APPENDIX 5

GEOTECHNICAL REPORT

SOILS SOUTHWEST, INC.
SOILS, MATERIALS AND ENVIRONMENTAL ENGINEERING CONSULTANTS

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Report of Geotechnical Evaluations

Planned Synagogue
Dovid Oved Retreat Center
3500 Seymour Road
Running Springs, California

Project No. 21007-F
July 7, 2021

Prepared for:

Ms. Kathy Oswalt
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Established 1984

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Attention: Ms. Kathy Oswalt

Subject: Report of Geotechnical Evaluations
Planned Synagogue
Dovid Oved Retreat Center
3500 Seymour Road
Running Springs, California

Reference: A.L.T.A./A.C.S.M. Survey Topo Map supplied by Environmental Hightech Engineering

Gentlemen:

Presented herewith is the Report of Geotechnical Evaluations conducted for the site of the proposed synagogue and retreat complex to be located at 3500 Seymour Road in the community of Running Springs, California. In absence of site-specific project location and development plan review, the opinions and recommendations supplied should be considered "preliminary", subject to revision following development plan review.

Based on test explorations, it is our opinion that the soils encountered primarily consist of upper dry, low-density compressible and hydro-collapsible gravely fine to coarse sands with some silts, rock fragments, and occasional rocks up to about 3 to 4 feet below grade, overlying dense to very dense calcified cemented decomposed bedrock to the maximum refusal 5.5 feet depth explored.

Based on review of the available USGS Department of Conservation, State of California documents, it is understood that the site is not situated within an AP Special Studies Zone, and with historical ground depth in excess of 50 feet, the potential for seismically induced soils liquefaction susceptibility is considered remote.

Based on test explorations, necessary laboratory testing and the engineering evaluations completed at this time, it is our opinion that the site should be considered suitable for the planned development provided the recommendations contained herein are incorporated in design and construction.

This report has been substantiated by subsurface explorations and mathematical analysis made in accordance with the generally accepted engineering principles, including those field and laboratory testing considered necessary in the circumstances.

We offer no other warranty, either express or implied.

Respectfully submitted,
Soils Southwest, Inc.

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1.0 Introduction

Presented herewith is the Report of Geotechnical Evaluations conducted for the site of the proposed Dovid Oved Retreat Center to be located at 3500 Seymour Road within the in the community of Running Springs, California.

The purpose of this evaluation is to determine the nature and engineering properties of the near grade soils, and to provide geotechnical recommendations for foundation design, slab-on-grade, retaining wall, paving, parking, site grading, utility trench excavations and backfill, and inspections during construction.

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

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

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

1.1 Proposed Development

No site topographic and development details are available for review at this time. However, based on the preliminary information supplied, it is understood that the subject development, among others, will primarily include a synagogue worship and retreat center structure of one and two-story construction. Conventional wood-frame and stucco structures with concrete slab-on-grade are expected. Moderate site preparations and grading are anticipated.

1.2 Site Description

The irregular shaped parcel is currently vacant and undeveloped. In general, the site is bounded by Cepu Road on the north, by an easement road and retreat cabin on the south, by a pedestrian pathway and forested property on the east, and by Pine Manor Lane and parking spaces to the west. Sheet flow from incidental rainfall on the nearly level parcel flows towards the west and northwest. With the exception of surface vegetation, mature conifer trees, and scattered utility risers or poles, no other significant features were noted.

2.0 Scope of Services

The geotechnical evaluations included subsurface explorations, soil sampling, necessary laboratory testing, engineering analyses and the preparation of this report. The scope of work included the following tasks:

o **Field Testing**

Two (2) exploratory test excavations using a backhoe advanced to refusal depth of 5.5 feet below the current grade surface. Approximate test excavation locations are shown on the attached Plate 1.

During excavations, the sub-soils encountered were continuously logged, bulk and undisturbed samples were procured at varying depths. Collected samples were subsequently transferred to our laboratory for necessary testing. Description of the soils encountered is shown on the Test Exploration Logs in Appendix A.

o **Laboratory Testing**

Representative samples on selected bulk and undisturbed site soils were tested in the laboratory to aid in the soils classification and to evaluate relevant engineering properties of the existing site soils pertaining to the project requirements. These tests may include some or all of the following tests depending upon site requirements:

- In-situ moisture contents and dry density (ASTM Standard D2216),
- Maximum dry density and optimum moisture content (ASTM Standard D1557),
- Direct Shear (ASTM Standard D3080), and
- Soil consolidation (ASTM Standard D2435),

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

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

o Preparation of this report for initial use by the project design professionals. The recommendations supplied should be considered as 'tentative' and may require revision and/or upgrading following review of the final grading and development plans, when prepared.

3.0 Site Conditions

3.1 Subsurface Conditions

Based on test explorations completed at this time, it is our opinion that the soils encountered primarily consist of near grade dry and low-density compressible and hydro-collapsible gravely fine to coarse sands with some silts, rock fragments and occasional rocks up to about 3 to 4 feet below grade, overlying rippable dense to very dense calcified cemented decomposed granitic material existing within the refusal depth of 5.5 feet explored. No shallow groundwater was encountered.

The soils existing as described being dry, loose, disturbed and somewhat compressible and hydro-collapsible in nature are considered unsuitable for directly supporting structural loadings without excessive differential settlements to footings. However, when re-worked in form of over- excavation and replacement as engineered fills, the prepared structural pad thus prepared, should be considered adequate for structural support for development planned.

Laboratory shear tests conducted on the upper bulk soil samples remolded to 90 percent indicate moderate shear strengths under increased moisture conditions. Results of the laboratory shear tests are provided in Plate B-1 in Appendix B.

Consolidation test conducted on the upper soils remolded to 90% indicate low potential for compressibility under anticipated structural loading. Results of the laboratory determined soils consolidation potentials are shown on Plate B-2 in Appendix B.

3.1.1 Regional Conditions

No historical local water data is available for review. Considering the elevated nature of the site, it is our opinion that historical groundwater levels should be in excess of 50 feet. Presence of shallow-depth dense to very dense cemented decomposed granitic bedrock is expected.

3.2 Excavatability

It is our opinion that subexcavations required for the project may be accomplished using conventional heavy-duty construction equipment. Some difficulty may be expected during deep excavations due to the underlying bedrock described. Use of minor blasting or jackhammering may be warranted.

3.3 Groundwater

Groundwater was not encountered within the refusal depth of 5.5 feet explored. Fluctuations in groundwater levels, however, can occur due to seasonal variations in the amount of rainfall, runoff, altered natural drainage paths, and other factors which were not evident at the time of the field reconnaissance and explorations that were made. It is our opinion that designer and contractor should make their own conclusions regarding groundwater conditions while designing and constructing structural pads.

3.4 Subsurface Variations

Based on the results of subsurface explorations and on past experience, it is our opinion that, variations in the continuity and depth of subsoil deposits, may be expected. Due to the nature and depositional characteristics of the soils underlying, care should be exercised in interpolating or extrapolating of the subsurface soils existing in between and beyond the test explorations.

3.5 Faulting and Seismicity

Based on the information published by the Department of Conservation, State of California, it is understood that the site is not situated within an A-P Special Study Zone, where a fault(s) runs through the site or its adjacent. However, considering the Southern California being in a seismically risky area, it is our opinion that the implementation of the design and construction knowhow as described in the current CBC design procedures should be considered to benefit the development planned as described.

3.6 Direct or Primary Seismic Hazards

Surface ground rupture along with active fault zones and ground shaking represent primary or direct seismic hazards to structures. There are no known active or potentially active faults that pass through or towards the subject site, and the site is not situated within an AP Special Studies Zone. According to the current CBC, the site is considered within Seismic Zone 4. As a result, it is likely that moderate to severe ground shaking may be experienced for the development proposed.

3.7 Induced or Secondary Seismic Hazards

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

3.7.1 Surface Fault Rupture

The site is not situated within an AP Special Studies Zone. Based on review of the available information, it is our opinion that no major fault is noted to cross through or extends towards the site. The potential for surface rupture resulting from nearby fault movement is not known for certainty but is considered "low".

3.7.1 Flooding

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

3.7.2 Land Sliding

Considering the subject site being near level with developed surroundings, potential for seismically induced land sliding is considered "remote".

3.7.3 Lateral Spreading

Structures or facilities proposed are expected to withstand predicted ground softening and/or predicted vertical and lateral ground spreading/displacements, to *an acceptable level of risk*. Seismically induced lateral spreading involves lateral movement of soils due to ground shaking.

With the current site topography, it is our opinion that the potential for seismically induced lateral ground spreading should be considered "remote".

3.7.4 Settlement and Subsidence

Based on subsequent laboratory analyses conducted on undisturbed samples procured at this time, it is our opinion that the near surface soils existing at their present state should be considered relatively compressible, hydro-collapsible, and susceptible to subsidence.

3.7.5 Liquefaction

Liquefaction is caused by buildup of excess hydrostatic pressure in saturated cohesionless soils due to cyclic stress generated by ground shaking during an earthquake. The significant factors on which liquefaction potential of a soil deposit depends, among others include, soil type, relative soil density, intensity of earthquake, duration of ground shaking, and depth of ground water, among others.

Considering the reported proximity of earthquake fault and the presence of shallow depth dense to very dense cemented decomposed granitic materials, it is our opinion that the site should be considered non-susceptible to soils liquefaction in event of a strong motion earthquake.

3.8 Seismic Design Coefficients

Using s Site Coordinates of 34.190313°N, -117.097509W and considering the site being situated at about 5.45 miles from the South San Andreas Fault. For foundation and structural design, the following seismic parameters are suggested based on the current 2019 CBC.

Recommended values are based upon the USGS ASCE 7-16 Hazard Reports Parameters and the California Geologic Survey: PSHA Ground Motion Interpolator Supplemental seismic parameters are provided in Appendix C of this report. The following presents the seismic design parameters as based on the available publications as currently published by the California Geological Survey and 2019 CBC.

TABLE 3.8.1 Seismic Design Parameters

CBC Chapter 16	2019 ASCE 7-16 Standard Seismic Design Parameters	Recommended Values
1613A.5.2	Site Class	D
1613.5.1	The mapped spectral accelerations at short period	S_s
1613.5.1	The mapped spectral accelerations at 1.0-second period	S_1
1613A5.3(1)	Seismic Coefficient, S_s	1.601 g
1613A5.3(2)	Seismic Coefficient, S_1	0.658 g
1613A5.3(1)	Site Class D / Seismic Coefficient, F_a	1.000 g
1613A5.3(2)	Site Class D / Seismic Coefficient, F_v	Not available
16A-37 Equation	Spectral Response Accelerations, $S_{Ms} = F_a S_s$	1.601 g
16A-38 Equation	Spectral Response Accelerations, $S_{M1} = F_v S_1$	Not available
16A-39 Equation	Design Spectral Response Accelerations, $S_{Ds} = 2/3 \times S_{Ms}$	1.068 g
16A-40 Equation	Design Spectral Response Accelerations, $S_{D1} = 2/3 \times S_{Ms}$	Not available

TABLE 3.8.2 Seismic Source Type

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

Seismic Source Type / Appendix C	
Nearest Maximum Fault Magnitude	M>\=8.0
Peak Horizontal Ground Acceleration	0.557g

In design, vertical acceleration may be assumed to about 1/3 to 2/3 of the estimated horizontal ground acceleration described.

It should be noted that lateral force requirement in design by structural engineer should be intended to resist total structural collapse during an earthquake. During lifetime use of the structure built, it is our opinion that some structural damage may be anticipated requiring minor structural repairs.

It is recommended that the described seismic design parameters should be incorporated in structural design and construction as deemed necessary by the project structural engineers.

4.0 Evaluations and Recommendations

4.1 General Evaluations

No development plans are available for review, accordingly the opinions and recommendations supplied should be "preliminary". The conclusions contained herein are based on surface and subsurface explorations as conducted at the test locations as described. Although no significant variations in soil conditions are anticipated, in the event subgrades exposed during construction are found different from those as described in this report, it will be the subcontractor's responsibility to notify Soils Southwest for revised and updated recommendations.

While caving was not encountered, it is possible that a trench, exploratory boring, or excavation may react in an entirely different manner. All shoring and bracing, if required, shall be in accordance with the current requirements of the State of California Division of Industrial Safety and other public agencies having jurisdiction.

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

(i) Moderate site clearance should be expected, including, but not be limited to, tree removal, roots, stumps, buried irrigation systems, surface debris, and others.

(ii) From geotechnical viewpoint, the site is considered grossly stable for the proposed development.

(iii) Because of the near surface compressible soils existing as described, conventional grading should be in form of sub-excavations, scarification and moisturization, followed by their replacement as engineered fills compacted to higher density. In event new fill soils are required over the grades existing, such should be placed following subgrade preparations as described. No footings and/or new fills should be placed directly bearing on the compressible surface soils currently existing.

(iv) The sub-excavation depths described should be considered as 'minimum'. During grading localized deeper sub-excavations may be required following removal buried debris, irrigation pipes etc. It will be the responsibility of the grading contractor to inform soils engineer the presence of such when exposed.

(v) In order to minimize potential excessive differential settlements, it is recommended that structural footings should be established exclusively into engineered fills of local sandy soils or its equivalent or better, compacted to minimum 90% of the soils Maximum Dry Density at near Optimum Moisture conditions. Construction of footings and slabs straddling over cut/fill transition should be avoided.

(vi) Structural design considerations should also include probability for "moderate to high" peak ground acceleration from relatively active nearby earthquake faults. The effects of ground shaking, however, can be minimized by implementation of the seismic design requirements and the procedures as outlined in the current CBC, and as described earlier in this report.

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

(viii) It is our opinion that, if site preparations and grading are performed as per the generally accepted construction practices, the proposed development will not adversely affect the stability of the site, or the properties adjacent.

4.1.1 Recommendations for Site Preparations

In absence of grading plan review, the planned structural pad grades are assumed at/or near the existing street grades. For adequate structural support, it is our opinion that moderate site preparations and grading should be included in form of sub-excavations of the near grade dry and compressible soils and their replacement as engineered fills compacted to minimum 90%.

In general, site preparations and grading should include sub-excavations of the near surface soils to about (i) 4 feet below the current grade surface, or (ii) to the depth as required to expose the underlying moist and dense natural soils, or (iii) to the depth as required to maintain an 18" thick compacted fill mat blanket below foundation bottoms, whichever is greater. Unless otherwise required by the local agency, the site preparations and grading described should encompass, in minimum, the individual structural foot-print areas and minimum 5 feet beyond. No cut and fill transitional conditions should be allowed.

During grading, the engineered fills placed should be compacted to near Optimum Moisture and with minimum 90% compaction of soil's Maximum Dry Density as determined by the ASTM D1557 test method.

The sub-excavation depths described should be considered as "preliminary". Localized additional sub-excavations may be required within areas underlain by undocumented old fills, buried utilities and abandoned sewer and/or buried septic systems. It is recommended that the excavated subgrades should be verified and approved by soils engineer prior to structural fill soil placement. Supplemental recommendations may be warranted following detailed development plans review.

General Earthwork recommendations are enclosed in Section 5 of this report.

4.2 Structural Fills

4.2.1 Structural Fill Material

Local soils free of debris, organic, roots, debris, and rocks larger than 6-inch in diameter may be considered suitable for re-use as structural backfill. Although no significant variations in soil conditions are anticipated, once exposed actual soils conditions may vary. In the event subgrades exposed during construction are found different from those as described in this report, it will be the subcontractor's responsibility to notify Soils Southwest about such variations for revised/updated recommendations. During grading, partially cemented silty sands in lumps when exposed should be thoroughly broken to small pieces prior to their incorporation as structural fills.

Structural backfills placed should be compacted to minimum 90% of the soil Maximum Dry Density as determined by the ASTM D1557 test method. Import soils, if required, should be gravelly sandy non-expansive in nature similar to the local soils as described or its better as approved by soils engineer. In general, fill soils for structural support should meet the following criteria:

Liquid Limit	<35
Plasticity Index	<15
Expansion Index	<20

4.2.2 Structural Fill Soils Placement

Structural fills shall be placed in 6- to 8-inch-thick loose lifts with near Optimum Moisture conditions. Each lift should be compacted to minimum 90 percent as described. No fill shall be placed, spread, or compacted in absence of soils engineer or a representative of this geotechnical consultant.

4.3 Structural Foundations

The proposed structures may be supported by continuous wall and/or isolated spread footings founded exclusively into engineered fills of local soils, or its similar imported fills approved by soils engineer compacted to minimum 90%.

Under static loading conditions, with a Factor of Safety of 3.0, load bearing foundations may be designed based on an allowable soil vertical bearing capacity of 2500 psf. Use of conventional spread footings are suggested sized to minimum 15" wide, embedded to minimum 18" below the lowest adjacent final grades. Actual foundation dimensions, however, should be determined by the project structural engineer based on anticipated structural loading, the soil vertical bearing capacity described, and on the soil's active pressures lateral passive resistance, and the described PGA, among others. Structural design should conform to the current CBC Seismic Design requirements as described earlier. Supplemental foundation design may be warranted following detailed development plan review.

If normal code requirements are applied, the above capacities may further be increased by an additional 1/3 for short duration of loading which includes the effect of wind and seismic forces. Supplemental 500 psf increment in foundation bearing capacity may be considered for each one-foot increment in footing embedment up to a total not exceeding 3000 psf.

From geotechnical viewpoint, footing reinforcements consisting of 2-#4 rebar placed near the top and 2-#4 near bottom of continuous footings are suggested. Additional reinforcements if specified by project structural engineer, should be incorporated in construction.

The settlements of properly designed and constructed foundations supported exclusively into engineered fills of site soils or its equivalent or better and carrying the maximum anticipated structural loadings of 40 kips and 4 klf for isolated pier and continuous wall foundations as described earlier are expected to be within tolerable limits. Under static loading conditions, over a span of 40 ft, estimated total and differential settlements are about 1 and 1/2-inch, respectively.

Should the project structural engineer determine that more stringent design criteria are required, those criteria should supersede the design parameters supplied herein.

4.4 Concrete Slab-on-Grade for Conventional Use

The subgrades compacted to minimum 90% prepared to receive footings should be considered adequate for concrete slab-on-grade placement for synagogue worship center proposed. For normal loading conditions use of 4"- thick (net) concrete slab-on-grade may be considered, reinforced as recommended by structural engineer, underlain by 2-inch thick of compacted clean sand, followed by 10-mil thick commercially available vapor barrier, such as Stego-Wrap or its equivalent, or better, overlying additional 2-inch of clean sand. The installations of vapor barrier should be as per manufacturer's specifications. The gravelly sands described should have a Sand Equivalent, SE of 30 or greater. Use of thicker concrete slab is suggested for during construction for use of temporary heavy construction equipment loading and construction material storage.

4.4.1 Concrete Curing and Crack Control

The recommendations presented in this report are intended to reduce the potential for cracking of concrete slabs-on-grade due to concrete curing or settlement. However, even when the following recommendations have been implemented; foundations, stucco walls and concrete slabs-on-grade may display some minor cracking due to minor soil movement and/or concrete shrinkage.

To reduce and/or control of excessive potential for concrete shrinkage, curling or cracking, concrete slabs shall be "cured" using approved commercially available shrinkage controlling agent as suggested by the project design engineer. In general, use of adequate construction and expansion joints are suggested at intervals not exceeding 24 to 30 times the slab thickness. Actual intervals should be as required by the project structural engineer. Shorter distance between joint spacings would provide greater crack control. Joints at curves and angle points are suggested, as recommended by structural engineer.

The occurrence of concrete cracking may also be reduced and/or controlled by limiting concrete and by proper concrete placement, curing and by using crack control joints at reasonable intervals, in particular, where re-entrant slab corners occur.

4.5 Resistance to Lateral Loads

Resistance to lateral loads can be restrained by friction acting at the base of foundation and by passive earth pressure. A coefficient of friction of 0.30 may be assumed with normal dead load forces for footing established on compacted fills.

An allowable passive lateral earth resistance of 230 pounds per square foot per foot of depth may be assumed for the sides of foundations poured against compacted fills of local soils or its similar. The maximum lateral passive earth pressure is recommended not to exceed 2300 pounds.

For design, lateral pressures from local soils when used as level backfill may be estimated from the following equivalent fluid density:

Active:	35 pcf
At Rest:	80 pcf

The above values may be increased by 1/3 when designing for short duration wind or seismic forces. The above values are based on footings placed on compacted engineered fills. In the case where footing sides are formed, all backfill placed against the footings should be compacted to at least 90 percent of maximum dry density.

4.6 Shrinkage and Subsidence

Based on the results of field observations and laboratory testing, it is our opinion that the upper soils when graded may be subjected to a volume change. Assuming 90% relative compaction for structural fills as described, and assuming an over-excavation and re-compaction of about 4 feet, such volume change due to shrinkage may be on the order of 10 to 15 percent. Further volume change may be expected following removal of buried rocks, tree roots and others.

Supplemental shrinkage is expected during preparation of the underlying subgrades prior to compacted fill soils placement. For estimation purposed, site subsoils subsidence may be approximated to about 2.5-inch when conventional construction equipment is used. Lesser shrinkage and subsidence are expected for the subgrades existing at 3 feet and below.

4.7 Construction Considerations

4.7.1 Unsupported Excavation

Temporary construction excavation up to a depth of 4 feet may be made without any lateral support. It is recommended that no surcharge loads such as construction equipment, be allowed within a line drawn upward at 45 degrees from the toe of temporary excavations. Use of sloping for deep excavation may be considered where plan excavation dimensions are not constrained by any existing structure.

4.7.2 Supported Excavations

If vertical excavations exceeding 4 feet in depths become warranted, such should be achieved using shoring to support side walls.

4.8 Soil Caving

Considering the presence of upper loose silty sandy local soils as described, minor caving may be expected during deep excavations. Temporary excavations in excess of 5 feet should be made at a slope ratio of 2 to 1 (h:v) or flatter, or as per the construction guidelines as provided by Cal-Osha.

4.9 Structural Pavement Thickness (if planned)

Flexible Asphalt Paving: Based on laboratory determined soil Sand Equivalent, SE, and on laboratory determined soil R-value of 60, the following flexible pavement sections are provided for preliminary estimation purposes.

Service Area	Traffic Index, TI	Pavement Type	Paving Thickness (inch)
On-site paving/parking for commercial/conventional passenger cars	6.5	a.c. over CL. II base	4 over 4

Within paving areas, subgrade soils should be scarified to 12-inch, moisture conditioned to near optimum, and recompacted to at least 95 percent relative to soil's maximum Dry Density as determined by the method ASTM D1557 test procedures. The asphalt used and the Class II base recommended, should be required to be compacted to minimum 95%.

The pavement evaluations are based on estimated Traffic Index (TI) as shown and on the assumed soil R-value as described. It is recommended that following mass grading completion, representative site soils should be laboratory tested to determined actual soil R-value, based on which and on the TI as provided by the local public agency designed paving thickness should be determined for actual implementation for the project described.

Concrete flatworks (such as walkways and driveways) have potential for cracking due to fluctuations in soil volume in relationship to moisture content changes. It is our opinion that when designed and adequately constructed, the following guidelines will help to "reduce" potential for irregular cracking or edge lifting, but may not eliminate all concrete distress. Concrete placement during severe weather conditions (high temperature or during high Santa Ana wind conditions) is not recommended to prevent potential for "warping". It is suggested that concrete used should have a slump not exceeding 4-inch, or as recommended by the project structural engineer.

Concrete reinforcing and construction/expansion joints etc. should be supplied by the project structural engineer.

Subgrades to receive concrete should be subexcavated to minimum 18", followed by the excavated soils replacement compacted to at least 95%.

Considering snowy weather conditions, it our opinion that concrete paving and driveways should be at last 6" (net) thick, reinforced with #5 rebar at 18" o/c, placed over 4" thick Class II gravel base compacted to minimum 95% compaction. Actual paving thickness and reinforcing requirements, however, should be supplied by the project structural engineer based on anticipated heavy snowy condition and soil Subgrade Reaction, k_s, of 350 kcf as described earlier.

Use of low-slump concrete is recommended. In addition, it is recommended that utility trenches underlying concrete slabs and driveways should be thoroughly backfilled with gravelly sandy soils, mechanically compacted to the recommended minimum percentage described. To minimize potential for concrete "warping", use of excess water in concrete should be restricted.

4.10 Utility Trenches Backfill

Utility trenches backfill within the structural pad should be placed in accordance with the following recommendations:

- Trench backfill should be placed in thin lifts compacted to 90 percent or better of the laboratory determined maximum dry density for the soils used. Alternatively, clean granular sand may be used having a SE value greater than 30. Water Jetting is not recommended.
- Exterior trenches along a foundation or a toe of a slope and extending below a 1:1 imaginary line projected from the outside bottom edge of the footing or toe of the slope should be compacted to 90 percent of the Maximum Dry Density for the soils used during backfill. All trench excavations should conform to the requirements and safety as specified by the Cal-Osha.

Considering seismically susceptible ground shaking, use of commercially available flexible utility connections for life-line services are suggested. Utility knockouts in foundation walls should be oversized to accommodate differential movements. Utility trenches are a common source of water infiltration and migration.

If granular fill materials are placed beneath the building, utility trenches that penetrate beneath the building should be effectively sealed to restrict water intrusion and flow through the trenches that could migrate below the building.

4.11 Pre-construction Meeting

It is recommended that no clearing of the site or any grading operation be performed without the presence of a representative of this office. An on-site pre-grading meeting should be arranged between the soils engineer and the grading contractor prior to any construction.

4.12 Seasonal Limitations

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

4.13 Planters

To minimize potential differential settlement to foundations, planters requiring heavy irrigation should be restricted from using adjacent to footings. In event such becomes unavoidable, planter boxes with sealed bottoms, should be considered.

4.14 Landscape Maintenance

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

4.16 Observations and Testing During Construction

Recommendations provided are based on the assumption that structural footings and slab-on-grade be established exclusively into compacted fills. Excavated footings should be inspected, verified and certified by soils engineer prior to steel and concrete placement to ensure their sufficient embedment and proper bearing as recommended. Structural backfills discussed should be placed under direct observations and testing by this facility. Excess soils generated from footing excavations should be removed from pad areas and such should not be allowed on subgrades underlying concrete slab.

4.17 Plan Review

No grading or development/grading plans are currently prepared and none such is available for review. The attached ALTA plan supplied is used for "preliminary" purposes in preparing this report. It is suggested that, when prepared, project grading and development plans should be available for review to verify the assumptions made in preparing this report.

5.0 Earth Work/General Grading Recommendations

No major site grading is anticipated provided the existing grades are maintained as final pad grade surfaces for the lots described. However, considering loss of moisture over the passage of time, minor site preparations should be expected in form of site clearance, scarification, moisturization and recompaction to minimum percent compaction as described. Supplemental general grading requirements are as follows:

Structural Backfill:

Local soils free of organic should be considered suitable for reuse as structural backfill. Loose soils, formwork and debris should be removed prior to backfilling retaining walls. Local soils backfill should be placed and compacted in accordance with the recommended specifications provided below. Where space limitations do not allow conventional backfilling operations, special backfill materials and procedures may be required. Pea gravel or other select backfill can be used within limited space areas. Additional recommendations on such will be provided during construction.

Site Drainage:

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

Utility Trenches:

Buried utility conduits should be bedded and backfilled around the conduit in accordance with the project specifications. Where conduit underlies concrete slab-on-grade and pavement, the remaining trench backfill above the pipe should be placed and compacted to at least 90%.

General Grading Recommendations:

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

2. The recommended compaction for fill to support foundations and slab-on-grade is 90% of soil's Maximum Dry Density at near Optimum Moisture Content. To minimize potential differential settlements to foundations and slabs straddling over cut and fill transition, cut portions following cut, should be further over-excavated and such be replaced as engineered fill compacted to at least 90% of the soil's Maximum Dry Density as described in this report.

3. Utility trenches within building pad areas and beyond should be backfilled with granular material and such should be mechanically compacted to at least 90% of the maximum density for the material used.

4. Compaction for all structural fills shall be determined relative to soil's Maximum Dry Density as determined by ASTM Standard D1557compaction methods. In-situ field density of compacted fill shall be determined by the ASTM D1556 (sand-Cone) or by the ASTM Standard D2922 using Nuclear Density Gauge, or by other approved test procedures.

5. Imported soils, if required, shall be clean, granular, non-expansive in nature as approved by the project Geotechnical engineer.

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

7. In accordance with the CBC chapter 33, rock sizes greater than 12 inches (305 mm) and up to 24 inches (610 mm) in maximum dimension may be placed at depth 5 feet below finished grades. Rock sizes greater than 24 inches (610 mm) in maximum dimension may be placed at 10 feet (3048 mm) or more below grade. Supplemental recommendations on such will be presented on request.

8. No jetting and/or water tampering should be considered for backfill compaction for utility trenches without prior approval of the soils engineer. For such backfill, hand tampering with fill layers of 8 to 12 inches in thickness are suggested.

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

10. Any and all import soils if required during grading should be equivalent to the site soils or better. The soils engineer prior to their use should approve such.

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

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

6.0 Closure

The conclusions and recommendations presented are based on the findings and observations as made at the time of subsurface test explorations. However, the recommendations supplied should be considered "preliminary" since they are based upon soil samples only. Supplemental investigations and additional recommendations may be warranted in event the site soils exposed during construction appear different from those as described earlier in this report.

Recommendations provided are based on assumptions that structural footings will be established exclusively into compacted fill. No footings and/or slabs are allowed straddling over cut/fill transition interface. FOOTING TRENCH EXCAVATIONS AND SLAB SUBGRADES SHALL BE VERIFIED IMMEDIATELY PRIOR TO CONCRETE POUR. SOILS SOUTHWEST, INC. WILL ASSUME NO LIABILITY OF ANY FUTURE STRUCTURAL DISTRESS IN THE EVENT THE ABOVE CONDITION IS NOT MET.

This office should review final grading and foundation plans when they become available. Footing excavations should be inspected prior to steel and concrete placement to ensure that foundations are founded into satisfactory soils and excavations are free of loose and disturbed materials. Similar subgrade verifications are recommended prior to concrete slab-on-grade placement.

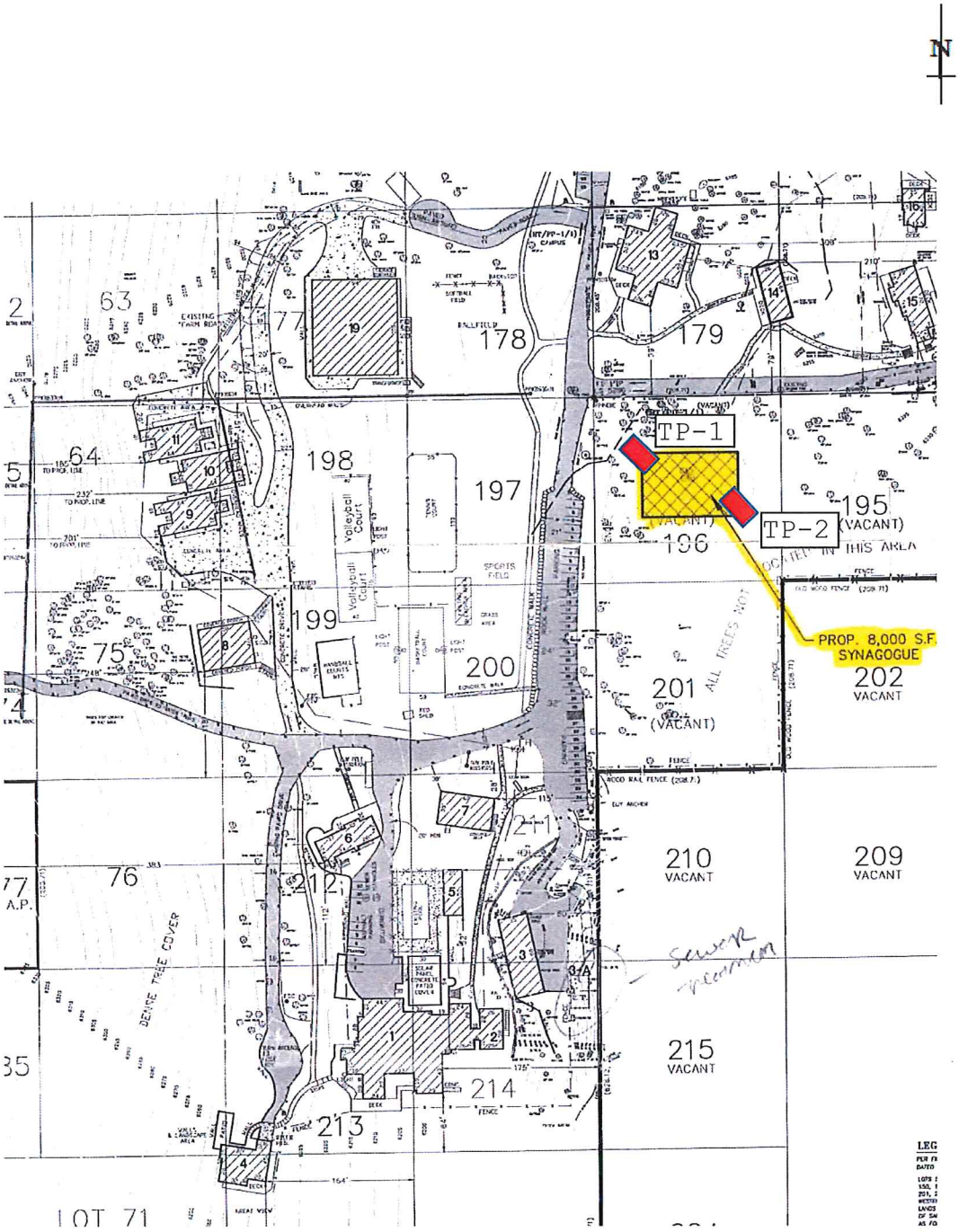
A pre-grade meeting between grading contractor and soils engineer is recommended prior to construction preferably at the site, to discuss the grading procedures to be implemented and other requirements described in this report to be fulfilled.

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

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

The recommendations presented assuming that a representative of this office will perform the necessary geotechnical observations and testing during construction. The field observations are considered a continuation of the geotechnical investigation performed. If another firm is retained for geotechnical observations and testing, our professional liability and responsibility shall be limited to the extent that Soils Southwest, Inc. would not be the geotechnical engineer of record and a letter of Transfer of Responsibility should be provided accordingly.

PLOT PLAN AND TEST LOCATIONS
(ALTA plan as supplied)



Legend: TP-1 Approximate Location of Excavated Test Treches Plate 1

7.0 APPENDIX A

Field Explorations

Field evaluations included site reconnaissance and two (2) subsurface test explorations using a backhoe advanced to refusal depth of 5.5 feet below existing surface grade. During site reconnaissance, the surface conditions were noted, and test excavation locations were determined. The field descriptions were modified, where appropriate, to reflect laboratory test results. Approximate test locations are shown on Plate 1.

Due to dry sandy soils in nature, undisturbed soil sampling was difficult. However, where feasible, relatively undisturbed soils were sampled using a drive sampler lined with soil sampling rings. The split barrel steel sampler was driven into the bottom of test excavations at various depths. Soil samples were retained in brass rings of 2.5 inches in diameter and 1.00 inch in height. The central portion of each sample was enclosed in a close-fitting waterproof container for shipment to our laboratory.

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

LOG OF TEST EXPLORATIONS

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

LOG OF TEST PIT TP-1

Project: Dovid Oved Retreat Center		**Job No.:**	21007-F/PRC
Logged By: John F.	**Boring Diam.:** Backhoe	**Date:**	May 14,2021

Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
				GM-SM			diatomaceous earth
	7.9	103.5	90.8	GP-SP			Topsoil Alluvial Sands- grayish light brown, slightly silty, fine to gravely coarse rock fragments and occasional rock - (Max Dry Density = 114 @ 15.0 %)
				ROCK		5	- color change to light yellow to white, traces of silt, fine to gravely coarse decomposed granitic origin materials
							- Abandoned test trench exploration @ 4.0 ft due to resistance (very dense granitic material
						10	- no groundwater
						15	
						20	
						25	
						30	

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

Site Location

Proposed New Sanctuary
3500 Seymore Road
Running Springs, California

Plate #

Bulk/Grab sample California sampler

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

LOG OF TEST PIT TP-2

Project: Dovid Oved Retreat Center		**Job No.:** 21007-F/PRC
Logged By: John F.	**Boring Diam.:** Backhoe	**Date:** May 14,2021

Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
				GP-SP			diatomaceous earth
							Topsoil Alluvial Sands - gray to light brown traces of silt, gravely, medium to coarse, rock fragments, occasional rock, scattered large chunks of cemented decomposed granitic material, damp
	5.4	103.0	90.3	ROCK		5	
						10	- color change to yellowish white, cemented decomposed granitic material and rippible granitic, very dense gravely, medium to coarse
						15	- Abandoned test exploration trench @ 5.5 ft due resistance- very dense cemented granitic material - no groundwater
						20	
						25	
						30	

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

Site Location

Proposed New Sanctuary
3500 Seymore Road
Running Springs, California

Plate #

Bulk/Grab sample California sampler

KEY TO SYMBOLS

Symbol Description

Strata symbols

Silty sand and gravel

Basalt
(or generic rock)

Poorly graded sand

Poorly graded gravel
and sand

Soil Samplers

Bulk/Grab sample

California sampler

Notes:

1. Exploratory borings were drilled on May 14,2021 using a 4-inch diameter continuous flight power auger.

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

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

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

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

8.0 APPENDIX B

Laboratory Test Programs

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

Moisture Content and Dry Density (D2937):

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

Direct Shear (D3080):

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

Consolidation (D2835):

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

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

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

Potential Expansion

Sandy gravelly in nature, the site soils are considered "very low" in expansion characteristics with an Expansion Index, EI, less than 20.0 Supplemental soil expansion testing should be performed following mass grading completion.

Laboratory Test Results

A. Table I: Moisture-Density Determinations (by Sand-Cone Method, ASTM D2216-80)

Test Locations, ft	% Moisture	Dry Density, pcf
TP-1 @ 2 ft	7.9	103.5
TP-2 @ 3 ft	5.4	103.0

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

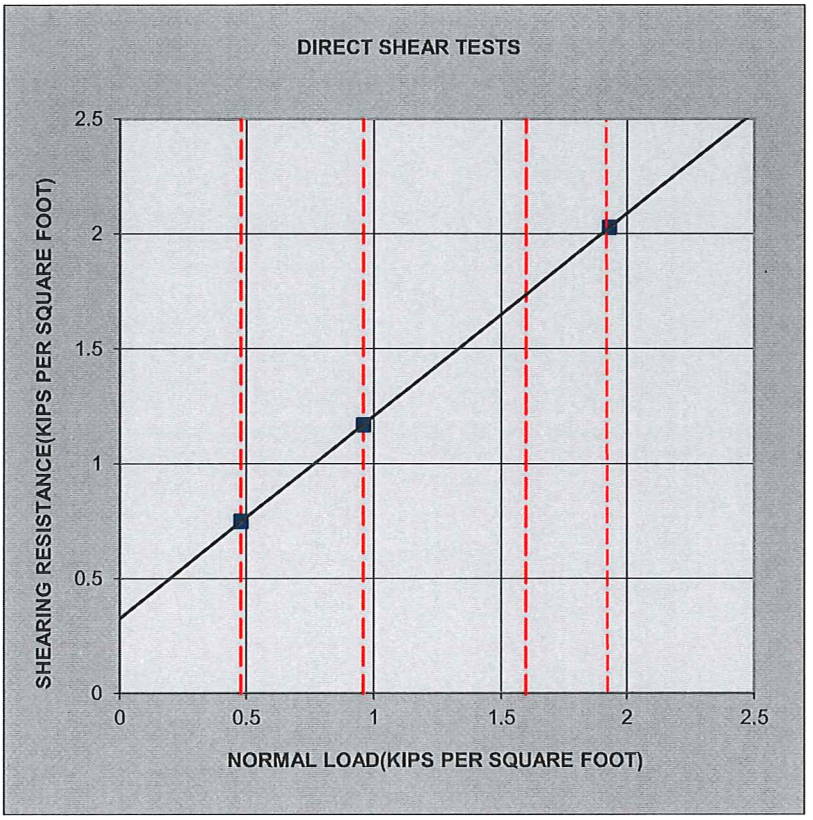
Sample Location @ depth, ft.	Max. Dry Density, pcf	Optimum Moisture (%)
TP-1& TP-2 @ 0-5.5 ft	114	15.0

C. Table III: Direct Shear (ASTM D3080)

Test Trench & Sample Depth	Test Condition	Cohesion (PSF)	Friction (Degree)
TP-1&2 @ 0-5.5 ft	Remolded to 90%	325.0	41.0

D. Table IV: Consolidation (D2435)

Trench TP #	Depth (ft.)	Consolidation prior to saturation (%) @ 2 kips	Hydro collapse (%) @ 2 kips	Total Consolidation (%@ 8 kips) (saturated)
1&2 (remolded)	0-5.5	0.6	0.1	1.9
1 (undisturbed)	2.0	1.4	1.9	7.9

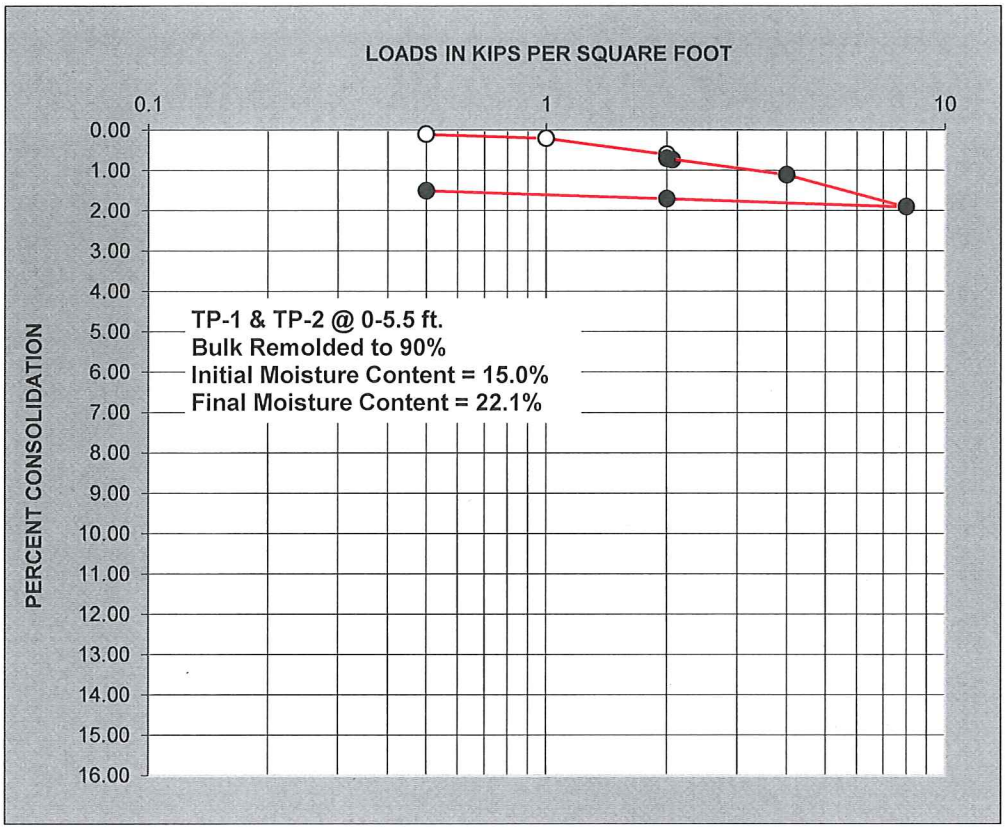


SYMBOL	LOCATION	DEPTH (FT)	TEST CONDITION	COHESION (psf)	FRICTION (degree)
■	TP-1& 2 Mixture	0 to 5.5	Remolded to 90%	325.40	41.41

Proposed Sanctuary Building to Existing Retreat Center 3500 Seymour Road Running Springs, California	PROJECT NO.	21007-F
	PLATE	B-1

SOILS SOUTHWEST, INC.
Consulting Foundation Engineers

CONSOLIDATION TESTS

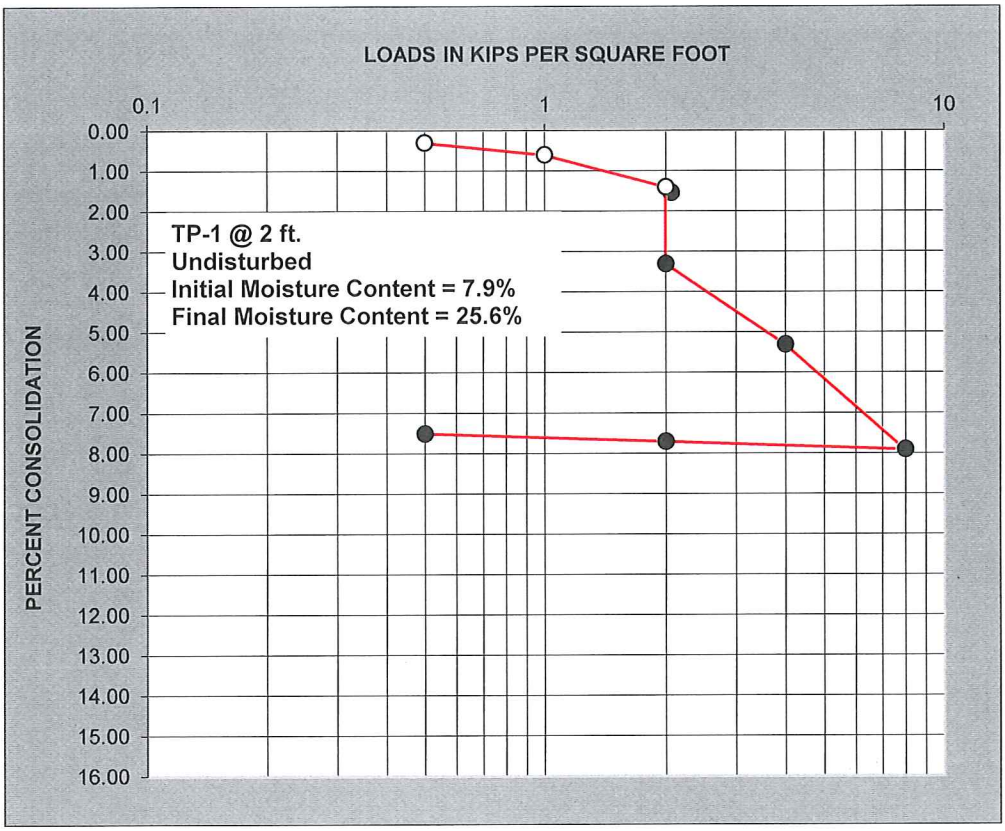


- **WATER PERMITTED TO CONTACT SAMPLE**

	PROJECT	Proposed Sanctuary Building to Existing Retreat Center 3500 Seymore Road, Running Springs		
	PROJECT NO.	21007-F	PLATE	B-2

SOILS SOUTHWEST INC.
Consulting Foundation Engineers

CONSOLIDATION TESTS



- **WATER PERMITTED TO CONTACT SAMPLE**

	PROJECT	Proposed Sanctuary Building to Existing Retreat Center 3500 Seymore Road, Running Springs		
	PROJECT NO.	21007-F	PLATE	B-2-1

SOILS SOUTHWEST INC.
Consulting Foundation Engineers

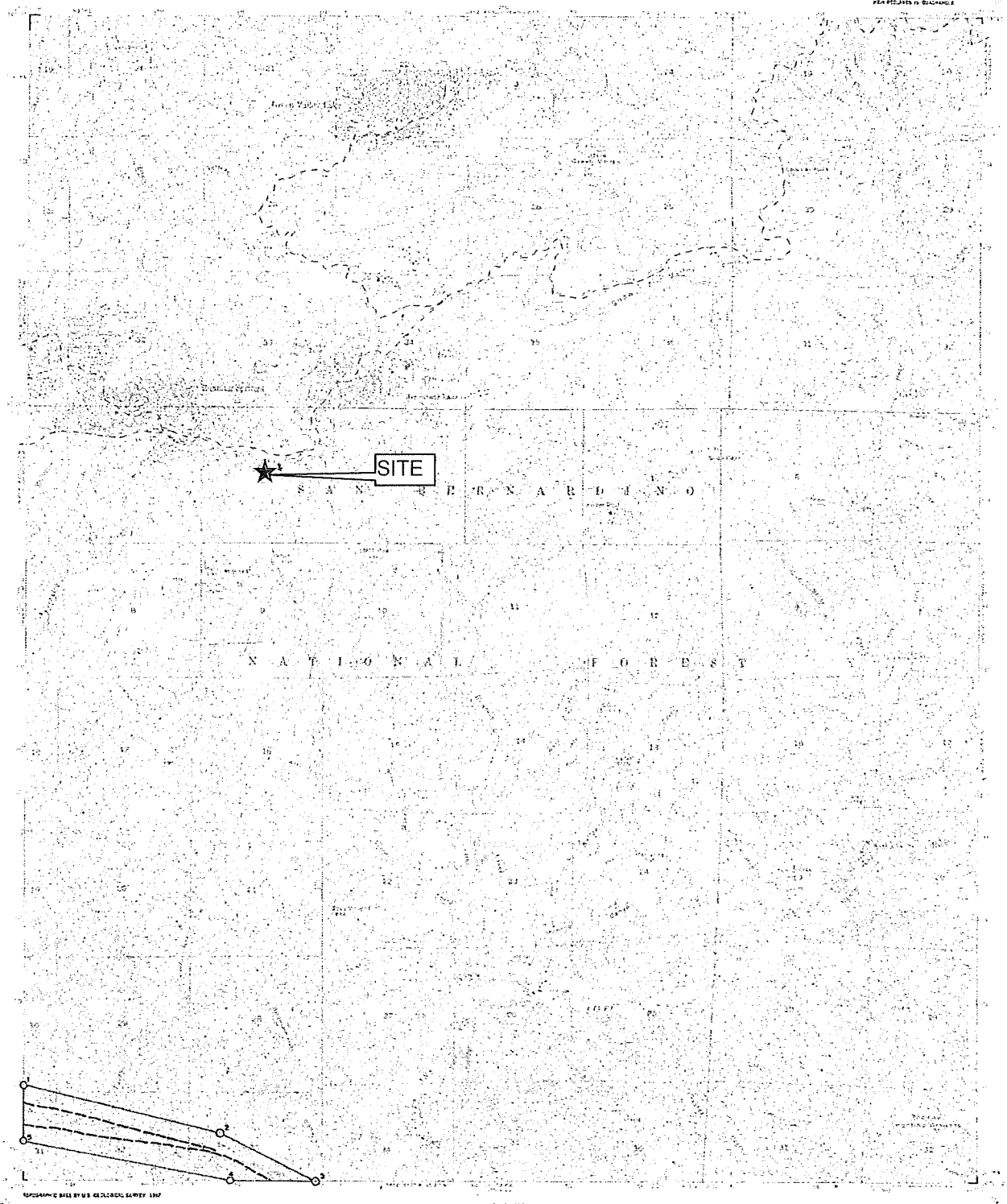
APPENDIX C

Supplemental Seismic Design Parameters

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

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF CONSERVATION

KELLER PEAK QUADRANGLE
CALIFORNIA - SAN BERNARDINO CO
7.5 MINUTE SERIES (TOPOGRAPHIC)



SCALE 1:24 000

CONTOUR INTERVAL 25 FEET

STATE OF CALIFORNIA

SPECIAL STUDIES ZONES

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

KELLER PEAK QUADRANGLE

OFFICIAL MAP

Effective: July 1, 1974

State Geologist

MAP EXPLANATION

Potentially Active Faults

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

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

Special Studies Zone Boundaries

These are delineated as straight-line segments that connect consecutively numbered turning points so as to define one or more special studies zone segments.

Seaward projection of zone boundary.

IMPORTANT - PLEASE NOTE

1) *This map may not show all potentially active faults, either within the special studies zones or outside their boundaries.*

2) Faults shown are the basis for establishing the boundaries of the special studies zones.

3) The identification of these potentially active faults and the location of such fault traces are based on the best available data. Traces have been drawn as accurately as possible at this map scale, however, the quality of data used is highly varied. The faults shown have not been field checked during this map compilation.

4) Fault information on this map is not sufficient to serve as a substitute for information developed by the special studies that may be required under Chapter 7.5, Division 2, Section 2623 of the California Public Resources Code.

REFERENCES USED TO COMPILE FAULT DATA

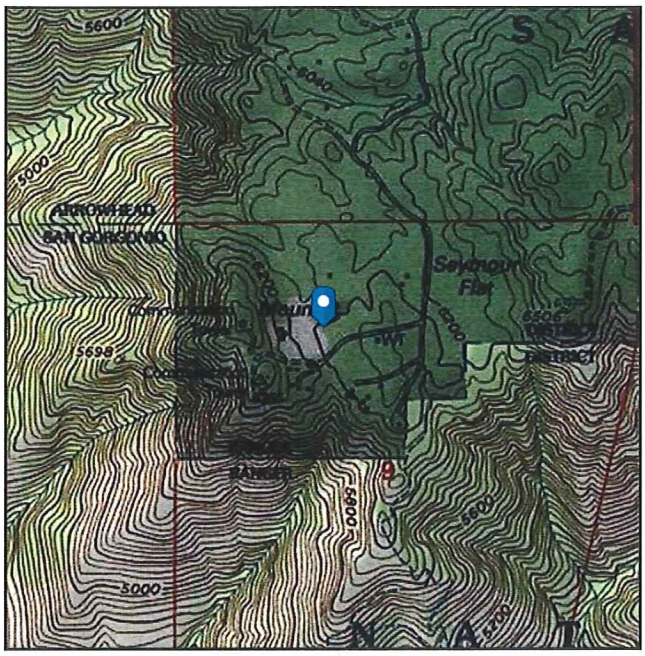
Keller Peak Quadrangle

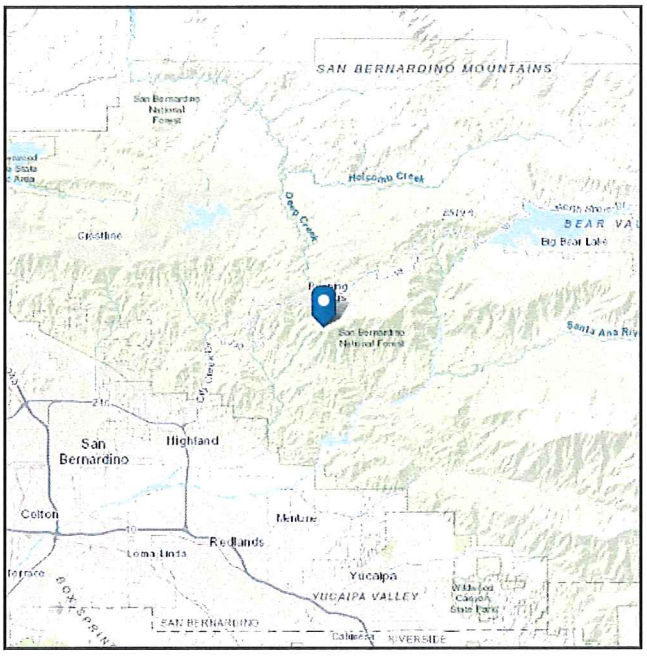
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: III
Soil Class: D - Stiff Soil

Elevation: 6206.09 ft (NAVD 88)
Latitude: 34.190313
Longitude: -117.097509





ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Seismic

Site Soil Class: D - Stiff Soil

Results:

S_S :	1.601	S_{D1} :	N/A
S_1 :	0.658	T_L :	8
F_a :	1	PGA :	0.699
F_v :	N/A	PGA_M :	0.768
S_{MS} :	1.601	F_{PGA} :	1.1
S_{M1} :	N/A	I_e :	1.25
S_{DS} :	1.068	C_v :	1.42

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Fri May 21 2021

Date Source: USGS Seismic Design Maps

Ground Motion Interpolator

Ground Motion Interpolator (2008)

Longitude: -117.097509

Latitude: 34.190313

Site Condition (VS30): 270 (180-1050 m/sec)

Return Period:

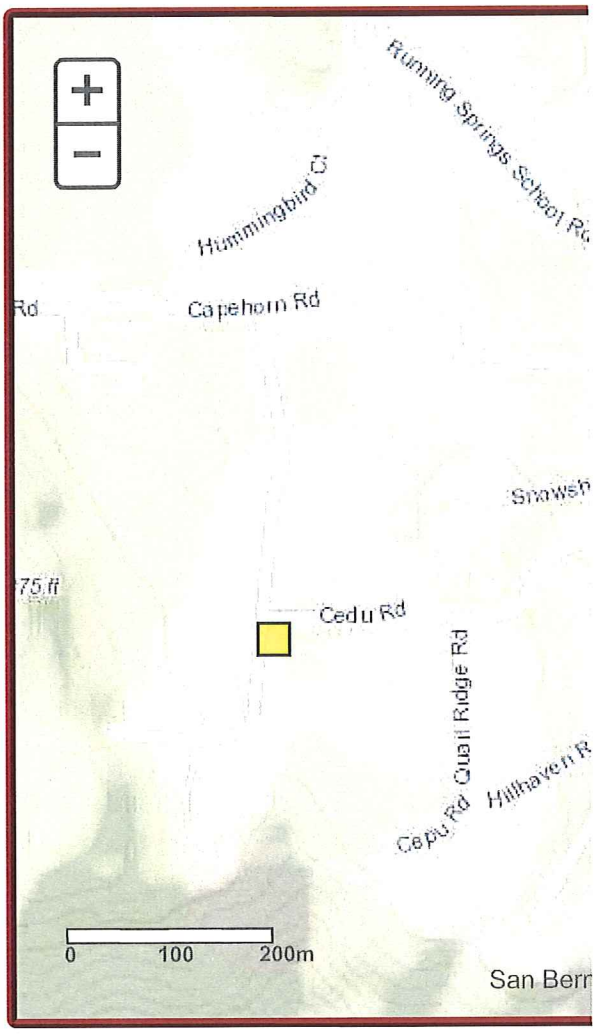
2% in 50 years 10% in 50 years

Spectral Acceleration:

PGA 0.2 second SA 1.0 second SA

Submit

Inputs:	**Result:**
-117.097509, 34.190313 vs30: 270 m/sec 10% in 50 years PGA	**0.557 g**



Information and Disclaimer

U.S. Geological Survey - Earthquake Hazards Program

2008 National Seismic Hazard Maps - Source Parameters

New Search

Distance in Miles	Name	State	Pref Slip Rate (mm/yr)	Dip (degrees)	Dip Dir	Slip Sense	Rupture Top (km)	Rupture Bottom (km)	Length (km)
5.45	S. San Andreas;BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	85		strike slip	0.1	13	390
5.45	S. San Andreas;SSB+BG	CA	n/a	71		strike slip	0	13	101
5.45	S. San Andreas;NSB+SSB+BG+CO	CA	n/a	79		strike slip	0.2	12	206
5.45	S. San Andreas;CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14	322
5.45	S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	85		strike slip	0	14	380
5.45	S. San Andreas;CC+BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	86		strike slip	0.1	13	449
5.45	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	14	384
5.45	S. San Andreas;CH+CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	86		strike slip	0	14	442
5.45	S. San Andreas;NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0	13	213
5.45	S. San Andreas;NM+SM+NSB+SSB+BG	CA	n/a	83		strike slip	0	14	271
5.45	S. San Andreas;NM+SM+NSB+SSB+BG+CO	CA	n/a	84		strike slip	0.1	13	340
5.45	S. San Andreas;NSB+SSB	CA	n/a	90	V	strike slip	0	13	79
5.45	S. San Andreas;NSB+SSB+BG	CA	n/a	75		strike slip	0	14	136
5.45	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB	CA	n/a	90	V	strike slip	0.1	13	421
5.45	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB+BG	CA	n/a	86		strike slip	0.1	13	479
5.45	S. San Andreas;PK+CH+CC+BB+NM+SM+NSB+SSB+BG+CO	CA	n/a	86		strike slip	0.1	13	548
5.45	S. San Andreas;SM+NSB+SSB	CA	n/a	90	V	strike slip	0	13	176

U.S. Geological Survey - Earthquake Hazards Program

2008 National Seismic Hazard Maps - Source Parameters

New Search

Fault Name	State
S. San Andreas;BB+NM+SM+NSB+SSB+BG+CO	**California**

GEOMETRY	
Dip (degrees)	85
Dip direction	
Sense of slip	strike slip
Rupture top (km)	0.1
Rupture bottom (km)	13
Rake (degrees)	180
Length (km)	390

MODEL VALUES		
Slip Rate	n/a	
Probability of activity	1	
	ELLSWORTH	HANKS
Minimum magnitude	6.5	6.5
Maximum magnitude	7.91	8.02
b-value	0.8	0.8

Fault Model	Deformation	Char Rate[1]	GR-a-	Weight

	Model		value[1]	
A priori	2.1	5.41e-05 / 5.41e-05	NA / NA	0.50
Moment Balanced	2.1	4.85e-05 / 5.06e-05	NA / NA	0.25
Moment Balanced	2.2	4.42e-05 / 4.29e-05	NA / NA	0.10
Moment Balanced	2.3	5.10e-05 / 5.52e-05	NA / NA	0.15

[1] 1st Value is based on Ellsworth relation and 2nd value is based on Hanks and Bakun relation

PROFESSIONAL LIMITATIONS

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

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

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

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

RECOMMENDED SERVICES

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

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

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

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