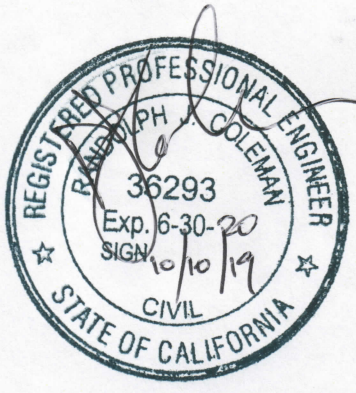
October 10, 2019

PRELIMINARY SOILS REPORT

PROPOSED MANUFACTURING SITE
APN 0472-131-03,040,08,10,13,16, & 17
National Trails Highway
Victorville, CA.

PREPARED AT THE REQUEST OF:

MARTINEZ OKAMOTO ARCHITECTS
15487 Seneca Road, Ste 203
Victorville, CA. 92392



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Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

INTRODUCTION

This Preliminary Soils Investigation Report has been prepared for the site of a proposed industrial manufacturing site on ±52 acres on the southwest side of National Trails Highway ("D" Street) south of Air Expressway in Victorville, California. The extent of this report includes:

1. Description of the field exploration and laboratory work performed.

2. Conclusions and recommendations regarding site preparation, foundation design and other construction aspects. These are based on our analysis of the data obtained from the exploration and testing program, and knowledge of the general and site specific characteristics of the subsurface soils.

PROJECT DESCRIPTION

Information furnished to this office indicates that the subject site will be developed with a one story portable office building, equipment necessary for the manufacturing of concrete K-rails, and associated hardscape and landscaping. It is our understanding that the structure will be a portable one-story office building. Consequently, light to moderate loads are normally associated with such a structure. The manufacturing area of the site will be subject to moderate to heavy loads. This information was used as a basis for the exploration and testing programs and the recommendation contained herein.

PURPOSE AND SCOPE OF WORK

The purpose of the study was to evaluate soil conditions at the site and provide conclusions and recommendations relative to site and development constraints. The scope of work included the following:

1. Site reconnaissance and field observations regarding topography, surface geology & vegetation.

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

2. Shallow subsurface exploration by the means of backhoe trenching.
3. Laboratory testing of selected soil samples as recovered by the field exploration.
4. Geotechnical evaluation and analysis of the data results.
5. Appropriate recommendations are proposed for site development.

SITE CONDITIONS

The site is located on the southwest side of National Trails Highway southeast of Air Expressway in Victorville (see drawings 1 thru 5). There has been some grading and clearing on the site. The property currently is vacant.

There are existing industrial sites across National Trails Highway from the site. The land to the south, west, and north of the site is vacant. The site has scattered light desert grasses and greasewood. Topographically, the site falls generally northeasterly at approximately 5% to 15%. The elevation of the original ground is approximately 2,750 feet.

FIELD INVESTIGATION

The shallow subsurface conditions at the site were investigated by three trenches at the locations shown on drawing 6. The trenches were excavated to a depth of 10 to 12 feet. The soil sections were inspected and logged (drawing #8 through #10).

LABORATORY TESTING

The following laboratory tests were conducted in accordance with the relevant ASTM standards and the State of California Standard Specifications:

A. Classification Tests:

The natural moisture content and the grain-size distribution were determined for several representative soil samples,

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

including the percentage of fines (drawing #11 and #12).

Results of these tests were used to classify and evaluate the various soil types encountered at the site.

B. Proctor Compaction Test:

The maximum dry density and optimum moisture content determinations were performed on typical soil samples that were recovered from the trench. Tests were done in compliance with ASTM D-698 (drawing #13 and #14).

REGIONAL GEOLOGICAL SETTING

The site belongs to the Mojave Desert Physiographic Province of Southern California at an approximate elevation of 2,750 feet.

The Mojave Desert is a broad, alluvial, triangular-shaped region of relatively low relief interrupted by Northwest-trending mountain ranges. These are structurally controlled by prominent active faults. The desert surface presently has been covered slowly by alluvial material eroded and transported away from the surrounding San Gabriel and San Bernardino Mountains by intermittent streams. The alluvium, Quaternary-Recent in age, has accumulated to form the generally low, featureless surface of this region. It consists primarily of fine sands, silty sands, coarse sands and gravels with occasional clayey sand interbeds.

SUBSURFACE SETTING

The encountered subsurface deposits are depicted in detail by the trench logs (drawings #8 through #10). The soil sequence primarily consists of fine grained silty sand and coarse to medium grained silty sand. This is consistent with what is to be expected based upon other studies that have been performed in the area. The in-situ density results indicate that the subsurface soils at the site are generally loose to medium dense.

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

GROUND WATER

Free ground water was not encountered within the maximum trench depth (12') at the time of testing. However, the depth of ground water table is anticipated to be at approximately 80' below the existing ground surface based upon information from the Mojave Water Agency website.

GEOLOGIC HAZARD ASSESSMENT

Based on the results of our investigation and a review of selected geologic references, the following potentially hazardous phenomena have been primarily assessed:

SEISMIC HAZARD ASSESSMENT

The site is located in Southern California, thus within a seismically active region. The San Andreas Fault extends approximately 21.5 miles (34.5-Km) southwest of the site, the Helendale Fault Zone is approximately 10 miles (16-km) northeast of the site, the Cleghorn Fault is approximately 19 miles (32-Km) southeast of the site, and the North Frontal Fault Zone is approximately 12 miles (19-km) southeast of the site. All of the faults are considered active. The San Andreas Fault and Helendale Fault are classified as right lateral strike-slip. The North Frontal Fault Zone is classified as a thrust fault. These faults were active within the Quaternary time and possibly the Holocene time.

Based on the available seismic data, the maximum credible earthquake along the San Andreas Fault has a magnitude of Richter M = 8.0. A seismic event of this magnitude could generate peak bedrock accelerations in the order of 0.58 g and a repeatable high ground acceleration of 65% of this value (0.38 g). The maximum probable earthquake, however, is considered to be Richter magnitude M = 7.5. This could produce peak bedrock acceleration under the site in the range of 0.19 g and a duration of strong shaking of 24+ seconds. The maximum probable magnitude earthquake for the North Frontal Fault Zone is thought to be 6.0 to 7.0. The

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

maximum probable magnitude earthquake for the Helendale Fault Zone is thought to be 6.5 to 7.5.

Using data from Sieh (1978) relating to the recurrence intervals of major seismic events on the San Andreas Fault every 100 - 200 years, as that of 1857, the occurrence of an earthquake in this area within the estimated lifetime of any new construction is considered very likely.

Liquefaction:

Liquefaction is the loss of soil strength as a result of an increase in pore water pressure due to dynamic earthquake loading. Conditions for liquefaction to occur generally include relatively high water table (within 40 feet of the ground surface), low relative densities of the saturated soils, and a susceptibility of the soil to liquefy based on grain size. Since our research indicates that the groundwater is at greater depth than 40', the soil sequence is predominantly in a medium dense state, hence the potential for on-site liquefaction is considered negligible.

Seismically Related Flooding:

Another seismically related hazard is earthquake induced flooding and includes tsunamis, seiches and reservoir failure. Due to the inland location of the site, hazards due to tsunamis are considered unlikely. Since there are no large water storage basins or tanks located at the immediate upslope from the project, the potential for damage from earthquake induced flooding or seiches is considered unlikely.

Soil Profile and Seismic Zone Coefficients

Based on our findings and the requirements of Chapter 16 of the 2016 California Building Code, we have determined the following soil profile and seismic zone coefficients for this site:

Latitude - 34.5626° N
Longitude - 117.3154° W
Occupancy Category - II (Table 1604.5, Pg 7, 2016 CBC)

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

Seismic Importance Factor (I) - 1.0 (Tbl 1.5-1, ASCE 7-16)
Spectral Response Accelerations - S_S - 1.371, S_1 - 0.541
Site Classification - D (Tbl 20.3-1, Pg 204, ASCE 7-16)
Spectral Response Coefficients - S_{DS} - 0.914, S_{D1} - 0.541
Seismic Design Category - D (Tbl 11.6-2, Pg 85, ASCE 7-16)
Response Modification Factor (R)- 6.5 (Tbl 12.2-1 ASCE 7-16)
Seismic Response Coefficient - $C_S = S_{DS}/(R/I)$ = 0.14 (12.8-2 ASCE 7-16, Pg 101)

Altec Engineering, Inc.
19531 Highway 18
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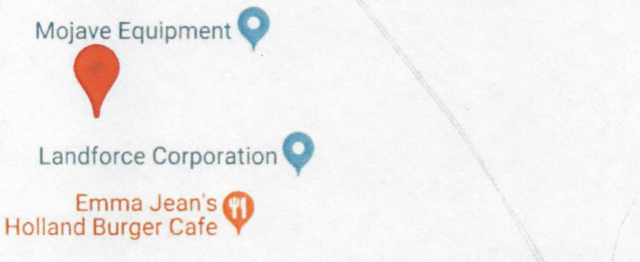
(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

OSHPD

Latitude, Longitude: 34.5626, -117.3154



Date	9/27/2019, 3:39:28 PM
Design Code Reference Document	ASCE7-10
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	1.371	MCE_R ground motion. (for 0.2 second period)
S_1	0.541	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.371	Site-modified spectral acceleration value
S_{M1}	0.811	Site-modified spectral acceleration value
S_{DS}	0.914	Numeric seismic design value at 0.2 second SA
S_{D1}	0.541	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	0.488	MCE_G peak ground acceleration
F_{PGA}	1.012	Site amplification factor at PGA
PGA_M	0.494	Site modified peak ground acceleration
T_L	12	Long-period transition period in seconds
SsRT	1.371	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.257	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.541	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.502	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.5	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	1.09	Mapped value of the risk coefficient at short periods
C_{R1}	1.077	Mapped value of the risk coefficient at a period of 1 s

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the various aspects of this soils investigation and a review of the site plan, our conclusions and recommendations are presented hereinafter. These findings and conclusions were prepared in accordance with the contemporary principles and practices.

1. Site Preparation

1.1 Prior to site grading, any existing stumps, roots, foundations, pavements, septic tanks, and wells shall be removed from the proposed building and paving areas. The top surface shall be stripped of all organic growth, non-complying non-native fill, and along with other debris, be removed to an area outside of the proposed grading.

1.2 Depressions resulting from removals, under item 1 above should have debris and loose soils removed and be backfilled with suitable soil placed as specified in the foregoing items.

1.3 The existing natural soils are not in satisfactory compacted condition and will need to be compacted prior to construction. All proposed structure areas of the site should rest upon minimum 18" properly re-compacted material.

a) Soils beneath the proposed building areas, including a distance of at least five feet (5') beyond the building perimeters, should be subexcavated a minimum of eighteen inches (18") below the bottom of the footings. Local variation in soil condition may warrant increasing the depth of overexcavation and recompaction and will have a final determination at the time of rough grading of the site. If different conditions are encountered, our office should be contacted to make any necessary modifications.

b) The bottom of all subexcavations should be scarified an additional 6 inches (for a total depth below the

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

footings of 24") and brought to at least 90% of optimum moisture content and compacted to a relative compaction of at least 90% (ASTM D-698).

c) The on-site soils should provide adequate quality fill materials provided they are free from organic matter and other deleterious materials. Unless approved by the engineer, rock or similar irreducible material with a maximum dimension greater than twelve inches (12") shall not be incorporated in fill. When caliche lenses are encountered, they should be either excluded from usage in fill or intermixed with granular soils before placement in the fill.

d) Fill of suitable material should be spread in lifts of six to eight (6" - 8") inches thick, each lift brought to 90% of optimum moisture content and compacted to a relative compaction of at least 90% (ASTM D-698). Compaction tests are to be performed for every 12" of fill.

e) Due to the variation in silt and/or clay content, the soils may be moisture sensitive, and susceptible to pumping during compaction operations. Close monitoring of the soil's moisture content and the proper choice of compaction equipment could reduce the possibility for creating unstable "pumping" soils.

f) Where pumping or unstable subgrade conditions are encountered the soil should be removed or scarified and allowed to dry sufficiently to a depth necessary to achieve a firm stable subgrade. Unstable or pumping subgrade, regardless of relative compaction tests, is considered unacceptable.

g) Import soils used to raise site grades should be equal to or better than on-site soils in strength, expansion and compressibility characteristics. Import soils will not be prequalified by the soil engineer. Acceptance of any import will be given after the material is on the

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

project, either inplace or in stockpiles of adequate quantity to complete the project.

1.4 Shrinkage and Subsidence

a. Reworking the native soils into properly compacted fill causes some volumetric changes. Based on the in-situ densities and testing of the onsite soils and on the estimated average degree of compaction to be achieved during grading. Shrinkage in the native soil could be estimated as following:

From 0.0 - 2.0 Feet Depth ..... Shrinkage of 15 - 20%

These shrinkage factors are based on an average in-place relative compaction between 90-95 percent. Hence, the actual shrinkage to occur during grading will depend on the average degree of relative compaction actually achieved at site.

b. Processing of existing grades and demolition debris removal could result in an additional 0.10 to 0.20 feet subsidence of the underlying soil.

c. The above estimates of both shrinkage and subsidence should not be considered absolute values since they are only intended to allow project planners estimating earthwork quantities. Contingencies should be made for balancing earthwork quantities based on actual shrinkage and subsidence that will take place during grading and for losses due to stripping operations.

1.5 Final site grade should be such that all water is diverted away from structures and not allowed to pond.

1.6 All roof-draining systems for proposed buildings should be designed so that runoff water is diverted away from all structures.

1.7 The Recommended Grading Specifications are included in the

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

general guidelines only and should not be included directly into project specifications without first incorporating the site specific recommendations contained in the body of this report. Chapter 18 of the California Building Code (2016 edition) contains specific considerations for grading and is considered a part of these recommendations.

2. Cut and Fill Slopes

Preliminary data indicates that cut and fill slopes should be constructed no steeper than two (2) horizontal to one (1) vertical. Fill slopes should be overfilled during construction and then cut back to expose fully compacted soil. A suitable alternative would be to compact the slopes during construction and then roll the final slope to provide a dense, erosion-resistant surface.

Cut and fill slopes should adhere to the requirements of Chapter 18 of the California Building Code (2016 edition) including the setback condition. Measures should be taken not to allow sheet flow over graded slopes that are steeper than 5:1. Berms and swales should be provided on top of all slopes.

3. Foundations

3.1 If the site is prepared conformably with the preceding recommendations, the footings for the proposed one-story structures could be 12" (minimum) wide and placed at least twelve inches (12") below the lowest final adjacent grade. Actual footing sizes will be determined by the structural engineer.

3.2 Foundations should be supported by at least eighteen inches (18") of uniform compacted soil. During construction in areas where foundation depths exceed 12", the depth of overexcavation should be increased accordingly.

3.3 Excavations should be free of any loose or unsuitable

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

material or debris prior to placement of concrete.

3.4 If above conditions are satisfied, the structure can be safely founded on:

a) Continuous footings which may be proportioned for the following values:

a.1 Design Values: 1500 psf for dead and sustained life loads. This load may be increased 1/3 for total loads including wind and seismic forces.

a.2 Footings should be a minimum of 12" below the lowest final adjacent soils grade for all structures or as required by the structural engineer.

a.3 To mitigate major cracking in foundations caused by differential settlement, footings should be reinforced with a minimum of two #4 bars, one bottom and one top.

Additional reinforcement may be required by the structural engineer.

b) Isolated Pad Foundations which can be proportioned for the following values:

b.1 Design Values: 1500 psf for dead and sustained live loads. This load may be increased 1/3 for total live loads including wind and seismic forces.

b.2 Footing depth should be at least twelve inches (12") below the lowest adjacent finished soil grade. Actual depth will be dependent on the applicable sections of the C.B.C.

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

b.3 Reinforcement should be as stated earlier or as required by the structural engineer.

4. Lateral Loading

Resistance to lateral loads will be provided by passive earth pressure and basal friction.

For footings bearing against the native soils or compacted fill, passive earth pressure may be considered to be developed at a rate of 150 pounds per square foot per foot of depth. Basal friction may be computed at 0.4 times the normal dead load. Basal friction and passive earth pressure may be combined directly without reduction. Active pressures are to be 45 pounds per square foot per foot of depth for the heel side and 30 pounds per square foot per foot of depth for the toe side.

These values may be increased by 1/3 for wind or seismic loading. The coefficient of friction could be estimated to be 0.25 for soil compacted to 90% of maximum dry density.

Foundation concrete should be poured in neat trenches and the foundation backfill compacted as recommended.

5. Slab-On-Grade

To provide adequate support, all concrete slabs-on-grade should bear on a minimum of twelve (12") inches of compacted soil. The final pad surface should be rolled to provide a smooth, dense surface upon which to place the concrete.

It is also recommended that concrete slab-on-grade be reinforced with at least 6" x 6" / #10 x #10 welded wire fabric or #3 bars at 24" on center both ways.

Slabs to receive moisture-sensitive coverings should be provided with a barrier to vapor moisture. This barrier may consist of an impermeable membrane, such as Visqueen. A layer of sand over the Visqueen will promote uniform setting of the

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

concrete.

6. Excavations

6.1 All excavations should be made in accordance with applicable regulations and ordinances.

Based on our current investigation and the knowledge of the area in general, subsurface caving may be encountered. Hence, there may be a potential for construction problems involving caving.

If subsurface caving is encountered, then lateral bracing or appropriate cut slopes should be provided.

6.2 No surcharge loads should be allowed within a horizontal distance equal to the depth of the excavation as measured from the top of the excavated slope.

7. Expansion

The material encountered showed a negligible expansion potential. Re-enforcement as stated in section 3.4.a.3 should be adequate. Although the material encountered during this investigation is predominately non-expansive, an additional evaluation to be conducted by this firm during rough-grading operations is recommended.

8. Utility Trenches

8.1 Backfill of utilities within road rights-of-way should be placed in strict conformance with the requirements of the governing agency.

8.2 Utility trench backfill within the project boundary should be governed by the provisions of this report relative to minimum compaction standards. In general, service lines extending inside the site may be backfilled with native soils and mechanically compacted to a minimum of 90% of maximum density as determined by

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

the ASTM D 1557 test procedure.

8.3 Backfill operations should be observed and tested by the engineer or their representative to monitor compliance with these recommendations.

9. Pavement Design

R-Value samples were obtained at three locations for the pavement design. Sample #1 was taken onsite at the approximate location of the truck access driveway. Sample #2 was taken from National Trails Highway approximately 250′ south of the north end of the site. Sample #3 was taken from National Trails Highway approximately 300′ north of the south end of the site (drawing #7).

The structural paving section for the onsite truck drive aisle is determined by R-Value testing of the native soils and the recommended Traffic Index (T.I.). Due to the anticipated heavy truck traffic we have assigned a T.I. of 10 for the onsite areas. The results of the R-Value testing indicate an **R-Value of 65** (See attached report summary as Appendix A). Using this information, the following paving section is recommended:

G.E.=0.0032(TI)(100-R)

T.I. - 10
G.E. = 0.0032(10)(100-65) = 1.12

1.12 + 0.20 = 1.32 G.E. Required

T.I.	AC	Class II Base*	Subgrade**	G.E. Provided
10	0.5′(6.0″)	0.5′(6.0″)	12″	1.45

* Compact to 95% minimum
** Compact to 90% minimum

The structural paving section for National Trails Highway is determined by R-Value testing of the native soils and the

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

Traffic Index (T.I.) for the street. Due to the heavy truck traffic we have assigned a T.I. of 12 for National Trails Highway. The results of the R-Value testing indicate an **R-Value of 69** (See attached report summary as Appendix A). Using this information, the following paving section is recommended:

G.E.=0.0032(TI)(100-R)

T.I. - 12
G.E. = 0.0032(12)(100-69) = 1.19

1.19 + 0.20 = 1.39 G.E. Required

T.I.	AC	Class II Base*	Subgrade**	G.E. Provided
12	0.5'(6.0")	0.50'(6.0")	12"	1.45

* Compact to 95% minimum
** Compact to 90% minimum

10. Additional Services

This report was based on the assumption that an adequate program of client consultation, construction monitoring and testing will be performed during the final design and construction phases to check compliance with these recommendations. If this is not done, no final grading certificate will be provided by this office.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

The conclusions and recommendations submitted in this report are based in part upon the data obtained from the two (2) trench. The nature and extent of variations across the site may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report. The log of the exploratory trenches do not provide a guarantee as to the conditions that may exist beneath the entire property. Variations in soil conditions and depth to groundwater

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

may exist beyond the boring locations and may need additional study and recommendation revisions.

In the event that any change in the assumed nature, or design of the proposed project is planned, the conclusion and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report modified or verified in writing.

This report is issued with the understanding that it is the responsibility of the owner or their representative to ensure the information and recommendation contained herein are called to the attention of the architect and engineers for the project and incorporated into the plan, that the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.
This report does not include any environmental review with respect to hazardous or toxic materials in the soil, groundwater, or on the ground surface. Any parts of this report regarding unusual odors, suspicious items or conditions are informational only. Also the lack of these statements does not infer that any potential environmental problems do not exist on the site.

Physical changes to the site caused by grading and/or clearing, changes in governmental regulations, or changes to the proposed structures or development after this report has been completed will require additional review of this report. Updates and/or additional studies may be needed at that time.

ALTEC ENGINEERING CORPORATION

RANDOLPH J. COLEMAN, RCE 36293 EXP 6-30-2020

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

LIMITATIONS

ALTEC Engineering Corporation has performed its services within the limits prescribed by our client, with the usual thoroughness and competence of the engineering profession. ALTEC Engineering Corporation makes no other warranty or representation, either expressed or implied.

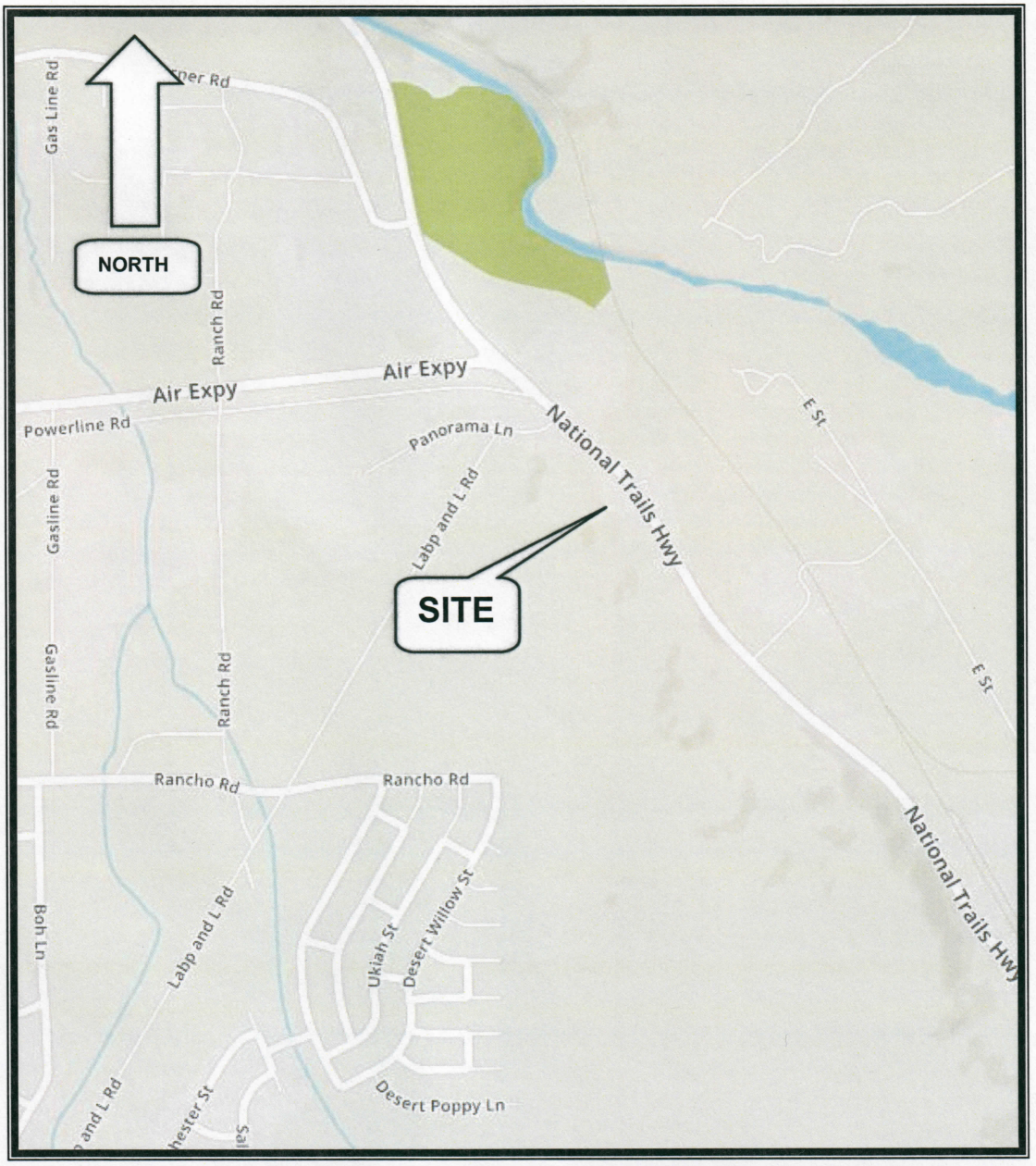
The conclusions and recommendations in this report are based upon data obtained from separate sampling locations and interpolation between them carried out for the project and scope of services described. It is assumed and expected that the conditions between locations are similar to those encountered at individual locations. However, it is possible that conditions between sampling locations may vary. Should conditions be encountered in the field that appear different than those described in this report, we should be contacted immediately in order that we might evaluate their effect.

If this report or portions thereof are provided to contractors or included in specifications, it should be understood by all parties that they are provided for information only, and should be used as such.

The report and its contents resulting from the investigation are not intended or represented to be suitable for reuse on extensions or modifications of the project, or for use on any other project.

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com



LOCATION MAP - WEST SIDE OF NATIONJAL TRAILS HIGHWAY
SOUTH OF AIR EXPRESSWAY - VICTORVILLE
NOT TO SCALE
DRAWING 1

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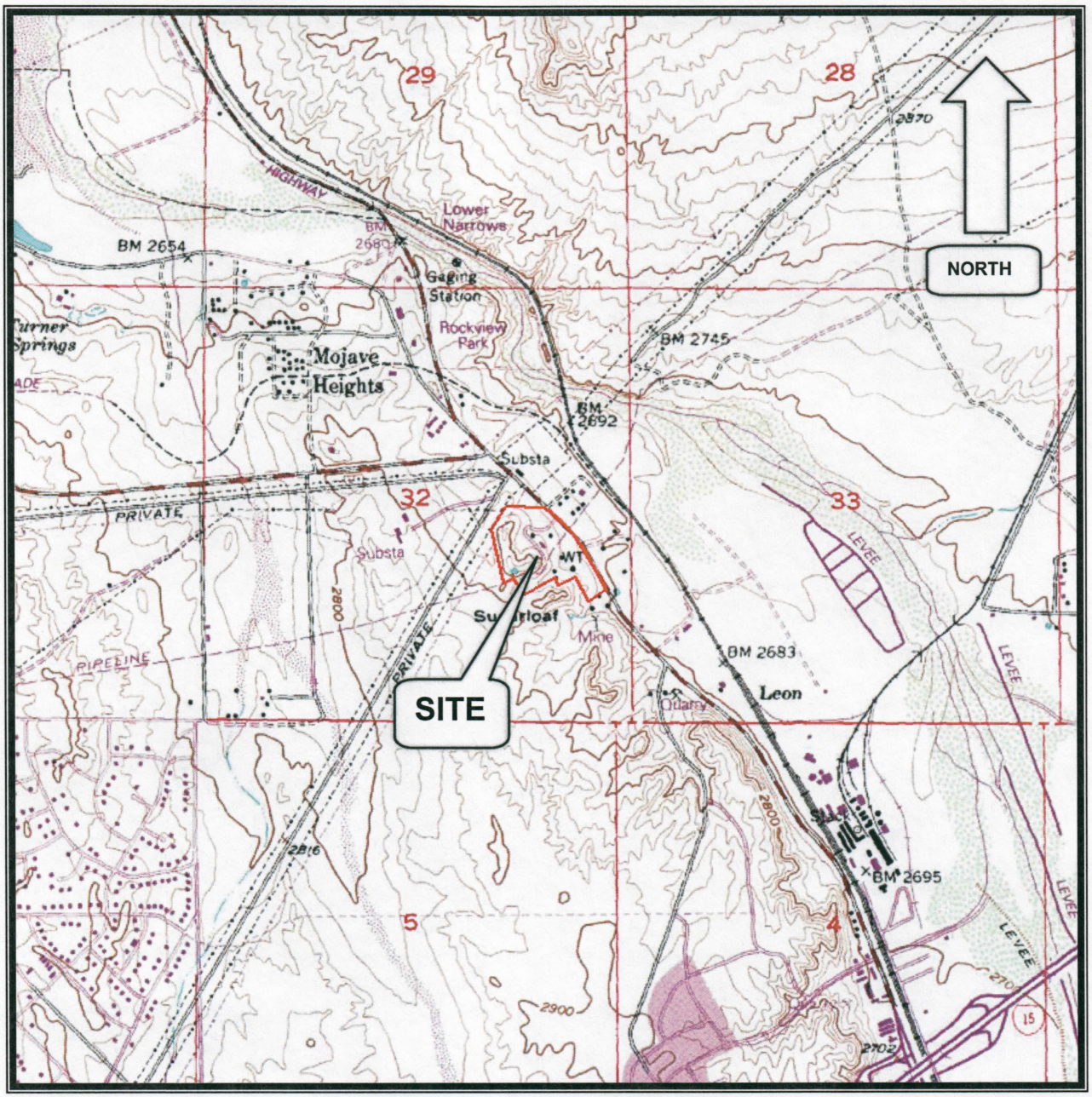
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com



USGS QUAD SHEET
NOT TO SCALE
DRAWING 2

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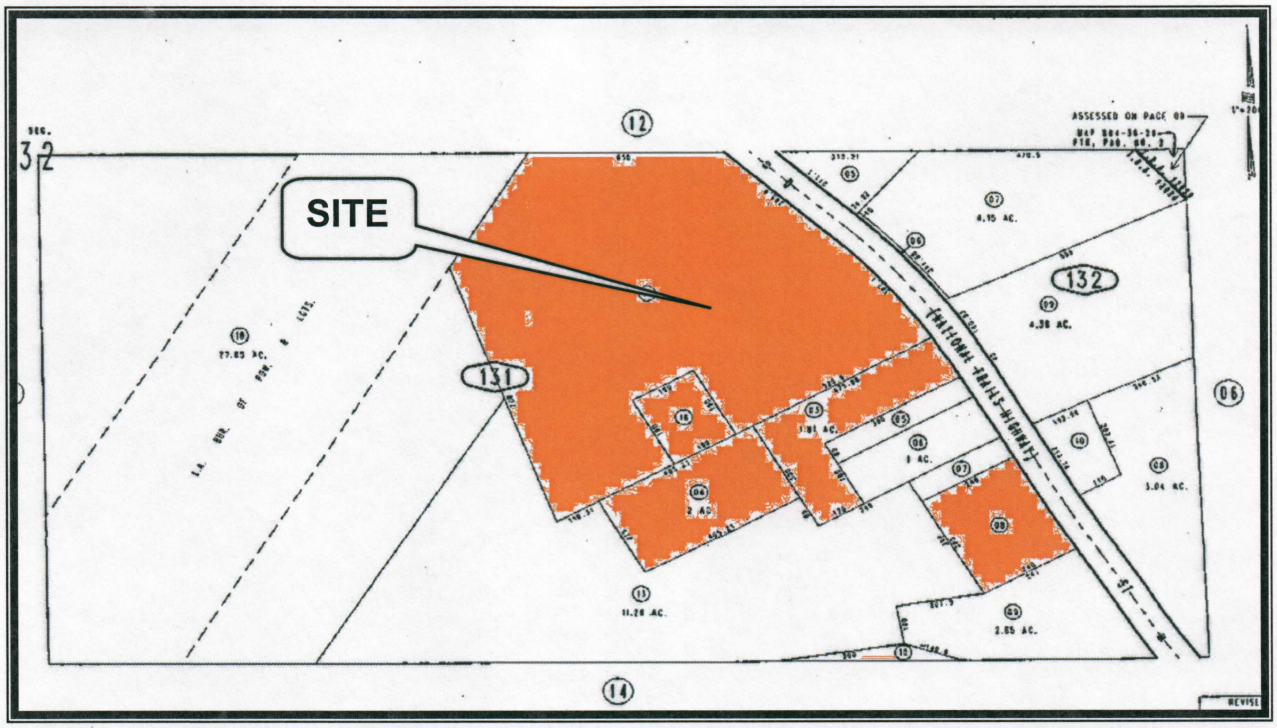
19531 Highway 18
Apple Valley, CA 92307

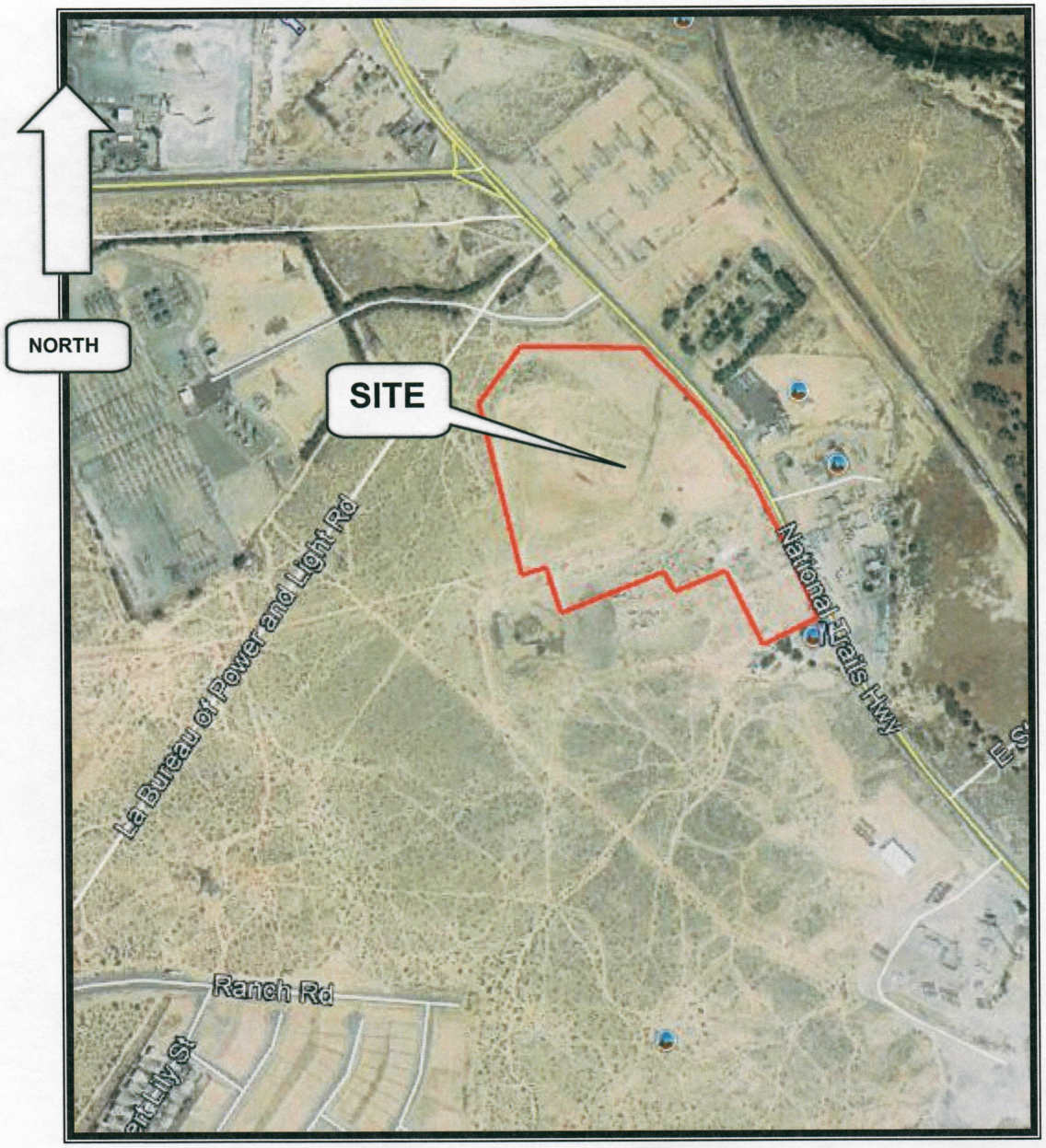
(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com



ASSESSOR'S MAP – APN 0472-131-03,04,08,10,13,16, & 17
NOT TO SCALE
DRAWING 3

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

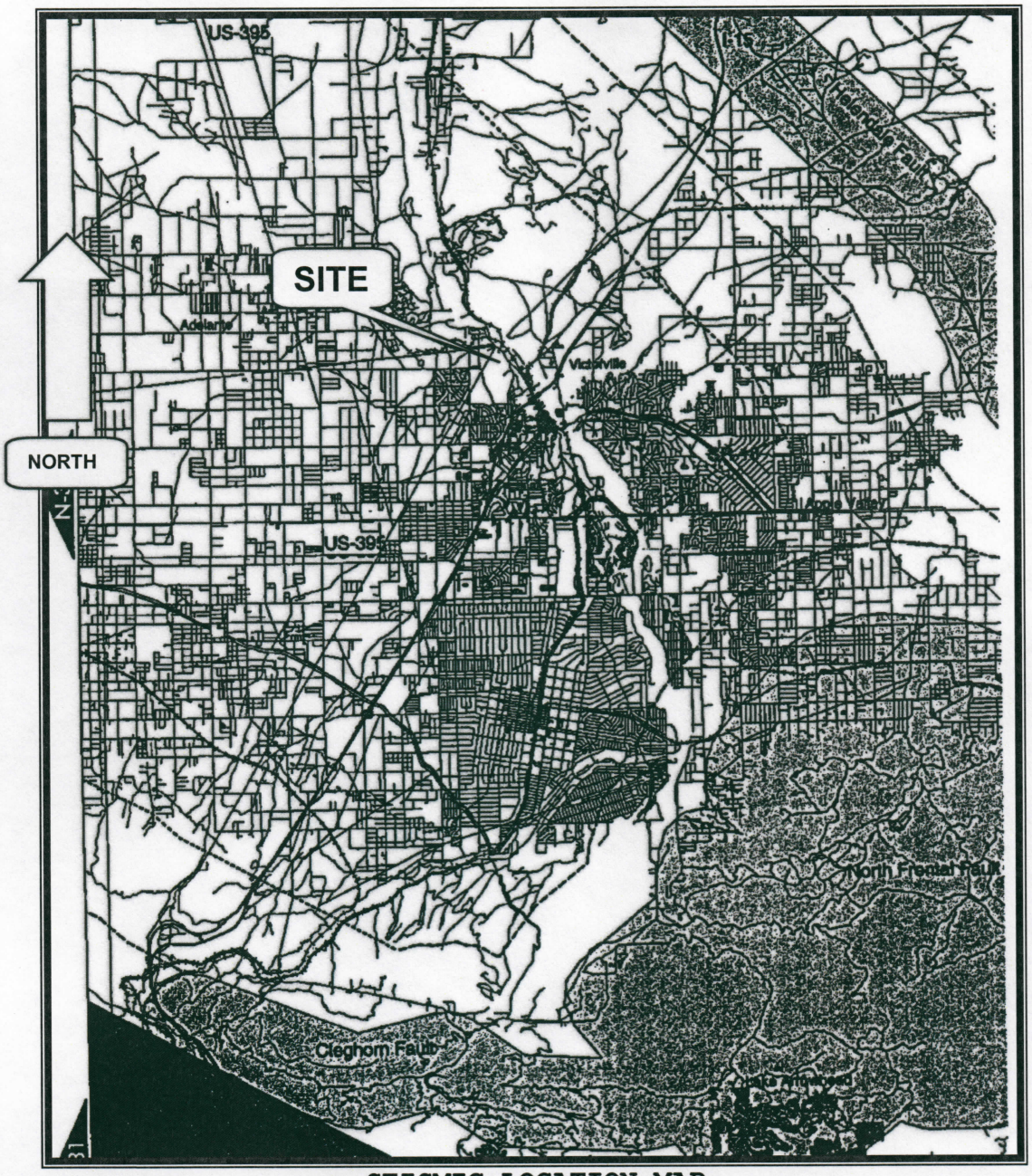
(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com



AERIAL OF SITE - AUGUST 2018
NOT TO SCALE
DRAWING 4

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

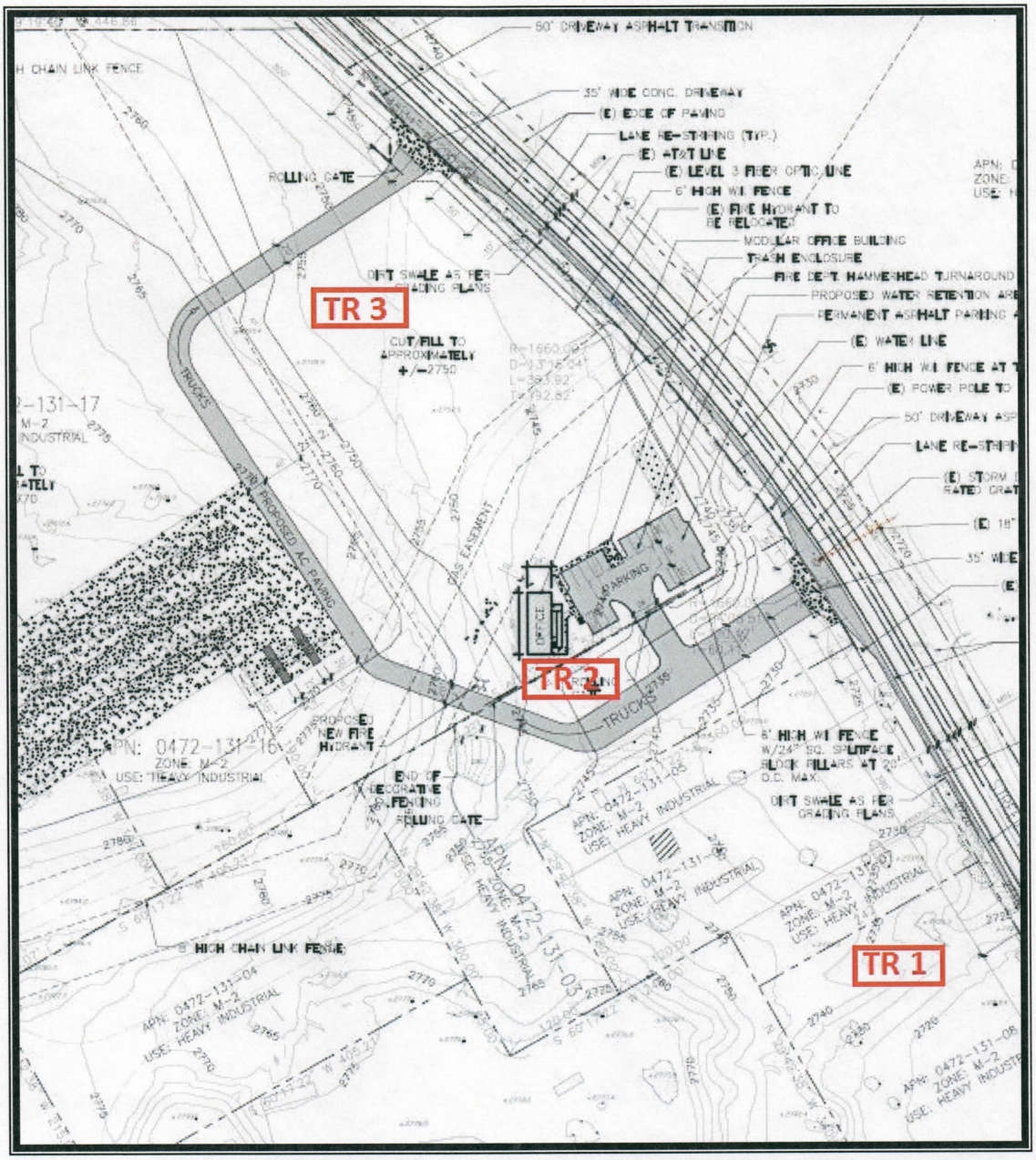
(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com



SEISMIC LOCATION MAP
NOT TO SCALE
DRAWING 5

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

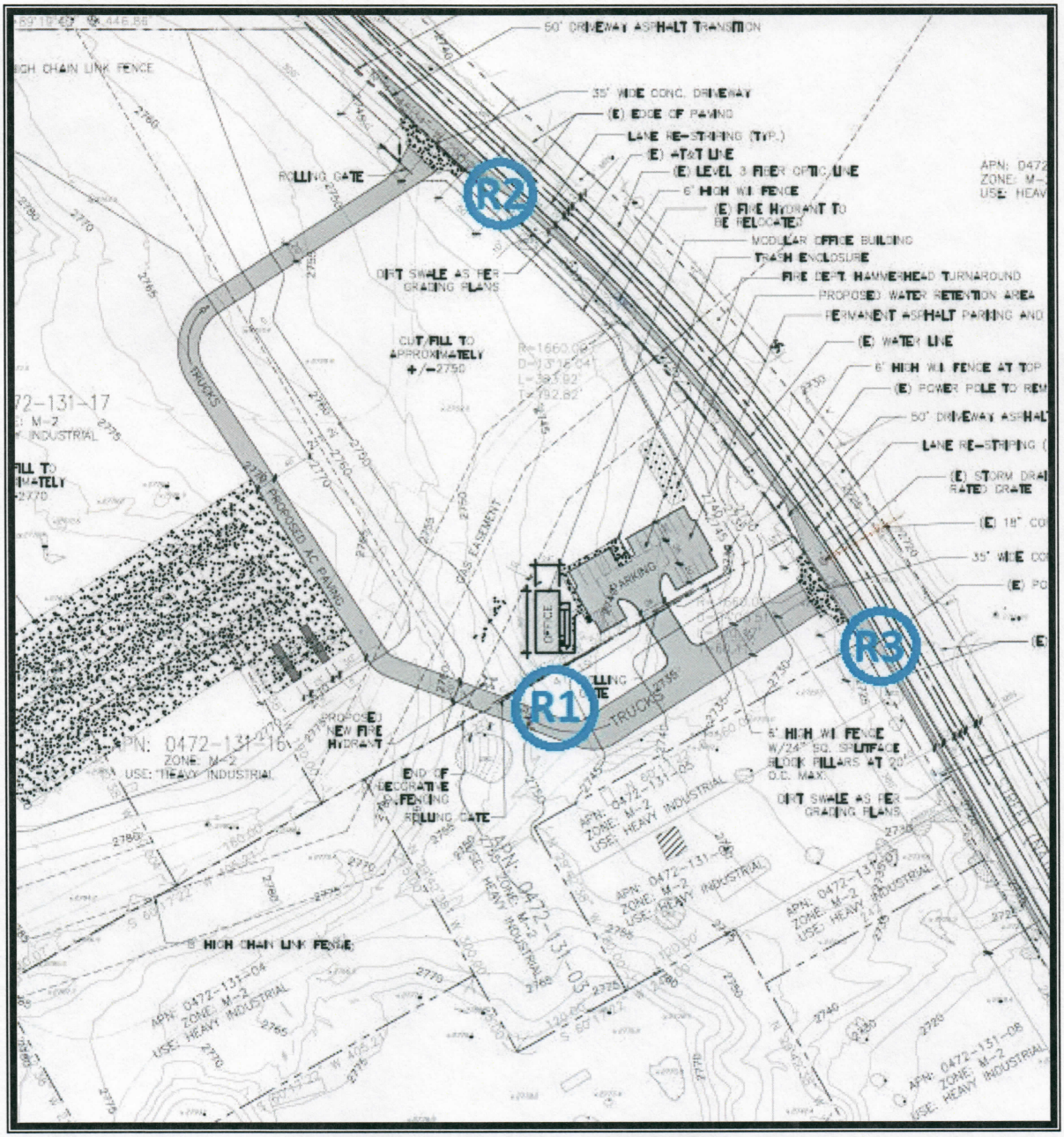
(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com



EXPLORATORY TRENCH LOCATIONS
NOT TO SCALE
DRAWING 6

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com



R-VALUE SAMPLE LOCATIONS
NOT TO SCALE
DRAWING 7

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

TRENCH LOG

TRENCH NO. 1

DEPTH FT	IN PLACE DENSITY (PCF)	MOISTURE (%)	PERCENT COMPACTION	CLASSIF.	
1					Fine Silty Sand, Gray, Dense, Dry to Sl. Damp
2	107.2	2.4	87.2		
3	110.1	2.2	89.5		
4					
5					
6					
7					
8					
9					
10					
11					BOTTOM OF TRENCH
12					NO GROUNDWATER
13					NO VOIDS
14					
15					

DRAWING 8

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

TRENCH LOG

TRENCH NO. 2

DEPTH FT	IN PLACE DENSITY (PCF)	MOISTURE (%)	PERCENT COMPACTION	CLASSIF.	
1	116.8	2.4	89.5		Medium to Fine Silty Sand, Gray, Some Trash, Dry, Medium dense
2	111.7	2.0	90.8		
3					Fine Silty Sand, Gray, Dry Medium Dense
4					
5					
6					
7					
8					
9					
10					
11					BOTTOM OF TRENCH NO GROUNDWATER NO VOIDS
12					
13					
14					
15					

DRAWING 9

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

TRENCH LOG

TRENCH NO. 3

DEPTH FT	IN PLACE DENSITY (PCF)	MOISTURE (%)	PERCENT COMPACTION	CLASSIF.	
1	116.8	2.4	89.5		Medium to Fine Silty Sand, Brown, Dry, Medium Dense
2	111.7	2.0	90.8		
3					Fine Silty Sand, Brown, Dry, Medium Dense
4					
5					
6					
7					Coarse Sand, Gray, Loose to Medium Dense, Some Minor Caving, Dry
8					
9					Thin Lense (±.2′) Highly Cemented Sand, Very Hard
10					
11					
12					BOTTOM OF TRENCH NO GROUNDWATER NO VOIDS
13					
14					
15					

DRAWING 10

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

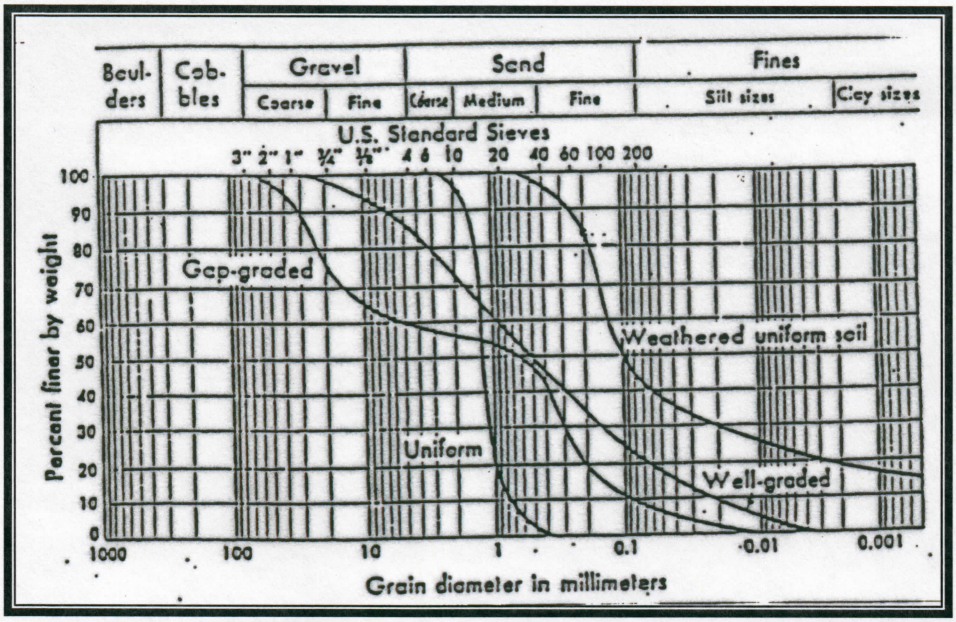
(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

SIEVE ANALYSIS RESULTS

SAMPLE # 1 SAMPLE DEPTH 3.0' BORING/TRENCH # 1

SIEVE #	WEIGHT RETAINED	% RETAINED	% PASSING
4	0.00	0.0	100.0
10	0.00	0.0	100.0
20	0.00	0.0	100.0
40	0.02	1.0	99.0
80	0.19	14.0	86.0
100	0.26	19.0	81.0
200	0.59	44.0	56.0
PAN	1.34	100.0	0.0

TOTAL SAMPLE WEIGHT 1.34 LBS.
PERCENT FINES 56.0%



DRAWING 11

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

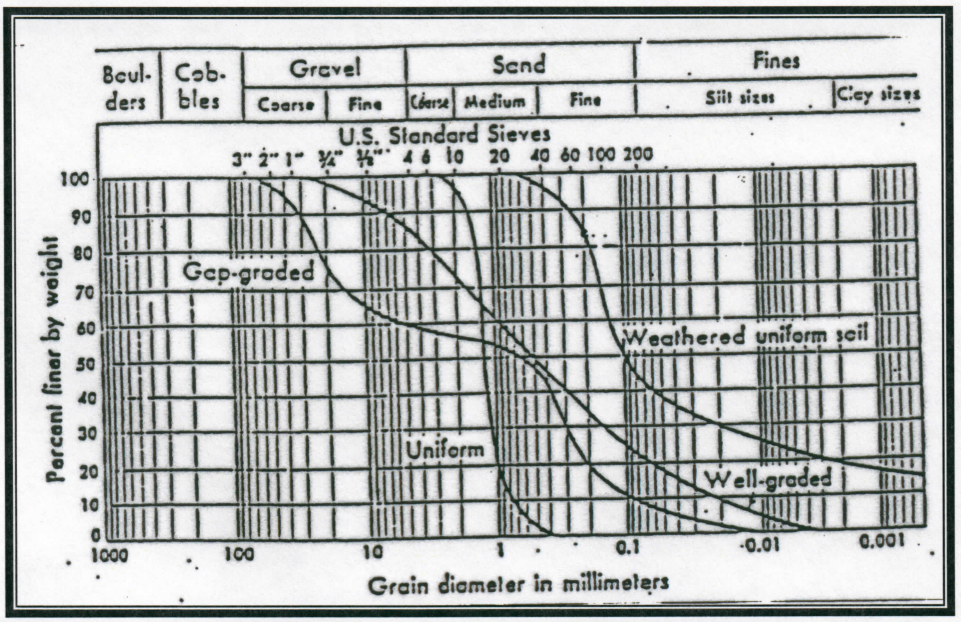
(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

SIEVE ANALYSIS RESULTS

SAMPLE # 2 SAMPLE DEPTH 2.0' BORING/TRENCH # 2

SIEVE #	WEIGHT RETAINED	% RETAINED	% PASSING
4	0.04	3.0	97.0
10	0.22	14.0	86.0
20	0.60	39.0	61.0
40	0.88	58.0	42.0
80	1.23	80.0	20.0
100	1.29	84.0	16.0
200	1.42	93.0	7.0
PAN	1.53	100.0	0.0

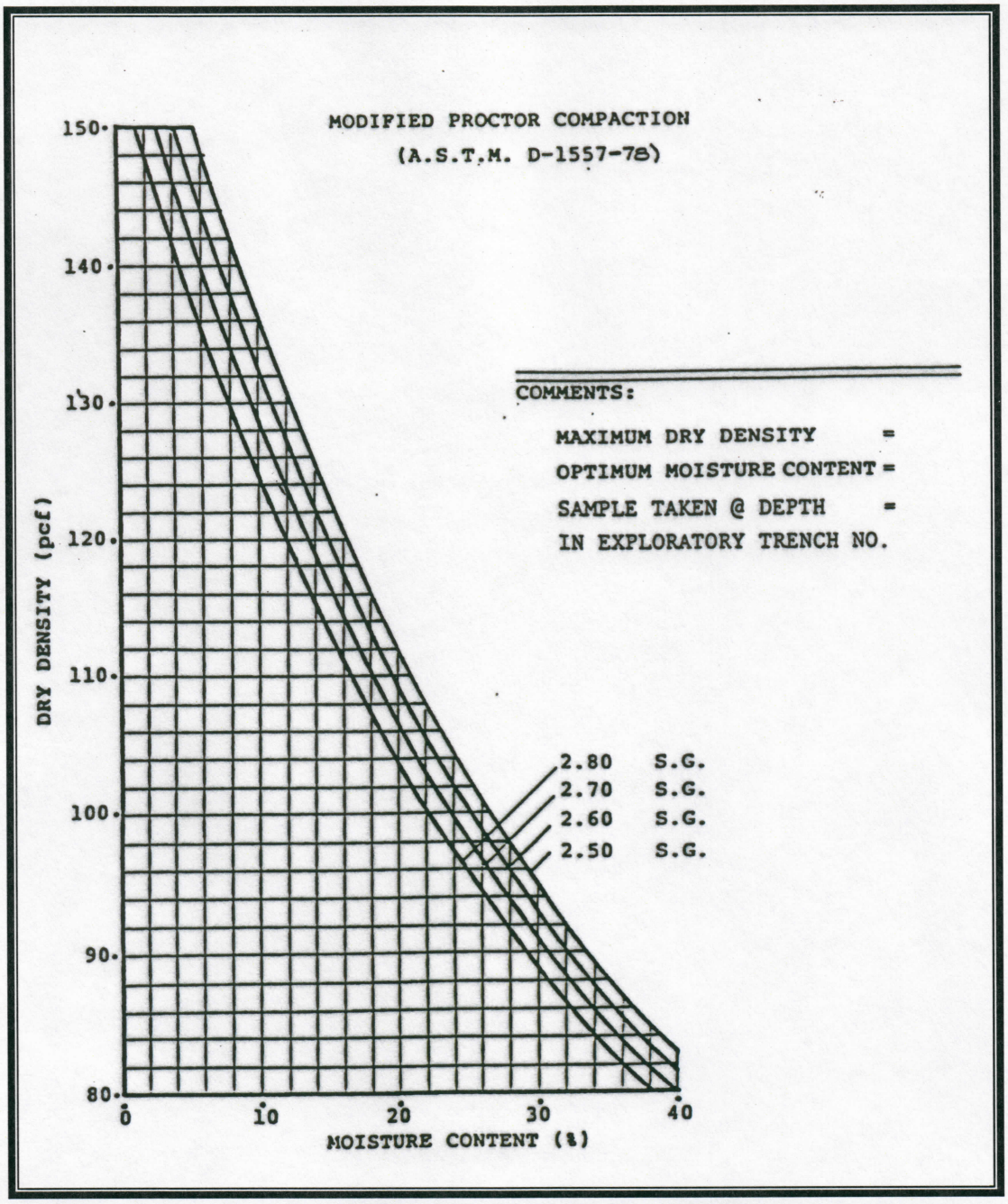
TOTAL SAMPLE WEIGHT 1.53 LBS.
PERCENT FINES 7.0%



DRAWING 12

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com



DRAWING 13

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
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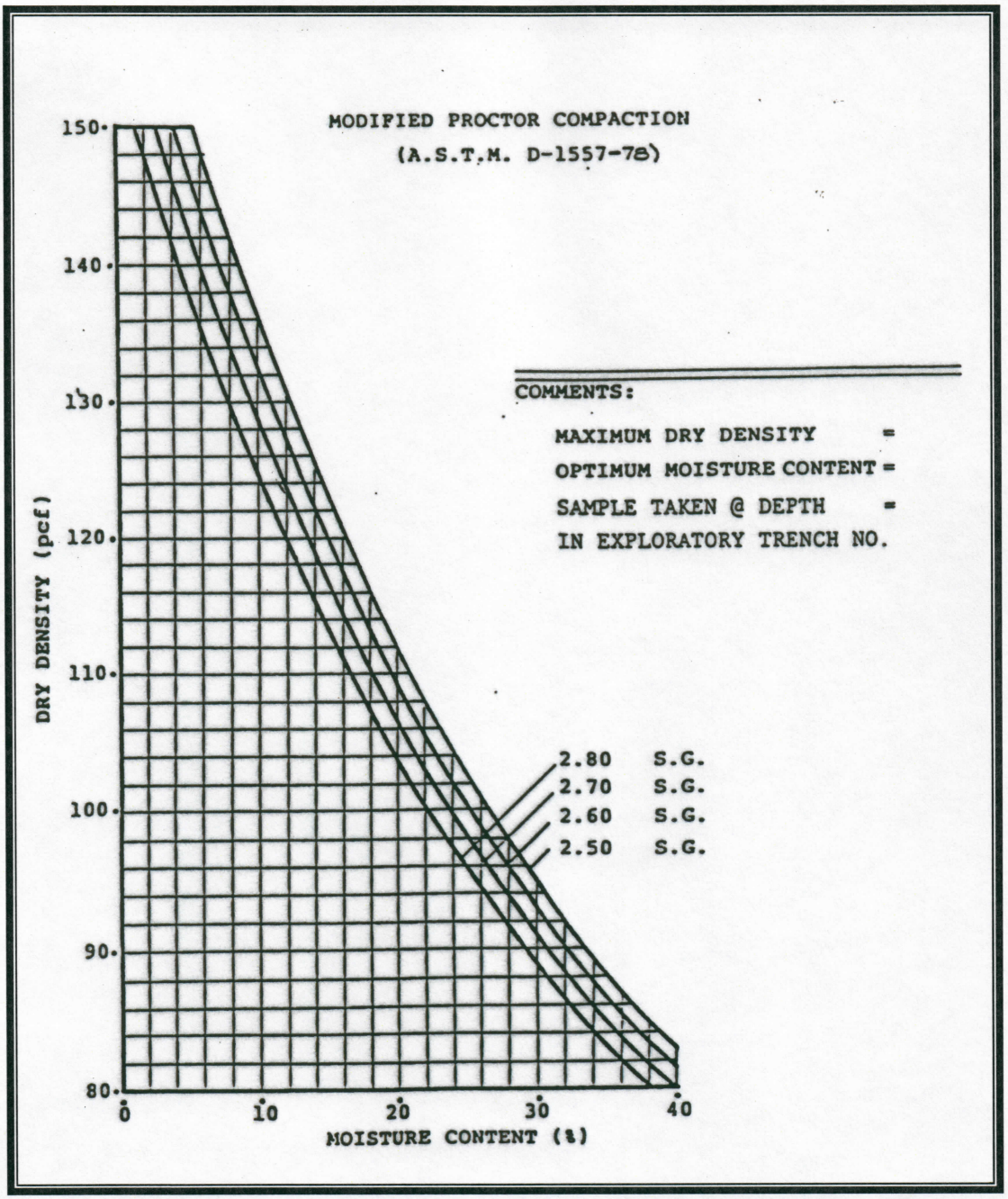


DRAWING 14

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

TEST DATA SUMMARY

LABORATORY STANDARD: ASTM 1557-78; METHOD C; 4-INCH DIAMETER MOLD; 1/30 CUBIC FOOT VOLUME; 5 LAYERS; 25 BLOWS PER LAYER; 10 POUND HAMMER; 18 INCH FALL

TYPE	CLASSIFICATION	OPTIMUM MOISTURE (PERCENT)	MAXIMUM DENSITY (PCF)	PLASTICITY INDEX
1	FINE SILTY SAND, GRAY (SM) (SP)	8.5	130.5	NON-PLASTIC
2	MEDIUM TO FINE SILTY SAND, BROWN (SM) (SW)	7.0	123.0	NON-PLASTIC

DRAWING 15

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%		ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

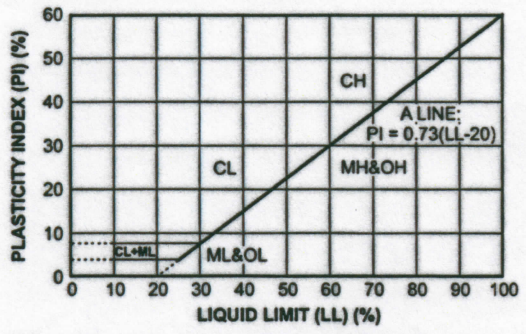
LABORATORY CLASSIFICATION CRITERIA

GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent ..... GW, GP, SW, SP
More than 12 percent ..... GM, GC, SM, SC
5 to 12 percent ..... Borderline cases requiring dual symbols

PLASTICITY CHART



DRAWING 16

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

APPENDIX "A"

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

R-VALUE TEST REPORT

Report Number: CB181360.0007
Service Date: 09/30/19
Report Date: 10/07/19

Terracon
1355 E Cooley Dr, Ste C
Colton, CA 92324-3954
909-824-7311

Client
Altec Engineering
Attn: Randy Coleman
19531 US Highway 18
Apple Valley, CA 92307-2626

Project
Altec Quality Testing
19531 US Hwy 18
Apple Valley, CA

Project Number: CB181360

MATERIAL:	Soil
PROJECT:	National Trails Highway South of Air Expressway, Victorville, CA
LOCATION:	Onsite
DATE RECEIVED:	09-30-2019
DATE TESTED:	10-07-2019
R-VALUE: (CT 301)	65

Services: Provide results of the requested tests performed on a sample from the above project.

Terracon Rep.: Client
Reported To:
Contractor:
Report Distribution:
(1) Altec Engineering, Randy Coleman

Reviewed By: T-R

Thomas Remmel
Laboratory Manager

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

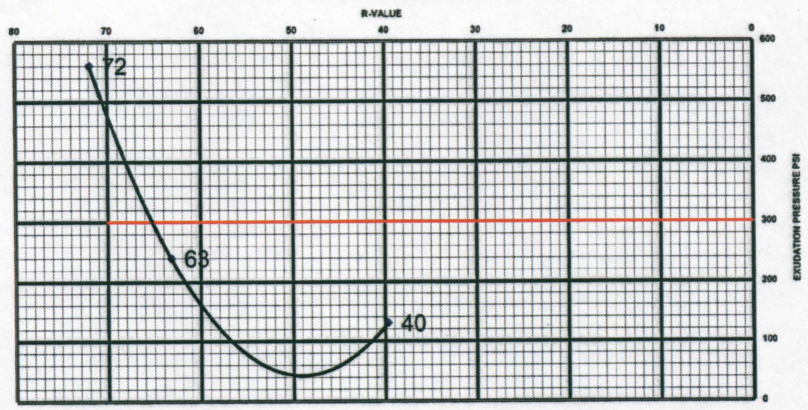
Job No. CB181360
Date. 10/7/2019

LABORATORY RECORD OF TESTS MADE ON BASE, SUBBASE, AND BASEMENT SOILS

CLIENT: Altec Engineering
PROJECT National Trails Highway south of Air Expressway, Victorville, CA
LOCATION: Onsite
R-VALUE # : R.V. #1
T.I. :

	A	B	C	D
COMPACTOR AIR PRESSURE P.S.I.	150	250	350	
INITIAL MOISTURE %	7.9	7.9	7.9	
WATER ADDED, ML	20	10	0	
WATER ADDED %	1.9	0.9	0.0	
MOISTURE AT COMPACTION %	9.8	8.8	7.9	
HEIGHT OF BRIQUETTE	2.54	2.55	2.55	
WET WEIGHT OF BRIQUETTE	1166	1167	1168	
DENSITY LB. PER CU.FT.	126.7	127.4	128.6	
STABILOMETER PH AT 1000 LBS.	35	20	17	
2000 LBS.	64	34	28	
DISPLACEMENT	5.70	5.40	4.60	
R-VALUE	40	63	72	
EXUDATION PRESSURE	130	240	560	
THICK. INDICATED BY STAB.	0.00	0.00	0.00	
EXPANSION PRESSURE	3	16	30	
THICK. INDICATED BY E.P.	0.10	0.53	1.00	

EXUDATION CHART



R-Value: 65

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

R-VALUE TEST REPORT

Report Number: CB181360.0007
Service Date: 09/30/19
Report Date: 10/07/19

Terracon
1355 E Cooley Dr, Ste C
Colton, CA 92324-3954
909-824-7311

Client
Altec Engineering
Attn: Randy Coleman
19531 US Highway 18
Apple Valley, CA 92307-2626

Project
Altec Quality Testing
19531 US Hwy 18
Apple Valley, CA

Project Number: CB181360

MATERIAL:	Soil
PROJECT:	National Trails Highway South of Air Expressway, Victorville, CA
LOCATION:	National Trails Highway 205' South of North Boundary
DATE RECEIVED:	09-30-2019
DATE TESTED:	10-07-2019
R-VALUE: (CT 301)	69

Services: Provide results of the requested tests performed on a sample from the above project.

Terracon Rep.: Client
Reported To:
Contractor:
Report Distribution:
(1) Altec Engineering, Randy Coleman

Reviewed By:
Thomas Remmel
Laboratory Manager

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

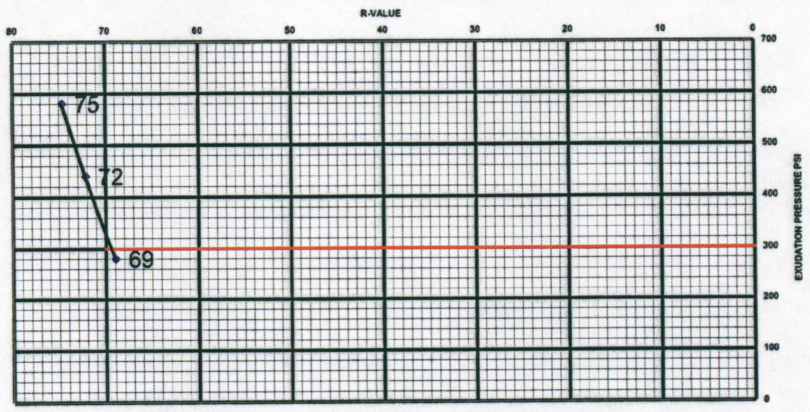
Job No. CB181360
Date. 10/7/2019

LABORATORY RECORD OF TESTS MADE ON BASE, SUBBASE, AND BASEMENT SOILS

CLIENT: Altec Engineering
PROJECT National Trails Highway south of Air Expressway, Victorville, CA
LOCATION: National Trails Highway 250' South of North Boundary
R-VALUE # : R.V. #2
T.I. :

	A	B	C	D
COMPACTOR AIR PRESSURE P.S.I.	350	350	350	
INITIAL MOISTURE %	6.7	6.7	6.7	
WATER ADDED, ML	20	15	10	
WATER ADDED %	1.9	1.4	1.0	
MOISTURE AT COMPACTION %	8.6	8.1	7.7	
HEIGHT OF BRIQUETTE	2.45	2.45	2.45	
WET WEIGHT OF BRIQUETTE	1106	1107	1105	
DENSITY LB. PER CU.FT.	125.9	126.6	126.9	
STABILOMETER PH AT 1000 LBS.	17	16	15	
2000 LBS.	28	25	24	
DISPLACEMENT	5.30	5.20	4.80	
R-VALUE	69	72	75	
EXUDATION PRESSURE	280	440	580	
THICK. INDICATED BY STAB.	0.00	0.00	0.00	
EXPANSION PRESSURE	6	7	8	
THICK. INDICATED BY E.P.	0.20	0.23	0.27	

EXUDATION CHART



R-Value: 69

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

R-VALUE TEST REPORT

Report Number: CB181360.0007
Service Date: 09/30/19
Report Date: 10/07/19

Terracon
1355 E Cooley Dr, Ste C
Colton, CA 92324-3954
909-824-7311

Client
Altec Engineering
Attn: Randy Coleman
19531 US Highway 18
Apple Valley, CA 92307-2626

Project
Altec Quality Testing
19531 US Hwy 18
Apple Valley, CA

Project Number: CB181360

MATERIAL:	Soil
PROJECT:	National Trails Highway South of Air Expressway, Victorville, CA
LOCATION:	National Trails Highway 300' North of South Boundary
DATE RECEIVED:	09-30-2019
DATE TESTED:	10-07-2019
R-VALUE: (CT 301)	69

Services: Provide results of the requested tests performed on a sample from the above project.

Terracon Rep.: Client
Reported To:
Contractor:
Report Distribution:
(1) Altec Engineering, Randy Coleman

Reviewed By: Thomas Remmel
Laboratory Manager

The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

Altec Engineering, Inc.
19531 Highway 18
Apple Valley, CA 92307

(760) 242-9900
Fax (760) 242-9918
Altec1Eng@gmail.com

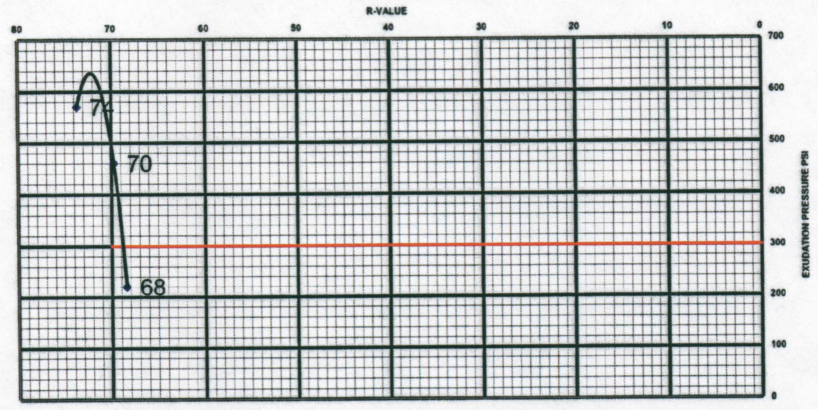
Job No. CB181360
Date. 10/7/2019

LABORATORY RECORD OF TESTS MADE ON BASE, SUBBASE, AND BASEMENT SOILS

CLIENT: Altec Engineering
PROJECT National Trails Highway south of Air Expressway, Victorville, CA
LOCATION: National Trails Highway 300' North of South Boundary
R-VALUE # : R.V. #3
T.I. :

	A	B	C	D
COMPACTOR AIR PRESSURE P.S.I.	350	350	350	
INITIAL MOISTURE %	8.7	8.7	8.7	
WATER ADDED, ML	0	-5	-10	
WATER ADDED %	0.0	-0.5	-0.9	
MOISTURE AT COMPACTION %	8.7	8.2	7.8	
HEIGHT OF BRIQUETTE	2.53	2.52	2.52	
WET WEIGHT OF BRIQUETTE	1147	1146	1145	
DENSITY LB. PER CU.FT.	126.4	127.3	127.8	
STABILOMETER PH AT 1000 LBS.	18	17	15	
2000 LBS.	30	29	26	
DISPLACEMENT	5.00	4.90	4.60	
R-VALUE	68	70	74	
EXUDATION PRESSURE	220	460	570	
THICK. INDICATED BY STAB.	0.00	0.00	0.00	
EXPANSION PRESSURE	5	6	6	
THICK. INDICATED BY E.P.	0.17	0.20	0.20	

EXUDATION CHART



R-Value: 69