John Helms, CEG
40344 Wood Court, Palmdale, CA 93551
(661) 718-3646

December 7, 2005

Mr. Norik Bedassian, P.E.
A. Z. Geo Technics, Inc.
38733 9th Street East, Suite P
Palmdale, CA 93550
(661) 273-8666

Subject: Geologic Setting for Proposed Development, Area West of Norma Street West and North of Kendall Avenue, City of Ridgecrest, County of Kern, California.

Dear Mr. Bedassian:

I am pleased to present to you geologic setting summary for A. Z. Geo Technics, Inc. job number GT 2812. The site consists of a two adjacent parcels that total approximately 1,328 feet by 1,900 feet in size. The parcels are located west of Norma Street West and north of Kendall Avenue, City of Ridgecrest, County of Kern, California. This letter report presents a geologic literature and map review for the area of the two parcels.

Geologic Setting

The project site, in southeast-central California, is located in the south central portion of Indian Wells Valley. The region is part of the southwestern most corner of the central Basin and Range geologic province of the western United States. The region, characterized as being located at the transition from the extensional Basin and Range province to the strike slip San Andreas Fault system (Roquemore, 1980), is one of the most seismically active regions of California (Bhattacharyya and Lees, 2002). Indian Wells Valley lies within the Eastern California shear zone (Dokka and Travis, 1990), which extends 500 km north-northwest from the San Andreas Fault, through the Mojave Desert region, and to Owens Valley and Death Valley. Individual faults within the region mainly consist of northwest-striking right-slip faults, and have slip rates of less than 1.0 mm/yr (Dokka, 1983). Total displacement across the zone is estimated at 8.0mm/yr (Dokka and Travis, 1990).

Tectonic and volcanic activity during the past 3 m.y. shaped much of the geomorphic and geologic character of the Indian Wells Valley. The region has been affected by several major faults such as the Garlock fault, the Sierra Nevada frontal fault system, and the Panamint Valley fault, which delineate the southern, western, and eastern boundaries of this region. The two major active faults in the Indian Wells Valley are the Little Lake and the Airport Lake fault zones (Roquemore and Zellmer, 1983). The fault zones form a broad zone of faulting across central and south Indian Wells Valley and are truncated by the Garlock fault farther to the south. The Little Lake fault is the most seismically active fault in the Indian Wells Valley region.

Indian Wells Valley is bound by the Sierra Nevada Mountain Range to the west, the Argus range to the east, El Paso Mountains and Spangler Hills to the south, and the Coso Mountains to the north. Each of the respective areas has some sediment input into the valley. Geologic mapping depicts the surficial geologic units in the project site area as Holocene-aged Alluvium, Pleistocene-aged Alluvium and Lacustrine deposits (Dibblee, 1967). Currently, broad low relief alluvial aprons across Indian Wells Valley grade into pediment surfaces closer to the bounding range fronts. The lacustrine deposits that underlie a majority of Indian Wells Valley are related to numerous transgressions and regressions of pluvial China Lake. The lake was one within a chain of pluvial lakes that define the Owens River system. The entire project site is most likely covered in a thin veneer of young Holocene-aged sand and gravel rich alluvium underlain by a thick sequence of clay and silt rich lacustrine sediments. No faults or other linaments have been mapped across the project site. The project site is not located within the current State of California Earthquake Fault Zone and is not subject to the conditions of the Alquist-Priolo Special Studies Zone Act of 1972 (California Public Resources Code, Chapter 7.5, Division 2). A detailed geologic map of the project site is not included in the scope of this report; however, no fault related geomorphic features were observed across the project site area.

References

Dibblee, T.W., Jr., 1967, Aerial Geology of the Western Mojave Desert, California, U.S. Geological Survey Professional Paper 522, p. 151.

Dokka, R.K., 1983, Displacements on late Cenozoic strike-slip faults of the central Mojave Desert, California: Geology, v. 11, p. 305-308.

Dokka, R.K., and Travis, C.J., 1990, The eastern California shear zone and its role in the tectonic evolution of the Pacific–North American transform boundary: Geological Society of America Abstracts with Programs, v. 22, no. 3, p. 19.

Roquemore, G., 1988, Revised estimates of slip-rate on the Little Lake Fault, California: Geological Society of America Abstracts with Programs, v. 20, no. 3, p. 225.

Roquemore, G., and Zellmer, J., 1983, Tectonics, seismicity, and volcanism at the Naval Weapons Center: Naval Research Reviews, v. 35, p. 3–9. Roquemore, G.R., 1981, A hypothesis to explain anomalous structures in the western Basin and Range Province: U.S. Geological Survey Open File Report 81-0503.

Thank you for this opportunity to be of service to you. If you have any questions or require additional information, please do not hesitate to contact me.

Sincerely,

John Helms, C.E.G. 2272

REGISTERED GEOLOGIST
JOHN G. HELMS
No. 2272
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

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Geotechnical and Environmental Consultants

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GEOTECHNICAL REPORT

PROJECT NUMBER

GT-2812-S

SITE LOCATION

NORMA STREET WEST
IN THE COMMUNITY OF RIDGECREST
COUNTY OF KERN
STATE OF CALIFORNIA

LEGAL DESCRIPTION

APN 510-010-06
APN 210-010-07

DATE

NOVEMBER 28, 2005

PREPARED FOR

ALDRIN PRESTOSA

A Z Geo Technics, Inc.

Geotechnical, Environmental and General Building Services

NOVEMBER 28, 2005

MR. ALDRIN PRESTOSA
TAFT CORP.
26740 VIA LINDA STREET
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(310) 437-9190

SUBJECT: PRELIMINARY SOILS REPORT FOR A SITE LOCATED ON NORMA STREET WEST, IN THE COMMUNITY OF RIDGECREST, COUNTY OF KERN, STATE OF CALIFORNIA.
APN 510-010-006 & 510-010-07 ("Site")

Dear Mr. Prestosa:

Pursuant to your authorization, AZ Geo Technics, Inc., referred to herein as **"Consultant"**, has visited the Site and performed a preliminary soils evaluation for Aldrin Prestosa, referred to herein as **"Client"**. The findings and recommendations contained in this "Report" are based upon eight (8) specific exploratory trenches and observations as noted within our described limitations. The materials immediately adjacent to or beneath those observed may have different characteristics and no representations are made as to the quality or extent of materials not observed.

Client, and/or Clients' contractor(s)/agents, are the responsible parties for the implementation of all recommendations during the life of the project. To the best of Consultants' knowledge, the evaluation covered in this limited study is in accordance with applicable recommendations. Any variances not approved in writing by Consultant would nullify this Report for any use. No other warranties are expressed or implied. Please note, this Report is valid for only one (1) year from the date hereof, subject to Consultants' review and approval prior to further use.

If you have any questions regarding this Report, please contact our office at your convenience. We appreciate this opportunity to be of service and will be available for future developments at your convenience.

Respectfully submitted for,

AZ GEO TECHNICS, INC.

REGISTERED PROFESSIONAL ENGINEER
NORIK BEDASSIAN
C 53083
Exp. 6-30-07
CIVIL
STATE OF CALIFORNIA

Norik Bedassian P.E.

NB:wa/GT-2812

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ENCLOSURES

SCOPE

The scope of this limited evaluation consisted of the following geotechnical steps:

A. Review of literature, reports, and maps made available by Client pertinent to the Site.

B. Preliminary Site reconnaissance and subsurface exploration.

C. Laboratory analysis of selected representative bulk and relatively undisturbed samples.

D. Preparation of this Report presenting our findings, conclusions, and recommendations.

PROPOSED DEVELOPMENT

The proposed development is reported to be single-family residential dwellings. "Client" prepared the Tentative Tract Map. The Site is intended for a two-story single-family residential dwelling(s). This study was performed for the proposed building areas, associated street, and on-Site utility construction only. Though no building plans were made available to Consultant at the time of the preparation of this Report, this type of structure is typically wood framed with continuous and/or isolated pad footings. Structural loads are anticipated to be light to moderate. Should something other than what is represented here be utilized during construction, Consultant should be notified immediately to review the proposed changes and modify this Report if necessary.

BACKGROUND OF SUBJECT SITE

The Site is currently vacant.

SITE DESCRIPTION

The Site is located in the Community of Ridgecrest, County of Kern, State of California. The Site is bounded on the north by vacant land, on the south by vacant land, on the east by Norma Street, and on the west by vacant lot. The Site is approximately forty (40) combined acres in size, rectangular in shape, and partially accessible. The Site terrain is relatively flat to hilly.

The surface is moderately covered with native weeds and shrubs. No signs of watercourses, but there was small-scattered rock outcroppings were observed on the Site. Drainage was by way of sheetflow and water run-off in a northeasterly direction.

FIELD SUB-SURFACE INVESTIGATION AND LABORATORY TESING RESULTS

Subsurface evaluation consisted of eight (8) exploratory trenches, excavated to a maximum depth of eight (8) feet in order to determine the condition of the near-surface natural material. The trenches were logged and reviewed. Representative bulk and undisturbed samples were collected for laboratory testing. Bulk (disturbed) samples of the near surface soil were observed from the cuttings developed during excavation operations. The subsurface conditions shown on the Trench Logs apply only at the specific locations and to the dates indicated. It is not warranted to be a representative of subsurface conditions at any other locations and times.

Expansive Soils

The potential expansion characteristics of the near-surface soils are classified as medium expansive in accordance with UBC Standards No. 18 - 2, Expansion Index Test. General guidelines for the proposed construction are based on soil expansion. Upon completion of rough pad grades, evaluation of foundation bearing materials should be made in accordance with UBC Standards No. 29 – 2. Specific recommendations for construction should be made after evaluation of foundation bearing materials.

Artificial Fill

No artificial fill or structural fill was encountered during the excavation operations.

Surface Erosion Potential

No evidence of significant erosion was observed on the Site. By nature, on-Site soil is cohesive and must not be considered to be susceptible to surface erosion.

SHRINKAGE AND SUBSIDENCE

It is estimated that there will be a minimum of ten percent (10%) shrinkage approximately six (6) inches below surficial soil at an average density of ninety three percent (93%) compaction relative to the maximum dry density, due to the reworking of the surface soils (excluding rocks and organics). Natural ground subsidence is estimated to be as much as one-half (½) of an inch, depending significantly on the methods and the compaction equipment used. Some additional losses are anticipated due to the preparation and removal of surface and sub-surface obstructions, such as trees and rock outcroppings.

SETTLEMENT

It is estimated that after grading, in accordance with our recommendations/supervision, the settlement of the foundation system is expected to occur on initial load application. A maximum of one-half (½) of an inch settlement is anticipated, but differential settlement is anticipated not to exceed one-fourth (¼) of an inch within a thirty (30) foot span.

DRAINAGE

All pads and roof drainage should be collected and transferred to an appropriate non-erosive drainage device. The drainage will not be allowed to pond on the pad or against the foundation.

SUBSURFACE CONDITIONS

Based on our findings from the Site observation and exploratory trenches, the on-Site earth materials generally consist of younger alluvium (Qal). These materials are typically moderately dense to dense sands, silts and clays in varying degrees of combinations. Please refer to the Trench Logs for a brief description of the on-Site earth materials encountered during the excavation operations.

Top Soil	Clayey Silty Sand
Near Surface Materials	Clayey Silty Sand
Subsurface At Depth Explored	Cemented Silty Sand With Calcium
Depth To Groundwater	None Encountered
Depth To Bedrock	None Encountered

FOUNDATION RECOMMENDATIONS

Foundations may be conventional spread or continuous wall footings, provided they are as follows:

- ▶Minimum continuous footings widths: Twelve (12) inches (one-story)
  Fifteen (15) inches (two-story)
  Eighteen (18) inches (three-story)
- ▶Minimum column footing width: Two (2) Feet

Minimum footing depths (in inches) below lowest adjacent final grade are as follows:

Expansion Index	Expansion Classification	One Story Structure	One Story structure	Two Story Structure	Two Story Structure	Three Story Structure	Three Story Structure
		Perimeter or Bearing Walls	Interior or Non-Bearing	Perimeter or Bearing Walls	Interior or Non-Bearing	Perimeter or Bearing Walls	Interior or Non-Bearing
0 – 20	Very Low	12	12	18	18	24	18
21 – 50	Low	12	12	18	18	24	18
51 – 90	Medium	15	12	20	18	24	18
91 - 130	High	18	12	24	18	30	18

Foundation reinforcement in addition to minimum structural requirements for dead, live and seismic loads:

Expansion Classification	Expansion Index	No. 4 ReBars Top and Bottom
Very Low	0 to 20	Two (2)
Low	21 to 50	Two (2)
Medium	51 to 90	Two (2)
High	91 to 130	Two (2)

SLABS-ON-GRADE

The concrete for slabs-on grade should conform to the requirements contained in Chapter 19 of the 1997 Uniform Building Code. The concrete slab thickness *minimums* do not preclude more stringent requirements of which may be imposed by the architect, structural engineer, or building official. These *minimums* are as follows:

Expansion Classification	Expansion Index	Minimum Slab Thickness
Very Low	0 to 20	Four (4) inches
Low	21 to 50	Four (4) inches
Medium	51 to 90	Five (5) inches
High	91 to 130	Six (6) inches

Slab Reinforcement

The concrete slab reinforcement *minimums* do not preclude more stringent requirements of which may be imposed by the architect, structural engineer, or building official. These *minimums* are as follows:

Expansion Classification	Expansion Index	Slab Reinforcement
Very Low	0 to 20	No. 3 Rebar @ 24” on center, each way
Low	21 to 50	No. 3 Rebar @ 18” on center, each way
Medium	51 to 90	No. 4 Rebar @ 18” on center, each way
High	91 to 130	No. 4 Rebar @ 14” on center, each way

Moisture Vapor Barrier

Where moisture sensitive materials are to be placed on the slab, the slab should be underlain by a moisture vapor barrier (polyethylene plastic vapor barrier). Moisture barriers should have a minimum thickness of ten (10) mil. and should be protected by a two (2) inch thick layer of sand (above and below) in order to reduce the possibility of punctures and to aid in obtaining a satisfactory concrete cure. The moisture barrier must be properly lapped and/or sealed, as well as sealed around all plumbing structures and other openings. The slab areas should be presaturated to near optimum moisture content of the sub-grade material to a minimum depth of six (6) inches prior to placing sand and moisture barrier.

BEARING

Soil Bearing

For the proposed construction, foundations should be designed for an allowable bearing value not to exceed fifteen hundred (1,500) pounds per square foot (psf) on compacted material. This value is for dead loads plus the adjusted live load, which may be increased by one-third (⅓) for short term seismic and wind effects.

LATERAL LOADS

Resistance to lateral loads will be provided by passive earth pressure and base friction. For footing bearing against compacted fill, passive earth pressure may be considered to be developed at a rate of three hundred fifty (350) pounds per square foot (psf) per foot of depth. Base friction may be computed as thirty hundredths (0.30) times the normal dead load. Base friction and passive earth pressure may be combined directly.

RETAINING WALLS

Retaining Wall Foundation Soils

Retaining walls should be founded on clean, non-deleterious natural or compacted competent material. Consultants' representative should observe soil materials exposed at the bottom of the proposed retaining wall footings. If these materials visually appear to be potentially expansive (e.g. clays and elastic silts), the expansion index testing should be performed in order to confirm the expansion characteristics of the material and Consultant should then make the appropriate recommendations.

Retaining Wall Design Parameters

Based upon a review of the current plans, retaining walls may be designed for a maximum height of five (5) feet.

The allowable net bearing pressure for retaining wall footings, at least one (1) foot wide and one (1) foot deep below the lowest adjacent grade which should be founded on competent natural soils or on at least two (2) feet of compacted fill to a minimum of ninety percent (90%) relative compaction, is two thousand (2,000) psf.

If retaining walls are constructed to retain on-Site compacted fill materials, they should be designed to resist lateral pressures equal to those exerted by an equivalent fluid having a density of not less than that shown in the following table.

Based upon analyses, the following Lateral Earth Pressures may be used in the design of any proposed retaining walls or similar structures:

	Driving Earth Pressure*	Resisting Earth Pressure*
Well Drained Level Soil	30 pcf	300 psf
Well Drained 2:1 Backfill Soil	45 pcf	--

* Equivalent fluid pressure (psf) per foot of soil height.

NEAR SOURCE FACTOR

The following UBC (1997) Seismic Design Coefficients should be used for the proposed structures. These criteria are based on the soil profile type as determined by existing sub-surface geologic conditions, on the proximity of the Site to the nearby fault, and on the maximum moment magnitude and slip rate of the nearby fault.

UBC 1997 TABLE	PARAMETER	FACTOR
16-I	Seismic Zone Factor Z	0.4
16-J	Soil Profile Type	Sc
16-Q	Seismic Coefficient Ca	.40 Na
16-R	Seismic Coefficient Cv	.56 Nv
16-S	Near Source Factor Na	1.2
16-T	Near Source Factor Nv	1.466
16-U	Seismic Source Type	B
--	Seismic Coefficient Ca	.4800
--	Seismic Coefficient Cv	.8209

HYDRO-CONSOLIDAITON

The disturbed and loose soil is underlain by sediments, which are subject to hydro-consolidation. This is a phenomenon by which metastable soils undergo rapid consolidation upon introduction of sufficient quantity of water or an increase in ambient loading. These soils are generally of low density and low moisture content.

The soils encountered beneath the Site were very dense below a depth of two (2) feet. Samples obtained below this depth had in-place dry densities of approximately one hundred thirteen to one hundred twenty (113 – 120) pounds per cubic foot (pcf). The moisture contents were found to be within twenty percent (20%) of optimum moisture.

In addition to the density data, the result of a consolidation test performed on a selected sample is included in this Report.

Based upon available data, it is our opinion that hydro-consolidation of on-Site soils do not present any unusual risk for this Site provided that the recommendations contained in this Report are followed.

Over-excavating the building area, Site processing, control of landscape irrigation, and minimal changes from existing grades will further lessen the possibility of hydro-consolidation.

SUMMARY AND CONCLUSIONS

General Conclusions

The following conclusions are presented based upon the results of our findings and analysis of field and laboratory data at the time and locations as shown. No representation is made to any other areas or consistency of the conditions. Environmental testing was not a part of the report.

1. Proposed construction is feasible from a geotechnical point of view provided the soil recommendations presented in this Report have been implemented during construction.
2. The area of the proposed Site is underlain by silty sand. The soils are dense, and slightly moist.
3. On-Site soils are primarily granular with an anticipated medium expansion potential.
4. No groundwater or evidence of seepage was encountered within the trenches.
5. Any change of plans must be approved by Consultant prior to construction.
6. At the time of further review and/or during construction, additional recommendations or changes may be provided depending on the future findings of the proposed development.

Liquefaction Potential

The primary factors influencing liquefaction potential include groundwater, soil type, and intensity of ground shaking. Liquefaction potential is greatest in saturated, loose, and poorly graded sand.

Based on our investigation, the sub-surface material is classified as a dense mixture of sand, clay, silts, and groundwater at a depth of below fifty (50) feet.

Therefore, considering the above characteristics, the potential for soil liquefaction and other secondary seismic hazards such as lurch cracks and seismically induced settlement are considered to be minor at the Site.

KERN COUNTY BUILDING CODE

It is the opinion of Consultant that the proposed construction will be safe against any geotechnical hazards from landslides, settlement, or slippage and the proposed work will not adversely affect adjacent property in compliance with the county code, provided Consultants' recommendations are followed.

RECOMMENDATIONS

General Site Grading

All Grading shall be performed in accordance with the General Earthwork and Grading Specifications (Enclosed) *except* as modified in the text of this Report.

The geotechnical exploration trench backfill is uncompacted and is unsuitable for support of structures. If any structure or other improvements (including paved access roads) are located over or immediately adjacent to the uncompacted fill, it is recommended that the backfill be over-excavated and replaced with engineered compacted fill or that the structure be designed to span the trench.

Construction should allow for all plumbing and utility services to be connected with flexible connections and/or provided with convenient shut-offs. Structures should be designed in accordance with at least minimum code standards for Seismic Zone 4 as described in the Kern County Building Code.

Diversion and reduction of the concentrated run-off(s) should be provided to minimize erosion of the on-Site slopes and improvements.

If Grading plans are required, all recommendations must be shown on the Grading plans prior to our review, approval, and signature; otherwise all recommendations should be addressed on the Plot Plan.

Any Site Grading should be in conformity with existing building codes. Chapter A - 33 of the Los Angeles County Building Code contains specific considerations for grading and forms a part of this Report.

Field review of the Site Grading by Consultant, if requested as recommended, will be an additional expense and will be billed at current fee schedule rates in effect at the time of the Site Grading.

Building Area Preparation

The minimum upper four to six (4 – 6) feet of soils across the Site are considered unsuitable to support any structure due to possible hydro-consolidation potential. These soils should be mitigated in structural areas by a minimum over excavation of the upper four to six (4 – 6) feet below original grade depending on the location of the lots. The resultant ground surface should be scarified an additional six (6) inches and moisture conditioned to optimum moisture and compacted to a minimum of ninety percent (90%) relative compaction prior to fill placement. All lateral over-excavation shall be extended to the equivalent of the depth of over-excavation beyond the building footprint, but not be less than five (5) feet (under any circumstances). If the building pad is to be created by cut and fill transitional, the cut area must be over-excavated thirty-six (36) inches below the bottom of the footing.

The Site should be cleared of surface and sub-surface obstructions including any existing debris, pavement, existing foundations, existing utilities, vegetation, residual top soils, and other deleterious materials. Removed materials and debris should be disposed of off-Site. All cavities created by the removal of buried obstructions should be backfilled with suitable compacted materials. Vertical temporary excavations greater than five (5) feet in height will require sloping or shoring in accordance with the requirements of OSHA.

The non-structural area shall be over-excavated to a minimum depth of twenty-four (24) inches from the natural grade or finish grade, whichever is lowest, and re-compacted to a minimum of ninety percent (90%) relative to maximum dry density.

Preparation Of Paving Areas

All surfaces to receive concrete or asphaltic concrete paving should be over-excavated and scarified to a minimum depth of twenty-four (24) inches, or mitigated to the Contractors' satisfaction based on exposed conditions. The scarified bottom should be moisture conditioned and re-compacted to a minimum relative compaction of ninety percent (90%) prior to placing any additional fill.

Regarding preliminary pavement sections, no "R" Value tests were conducted on samples of the proposed parking area sub-grade soils. During Site Grading, sample(s) should be tested, secured from the exposed pavement sub-grade areas, and evaluated for review or revision of the following preliminary pavement sections. Based upon "R" Value estimated, the following sections may be used for developing preliminary earth quantities and paving cost estimates:

Asphalt Concrete Pavement Sections:

Traffic Index 4.0 (Automobile and Light Truck Parking Areas): 3.0" Asphalt Concrete on 4.0" Crushed Aggregate Base or equivalent.
Traffic Index 5.0 (Automobile and Light Truck Drive Lanes): 3.0" Asphalt Concrete on 6.0" Crushed Aggregate Base or equivalent.

Asphalt concrete pavement section recommendations are based on the assumption that the pavement section is placed on a minimum twelve (12) inch thick layer of compacted sub-grade as recommended in this Report. Aggregate base material should be properly moisture conditioned and compacted to at least ninety five percent (95%) of the maximum dry density as determined by ASTM D - 1557 test procedures using mechanical compaction equipment. Pavement sections should be verified with the jurisdictional authority prior to the time of construction.

CORROSIVITY AND CHEMICAL ATTACK CONSIDERATIONS

Bulk samples obtained from near existing grade soils believed to represent possible worst-case conditions were tested for pH, resistivity, and soluble sulfate and chloride contents. Negligible corrosive sulfate and chloride concentrations were measured and pH data indicate no significant acidity of tested soils. Resistivity test results indicate a mildly corrosive potential of these soils to ferrous metals. Test results are summarized in Table 5. Recommendations, of which are considered appropriate for corrosion protection are presented below.

Concrete

Conventional Type II Portland Cement may be used in concrete for structures and concrete pipe that will be in contact with near finish grade soils.

Steel Pipe

Perform an abrasive blast to underground steel utilities and apply a high quality dielectric coating such as extruded polyethylene, a tape coating system, hot applied coal tar enamel, or fusion bonded epoxy.

Bond underground steel pipe with a rubber gasket, mechanical device, a grooved end, or other non-conductive type joints for electrical continuity.

Electrical continuity is necessary for monitoring corrosion and cathodic protection.

Electrically insulate each buried steel pipeline from dissimilar metals, cement-mortar coated and concrete encased steel, also electrically insulate above ground steel pipe using dielectric fittings to prevent dissimilar metal corrosion cells and to facilitate the application of cathodic protection.

Apply cathodic protection to steel piping as per NACE International RP – 0169 - 92. As an alternative for steel waterlines to a dielectric coating and cathodic protection, apply a mortar coating as per AWWA Standard C - 205.

Iron Materials Corrosion Protection

Encase cast and ductile iron piping in eight (8) mil. thick low-density polyethylene or four (4) mil. thick high-density; cross-laminated polyethylene plastic tubes or wraps per AWWA Standard C - 105; coat with a high quality dielectric coating such as polyurethane or coal tar epoxy. Electrically insulate underground iron pipe from dissimilar metals and above ground iron pipe with insulated joints and dielectric fittings.

Protect any iron valves and fittings with double polyethylene wrap per AWWA C - 105. Where concrete thrust blocks are to be placed against iron, use a single-polyethylene wrap to prevent concrete/iron contact and to eliminate the slipperiness of double wrap.

Buried Copper Tubing

Buried copper tubing for cold and hot water shall be encased in plastic pipe or cathodic protection should be applied.

All Pipes

On all pipes, it is recommended to coat bare steel appurtenances such as bolts, joint harnesses, or flexible couplings with a coal tar or elastomer-based mastic; coal tar epoxy, moldable sealant, wax tape; or equivalent after assembly.

Where metallic pipelines penetrate concrete structures such as building floors or walls, use plastic sleeves, rubber seals, boots, or other dielectric material to prevent pipe contact with the concrete and reinforcing steel.

Other Protective Measures

Electrically insulate (isolate) below-grade ferrous metals by means of dielectric fittings in exposed metal structures breaking grade.

All steel and wire concrete reinforcement of structures and foundations in contact with Site soils should have at least five tenths (0.50) of an inch greater cover than required by the ACI code and a water-cement ratio of five tenths (0.5) or less.

GEOTECHNICAL OBSERVATION AND TESTING SERVICES

Consultant should provide continuous observation and testing during Grading of the subject Site. It is the responsibility of Client to notify Consultant of the date of the pre-grade meeting as well as notifying the inspector of record. The recommendations provided in this report are based on preliminary design information and sub-surface conditions disclosed by widely spaced trenches. The outlined sub-surface conditions should be verified in the field during construction. Consultant should prepare a final as-grade soil report and maps summarizing all conditions encountered and any field modification to the recommendations provided herein. The primary aspects of geotechnical observation and testing may include the following on an as needed basis:

- Observation of all removal and over excavation.
- Observation and material testing during fill placement.
- Geologic mapping of cut slopes (if recommended).
- Observation of footing excavations.
- After pre-saturation of the slab areas, but prior to placement of sand and visqueen.
- During utility trench excavation backfilling and compaction.
- Prior to construction of pavement, parking, and driveway areas to perform R-Value tests (if needed).

- During compaction of sub-grade and aggregate base.
- When any unusual conditions are encountered.

It is the responsibility of Client to ensure the above testing/observations are satisfied and that Consultant is given forty-eight (48) hours prior notice. Any grading performed at the subject Site that does not conform to the recommendations in this Report is the sole liability of Client.

LIMITATIONS

This Report is issued with the understanding that it is the responsibility of the Client to ensure that the information and recommendations contained herein are called to the attention of all parties concerned, including but not limited to future owners, agents, designers and contractors, as well as that the necessary steps are taken to ensure that such recommendations are carried out under any and all circumstances/conditions.

Conclusions and recommendations presented in this Report are based on soil conditions as encountered at the test locations and may not necessarily represent areas between and beyond the trenches. No representation is made to the quality or chemical characteristic of on-Site soil. This Report is not transferable without written consent of Consultant. This Report shall not be used for any appraisal purposes or cost evaluation.

If conditions other than those noted in this Report are encountered, Consultant should be notified immediately so that supplementary recommendations can be provided.

Consultant will be available to make a final review of the project plan and specifications and to assist in assuring correct interpretation of this Report's recommendations for use in applicable sections.

A representative of Consultant should inspect all Grading operations, including Site clearing and stripping. The presence of Consultants' field representative will be for the purpose of providing observation and field testing, and will not include any supervising or directing of the actual work of the Contractor (its employees or agents). Neither the presence of Consultants' field representative nor the observations and testing by Consultant shall excuse the Contractor in any way for defects discovered in Contractors' work.

It is understood that Consultant will not be responsible for job or Site safety on this project, which will be the responsibility of Client and Client's contractor.

Again, it is imperative that all recommendations provided herewith to be adhered to throughout the life of the project. No changes or variations shall be allowed without written approval of Consultant.

The conclusions and recommendations presented in this Report are based upon preliminary field and laboratory observation described herein and information available at this time within the limits prescribed by Client. 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, Consultant should be contacted immediately in order to evaluate their effect and prepare additional recommendations.

This Report concludes Consultants' services under the scope of services and Consultant makes no other representations or any other warranties, expressed or implied.

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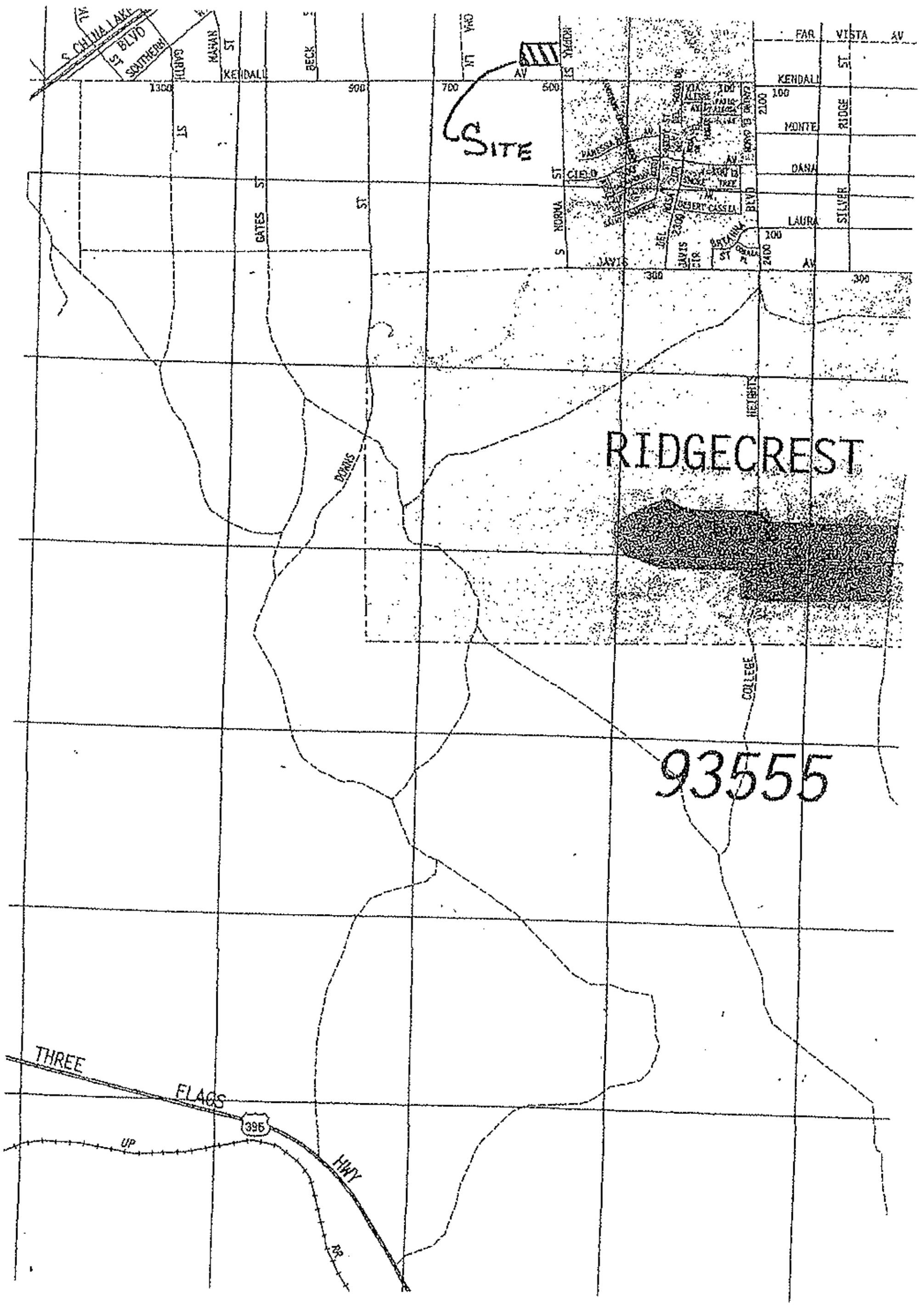
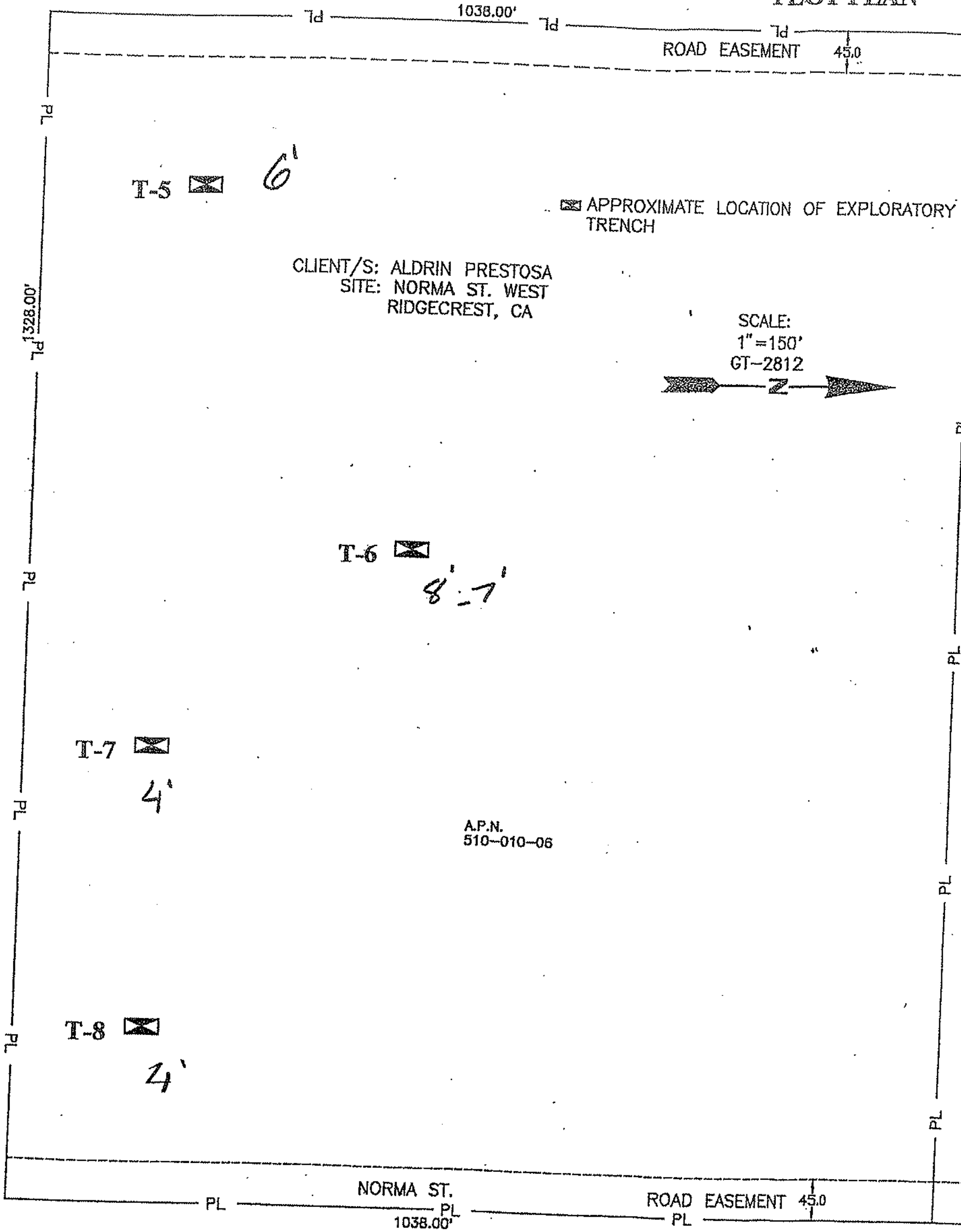
This Report does not cover any environmental, geologic, or flood hazards. If any such hazards exist, a geology report will be required.

ENCLOSURES

VICINITY MAP

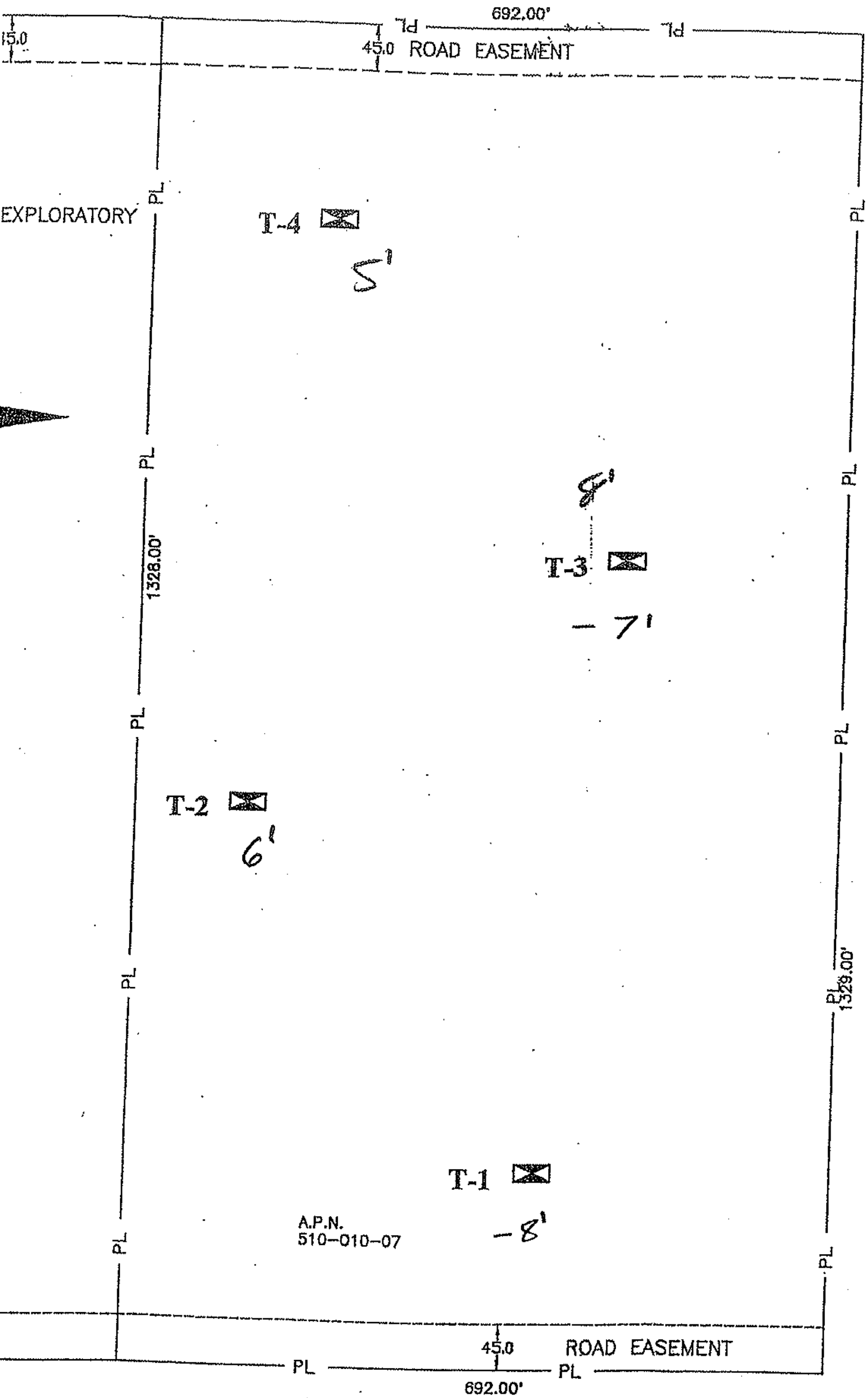


PLOT PLAN



1038.00'
PL
ROAD EASEMENT
45.0
T-5
6'
APPROXIMATE LOCATION OF EXPLORATORY TRENCH
CLIENT/S: ALDRIN PRESTOSA
SITE: NORMA ST. WEST
RIDGECREST, CA
SCALE:
1"=150'
GT-2812
N
1328.00'
T-6
8'-7'
T-7
4'
A.P.N.
510-010-06
T-8
4'
NORMA ST.

PLAN


692.00'
PL
45.0 ROAD EASEMENT
15.0
EXPLORATORY
T-4
5'
8'
T-3
- 7'
1328.00'
1329.00'
T-2
6'
T-1
- 8'
A.P.N.
510-010-07
45.0 ROAD EASEMENT
692.00'

TRENCH LOGS

TRENCH LOG SUMMARY

Date: 11/7/05	Project Number: GT-2812	Logged By: DS/JC
Client: Aldrin Prestosa	Location: Norma St. W., Ridgecrest	Trench No: T-1

Depth	Sample Number	Dry Density (pcf)	Percent Moist.	USCS	Description
0					
1					
2	(1) @ 2'	115.2	2.0	SM	Reddish Brown, Well Cemented Silty Sand, Slightly Moist, Very Dense.
3					
4	(2) @ 4' [A]	113.0	7.5	SC	Reddish Brown, Clayey Silty Sand, Moist, Dense.
5					
6	⊗ @ 6'			SM	Brown, Well Cemented Clay Silty Sand, Mostly Dry, Very Dense.
7				SC	Brown, Heavily Fortified With Calcium Carbonate Silty Clayey Sand, Mostly Dry, Extremely Dense.
8					End Of Trench At Eight (8) Feet. Refusal Due To Very Dense Caliche. No Groundwater Or Bedrock Encountered.

O = Ring Sample ☐ = Bulk Sample ⊗ = No Recovery

Graphic Representation

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

TRENCH LOG SUMMARY

Date: 11/7/05	Project Number: GT-2812	Logged By: DS/JC
Client: Aldrin Prestosa	Location: Norma St. W., Ridgecrest	Trench No: T-2

Depth	Sample Number	Dry Density (pcf)	Percent Moist.	USCS	Description
0					
1					
2	① @ 2'	108.7	2.1	SM	Reddish Brown, Clay Silty Sand, Slightly Moist, Moderately Dense.
3					
4	⊗ @ 4'			SM	Brown, Well Cemented Clay Silty Sand Fortified With Calcium Carbonate Deposits, Dry, Very Dense.
5				SM	Brown, Well Cemented Silty Sand With Heavy Deposits Of Calcium Carbonate, Dry, Extremely Dense.
6					End Of Trench At Six (6) Feet. Refusal Due To Very Dense Caliche. No Groundwater Or Bedrock Encountered.

O = Ring Sample ☐ = Bulk Sample ⊗ = No Recovery

Graphic Representation

Depth axis (1–15): 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Horizontal axis (1–24): 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

TRENCH LOG SUMMARY

Date: 11/7/05	Project Number: GT-2812	Logged By: DS/JC
Client: Aldrin Prestosa	Location: Norma St. W., Ridgecrest	Trench No: T-3

Depth	Sample Number	Dry Density (pcf)	Percent Moist.	USCS	Description
0					
1					
2	① @ 2'	121.0	1.1	SM	Brown, Clay Sand, Dry To Slightly Moist, Moderately Dense.
3					
4	⊗ @ 4'			SM	Brown, Clay Silty Sand With Scattered Angular Gravels, Dry, Moderately Dense.
5					
6	③ @ 6'	115.8	2.4	SM	Reddish Brown, Silty Sand With Rootlets, Slightly Moist, Dense.
7					
8	⊗ @ 8'			SM	Brown, Silty Sand With Scattered Angular Gravels And Extremely Cemented With Calcium Deposits, Dry, Very Dense. End Of Trench At Eight (8) Feet. Refusal Due To Very Dense Well Cemented Soil. No Groundwater Or Bedrock Encountered.

O = Ring Sample ☐ = Bulk Sample ⊗ = No Recovery

	Graphic Representation
1	
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4	
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11	
12	
13	
14	
15	
	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

TRENCH LOG SUMMARY

Date: 11/7/05	Project Number: GT-2812	Logged By: DS/JC
Client: Aldrin Prestosa	Location: Norma St. W., Ridgecrest	Trench No: T-4

Depth	Sample Number	Dry Density (pcf)	Percent Moist.	USCS	Description
0					
1					
2	⊗ @ 2'			ML/SM	Brown Well Cemented Sandy Clay Silt To Silty Clay Sand With Calcium Carbonate Present, Slightly Moist, Dense.
3					
4					
5					End Of Trench At Five (5) Feet. Refusal Due To Well Cemented Silty Calcium Carbonate. No Groundwater Or Bedrock Encountered.

O = Ring Sample ☐ = Bulk Sample ⊗ = No Recovery

	Graphic Representation
1	
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4	
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6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

TRENCH LOG SUMMARY

Date: 11/7/05	Project Number: GT-2812	Logged By: DS/JC
Client: Aldrin Prestosa	Location: Norma St. W., Ridgecrest	Trench No: T-5

Depth	Sample Number	Dry Density (pcf)	Percent Moist.	USCS	Description
0					
1					
2	⊗ @ 2'			SM	Brown, Cemented Clay Silty Sand, Dry, Moderately Dense.
3					
4	⊗ @ 4'			SM	Brown, Clay Silty Sand Cemented With Calcium Carbonate, Dry, Dense.
5	B				
6	⊗ @ 6'			SM	Brown, Silty Sand Cemented With Calcium Carbonate, Dry, Dense.
7					End Of Trench At Seven (7) Feet. Refusal Due To Well Cemented Silt With Calcium Carbonate. No Groundwater Or Bedrock Encountered.

O = Ring Sample □ = Bulk Sample ⊗ = No Recovery

Graphic Representation

Depth: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

TRENCH LOG SUMMARY

Date: 11/7/05	Project Number: GT-2812	Logged By: DS/JC
Client: Aldrin Prestosa	Location: Norma St. W., Ridgecrest	Trench No: T-6

Depth	Sample Number	Dry Density (pcf)	Percent Moist.	USCS	Description
0					
1					
2	① @ 2'	117.8	1.9	SM	Reddish Brown, Clay Silty Sand, Slightly Moist, Moderately Dense.
3					
4	② @ 4'	118.4	1.8	SM	Reddish Brown, Clay Silty Sand, Slightly Moist, Moderately Dense.
5					
6	⊗ @ 6'			SM	Brown, Silty Sand, Dry, Dense.
7					
8	⊗ @ 8'			SM	Brown, Well Cemented Caliche Silty Sand, Dry, Extremely Dense. End Of Trench At Eight (8) Feet. Refusal Due To Well Cemented Silty Sand) No Groundwater Or Bedrock Encountered.

O = Ring Sample   □ = Bulk Sample   ⊗ = No Recovery

	Graphic Representation
1	
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10	
11	
12	
13	
14	
15	
	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

TRENCH LOG SUMMARY

Date: 11/7/05	Project Number: GT-2812	Logged By: DS/JC
Client: Aldrin Prestosa	Location: Norma St. W., Ridgecrest	Trench No: T-7

Depth	Sample Number	Dry Density (pcf)	Percent Moist.	USCS	Description
0					
1					
2	⊗ @ 2'			ML	Brown, Well Cemented Calcium Carbonate Sandy Silt, Dry, Dense.
3					
4	⊗ @ 4'			ML	Brown, Sandy Silt With Large Angular Cobbles, Dry, Dense. End Of Trench At Four (4) Feet. Refusal Due To Caliche. No Groundwater Or Bedrock Encountered.

O = Ring Sample ☐ = Bulk Sample ⊗ = No Recovery

	Graphic Representation
1	
2	
3	
4	
5	
6	
7	
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10	
11	
12	
13	
14	
15	
	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

TRENCH LOG SUMMARY

Date: 11/7/05	Project Number: GT-2812	Logged By: DS/JC
Client: Aldrin Prestosa	Location: Norma St. W., Ridgecrest	Trench No: T-8

Depth	Sample Number	Dry Density (pcf)	Percent Moist.	USCS	Description
0					
1					
2	① @ 2'	116.7	2.6	SM	Reddish Brown, Clay Silty Sand, Slightly Moist, Moderately Dense-To-Dense.
3					
4	⊗ @ 4'			ML	Brown, Well Cemented Calcium Carbonate And Sandy Silt, Dry, Dense. End Of Trench At Four (4) Feet. Refusal Due To Dense Caliche. No Groundwater Or Bedrock Encountered.

O = Ring Sample □ = Bulk Sample ⊗ = No Recovery

	Graphic Representation
1	
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15	
	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Subdivisions			Symbol	Typical Descriptions
Coarse Grained Soils More Than 50% Of Material Is Larger Than No. 200 Sieve	Gravel And Gravelly Soils More Than 50% Of Coarse Fraction Retained On No. 4 Sieve	Clean Gravels (Little To No Fines)	GW	Well-Graded **Gravels**, Gravel-Sand Mixtures, Or Little To No Fines.
			GP	Poorly Graded **Gravels** Or Gravel-Sand Mixtures; Or Little To No Fines
		Gravels With Fines	GM	**Silty Gravels**, Gravel-Sand-Silt Mixtures.
			GC	**Clayey Gravels**, Gravel-Sand-Clay Mixtures.
	Sand And Sandy Soils More Than 50% Of Coarse Fraction Passing No. 4 Sieve	Clean Sand (Little To No Fines)	SW	Well-Graded **Sands**, Gravelly Sands, Or Little To No Fines.
			SP	Poorly Graded **Sands** Or Gravelly Sands; Or Little To No Fines.
		Sands With Fines	SM	**Silty Sands** And Sand-Silt Mixtures With Some Gravel.
			SC	**Clayey Sands**, Sand-Clay Mixtures.
Fine Grained Soils More Than 50% Of Material Passes No. 200 Sieve	Silts And Clays	Liquid Limit Less Than 50	ML	Inorganic **Silts** And Very Fine Sands, Clayey Fine Sands, Or Clayey Silts Of Low Plasticity.
			CL	Inorganic **Silts** Of Low To Medium Plasticity, Gravelly Sandy, Silty Clays, Or Lean Clays.
			OL	Organic **Silts** And Organic Silty; Clays Of Low Plasticity.
	Silts And Clays	Liquid Limit Greater Than 50	MH	Inorganic Silts; Micaceous, 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 TESTING

DESCRIPTION OF LABORATORY TESTING

Undisturbed Samples

Undisturbed samples for additional testing in our laboratory are obtained per ASTM D – 1586 – 74, by driving a sampling spoon into the material. A split barrel type spoon sampler was used, having an inside diameter of two and five tenths (2.5) inches, with a tapered cutting tip at the lower end and a ball valve at the upper end. The barrel is lined with thin brass rings, each one (1) inch in length. The spoon penetrated into the soil below the depth of the trench at approximately twelve (12) inches to eighteen (18) inches. The central portion of the sample is retained for testing. All samples in the natural field condition are placed in airtight containers and transported to the laboratory. Bulk samples, representative of the surface and near-surface materials, are obtained.

Classification

Typical materials were subjected to mechanical grain-size analysis by wet sieving from U.S. Standard brass screens (ASTM D - 422). Hydrometer analyses were performed where appreciable quantities of fines were encountered. The data was evaluated in determining the classification of the materials. The grain-size distribution curves are presented in the test data and the Unified Soil Classification is presented in both the test data and the Trench Logs.

Moisture and Density Test

Moisture content and dry density determinations were performed on relatively undisturbed samples obtained from the test trenches. The results of these tests are presented in the Trench Logs. Where applicable, only moisture content was determined from "undisturbed" or disturbed samples.

Expansion Index Test

The Expansion Index Test, UBC Standard No. 18 - 2, evaluated the expansion potential of selected materials. Specimens are molded under a given compactive energy approximately to the optimum moisture content and approximately fifty percent (50%) saturation or approximately ninety percent (90%) relative compaction.

The prepared one (1) inch thick by four (4) inches in diameter specimens are loaded to an equivalent one hundred forty-four (144) psf surcharge and are inundated with tap water until a volumetric equilibrium is reached.

Consolidation

Compression tests are performed on undisturbed and/or remolded samples in a two and five tenths (2.5) inches diameter, and one (1) inch high brass ring. Consolidometers, like the direct shear machine, are designed to receive the specimens in the rings in field condition. Porous stones, placed at the top and bottom of each specimen, permit the free flow of water from the sample during the test. Settlement accompanying each increment of load is measured by a dial indicator reading to one ten thousandths (0.0001) of an inch. To simulate possible adverse field conditions, moisture was added to an axial load of fifteen hundred (1,500) lbs./sq.ft. and Test Method: ASTM D – 2435 - 86 was followed.

Standard Penetration Test

Standard Penetration Testing is performed in the trench per ASTM D – 1586 - 86 by driving a split spoon sampler ahead of the trench at selected levels. The number of hammer blows required to drive the sampler twelve (12) inches with a one hundred forty (140) lb. Hammer dropped thirty (30) inches is identified as the Standard Penetration Resistance (SPT). Many correlations have been made between SPT values and soil properties. Empirical correlations also permit the blows of different energy or sampler sizes, such as ring samples, to be converted to SPT values.

Direct Shear

Direct shear tests were performed on selected undisturbed and/or remolded samples, which were soaked for a minimum of twenty-four (24) hours under a surcharge equal to the applied normal force during testing. After transfer of the sample to the shear box, and reloading the sample, pore pressures set up in the sample due to the transfer were allowed to dissipate for a period of approximately one (1) hour prior to application of shearing force. The samples were tested under various normal loads, a different specimen being used for each normal load.

The samples were sheared in a motor-driven, strain-controlled, direct-shear testing apparatus at a strain rate of five hundredths (0.05) of an inch per minute. After a travel of three tenths (0.300) of an inch of the direct shear machine, the motor was stopped and the sample was allowed to "relax" for approximately fifteen (15) minutes.

The "relaxed" and "peak" shear values were recorded. It is anticipated that, in the majority of samples tested, the fifteen (15) minutes relaxing of the sample is sufficient to allow dissipation of pore pressures set up in the samples due to application of shearing force. The relaxed values are therefore judged to be a good estimation of effective strength parameters. The test results were plotted on "Table 2 – Direct Shear Test".

Residual Direct Shear Test

The samples were sheared, as described in the preceding paragraph, with the rate of shearing of one thousandths (0.001) of an inch per minute. The upper portion of the specimen was pulled back to the original position and the shearing process was repeated until no further decrease in shear strength was observed with continued shearing (at least three times resheared). There are two methods to obtain the shear values: (a) the shearing process was repeated for each normal load applied and the shear value for each normal load recorded. One or more than one specimen can be used in this method; (b) only one specimen was needed, and a very high normal load (approximately nine thousand (9,000) psf) was applied from the beginning of the shearing process. After the equilibrium state was reached (after "relaxed"), the shear value for that normal load was recorded. The normal loads were then reduced gradually without shearing the sample (the motor was stopped). The shear values were recorded for different normal loads after they were reduced and the sample was "relaxed.

Atterberg Limits

The Atterberg Limits were determined in accordance with ASTM D - 4318 for engineering classification of the fine-grained materials.

Maximum Density Test

The maximum dry density and optimum moisture content of typical materials were determined in accordance with ASTM D - 1557-78 (five (5) layers). The results of these tests are presented in the test data.

Soluble Sulfates

The California Materials Test Method No. 417 determined the soluble sulfate contents of selected samples.

Resistivity Test

California Materials Test Method # 643 as prescribed and forwarded from the California Department of Transportation Materials Lab determined the resistivity test, selected samples, and results. The sample was prepared for testing as follows: Bulk sample material was sieved through a number eight (8) sieve and sixteen hundred (1,600) grams of natural material was collected, weighed, and dried. The sample was removed from the oven and thirteen hundred (1,300) grams of material was separated and prepared as follows: The sample was oven dried and one hundred fifty (150) ml of distilled (deionized) water was added to the material and mixed thoroughly and placed into a calibrated soil box suitable for use with a Nillson Model 400 resistivity meter. The sample was compacted into the soil box by hand level with the top of the soil box.

The material was then tested for resistivity and removed from the soil box and an additional one hundred (100) ml of distilled (deionized) water was added. With two hundred fifty (250) ml. of water added to the sample the material was returned to the soil box in the manner mentioned hereinabove and the material was tested again. Both test results were recorded in an appropriate manner for recording such data.

TABLE I

Maximum Density Test Results

ASTM D - 1557

Sample	Soil Description	USCS	Maximum Dry Density (pcf)	Optimum Moisture (%)
A/B	Gravelly Clayey Silty Sand	SC	133.4 pcf	9.3%

TABLE II

Direct Shear – Undisturbed Saturated Samples

Trench	Angle Of Friction (degrees)	Cohesion (psf)
T-1 @ 4'	38.9°	437.7 psf
T-3 @ 6'	47.2°	43.3 psf

Remolded Saturated Samples

Sample	Angle Of Friction (degrees)	Cohesion (psf)
A/B	48.5°	0 psf

TABLE III

Chemical Test Results

Sample	Sulfates	Chlorides	pH
A/B	150 ppm (.015%)	20 ppm	8.0

TABLE IV

Expansion Test Results

ASTM D - 4829

Sample	Expansion Index	Expansion Potential
A/B	53	Medium

TABLE V

Resistivity Test Results

California State Method No. 643

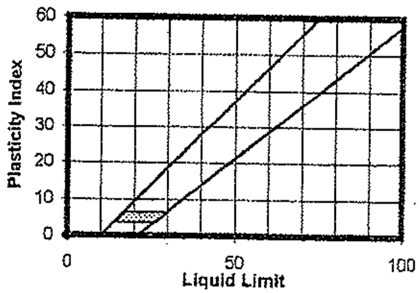
Sample: A/B

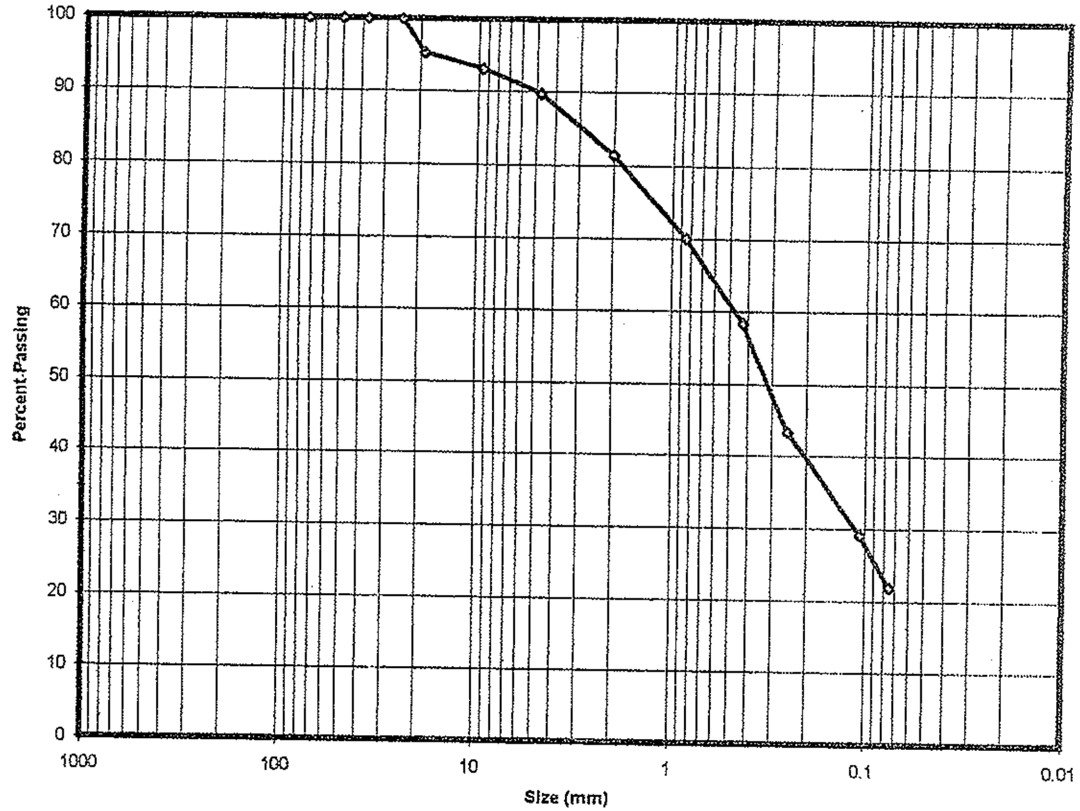
Water Added	Dial Reading	Range Setting	OHM Reading	Factor	OHM-CM
150 mls	20	1K	20,000	**.636**	12,720
250 mls	44	100	4,400	**.636**	2,798

Resistivity Classification

OHMs-CM	Classification
Below 500	Very Corrosive
501 - 999	Corrosive
1,000 – 1,999	Moderately Corrosive
2,000 – 9,999	Mildly Corrosive
10,000 - Above	Negligible

Sieve Size	Percent Passing
3 inch	100
1.5 inch	100
3/4 inch	95.2
3/8 inch	93.1
No. 4	89.8
No. 8	81.4
No. 16	70.1
No. 30	58.4
No. 50	43.3
No. 100	29.1
No. 200	22
Liquid Limit	0
Plastic Limit	0
Plasticity Index	0





Grain Size Analysis and Soil Classification (ASTM D422-63 & D2487-85)

Sample Identification	Sample Description	Unified Soil Classification	PLATE: G-1 J.O.: GT-2812 DATE: 11/16/05
A & B	GrvlyClyeySltySd	SM	

PLATE: HC-1
J.O.: GT-2812
DATE: 11/18/05

Consolidation Pressure Curve

Sample Identification	Sample Description
T-3 @ -6.0'	SiltySand
Wi=2.4% Wf=12.4%	Ws=115.8 pcf

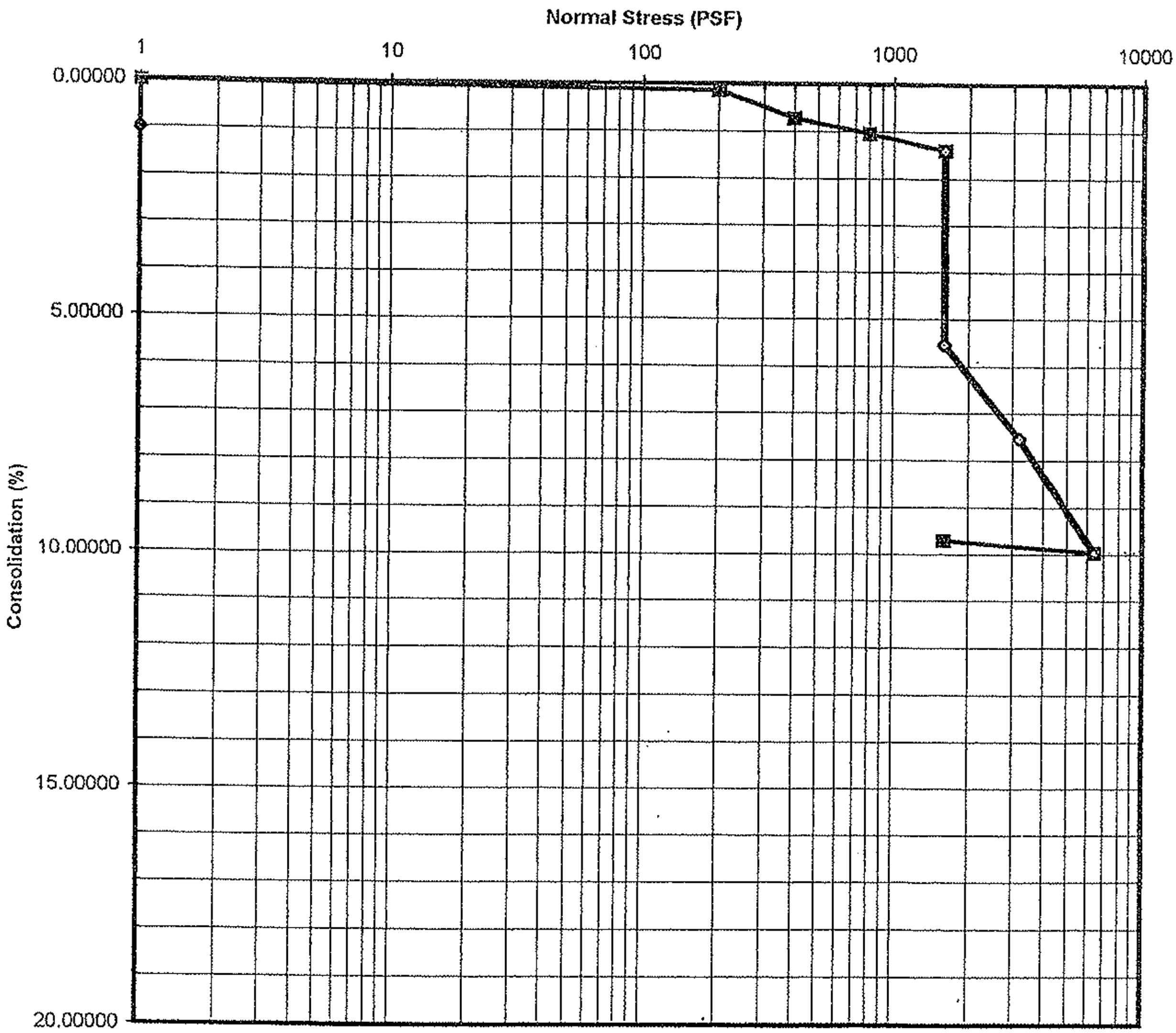


PLATE: HC-2
J.O.: GT-2812
DATE: 11/18/05

Consolidation Pressure Curve

Sample Identification	Sample Description
T-6 @ -4.0'	SiltySand
Wi=1.8% Wf=11.8%	Ws=118.4 pcf

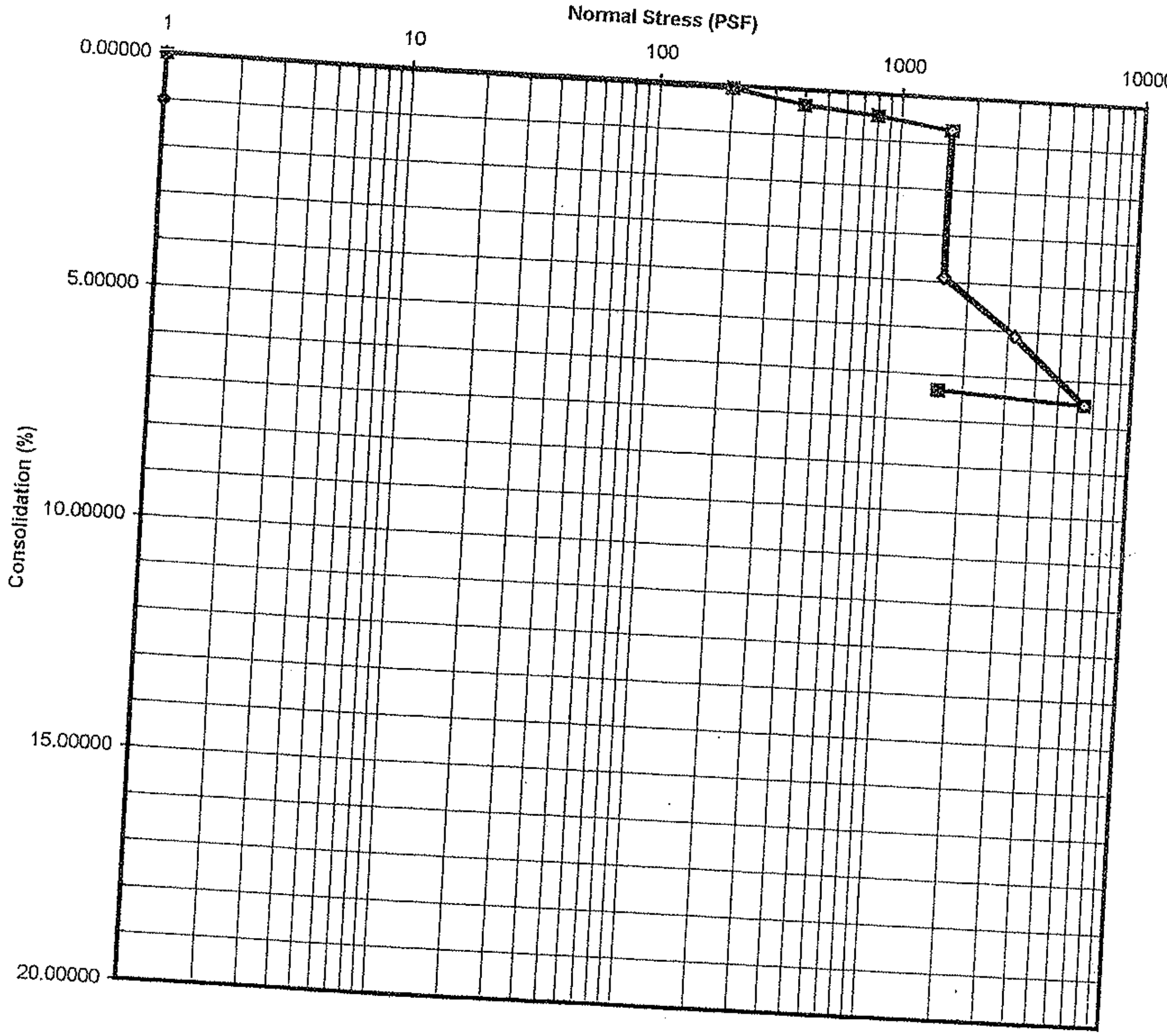
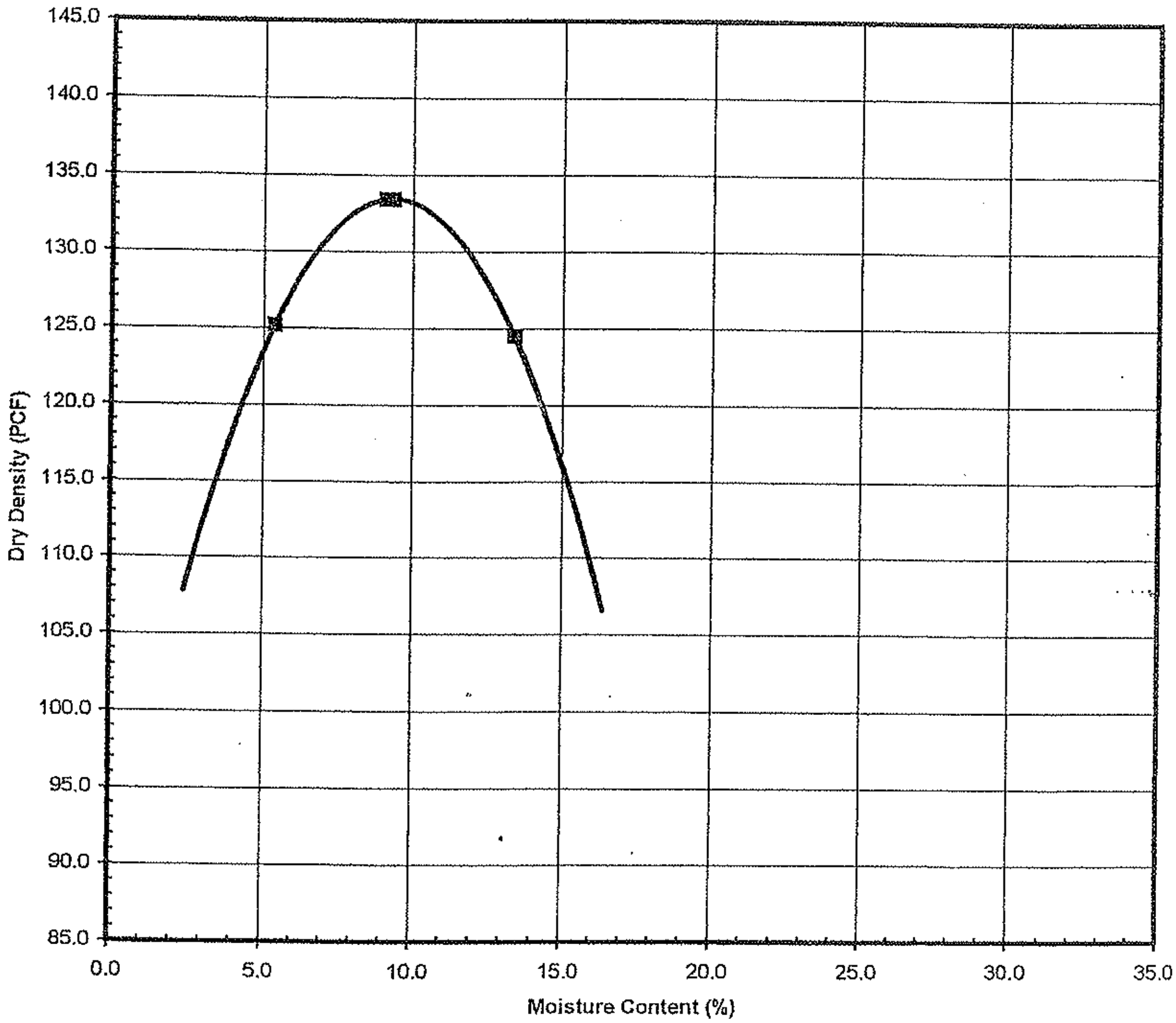


PLATE: M-1
J.O.: GT-2812
DATE: 11/21/05

Maximum Dry Density & Optimum Moisture Curve

Sample Identification	Sample Description	Maximum Dry Density (PCF)	Optimum Moisture (%)
A & B	GrvlyClyeySltySd	**133.4**	**9.3**



AV GEO TECHNICS, INC.

DIRECT SHEAR

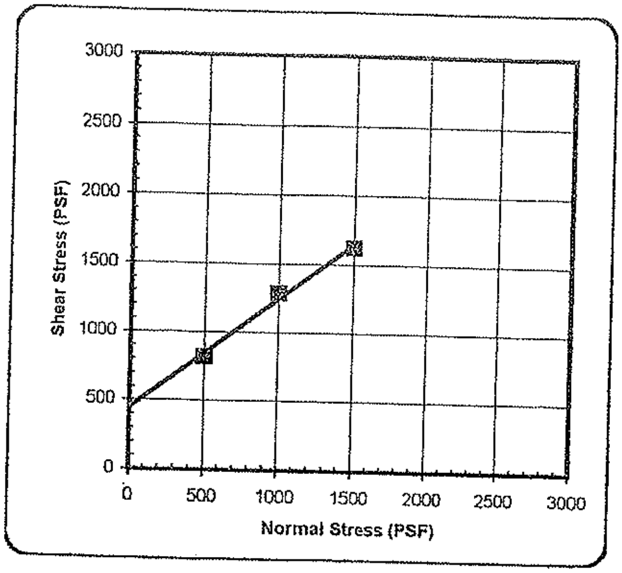
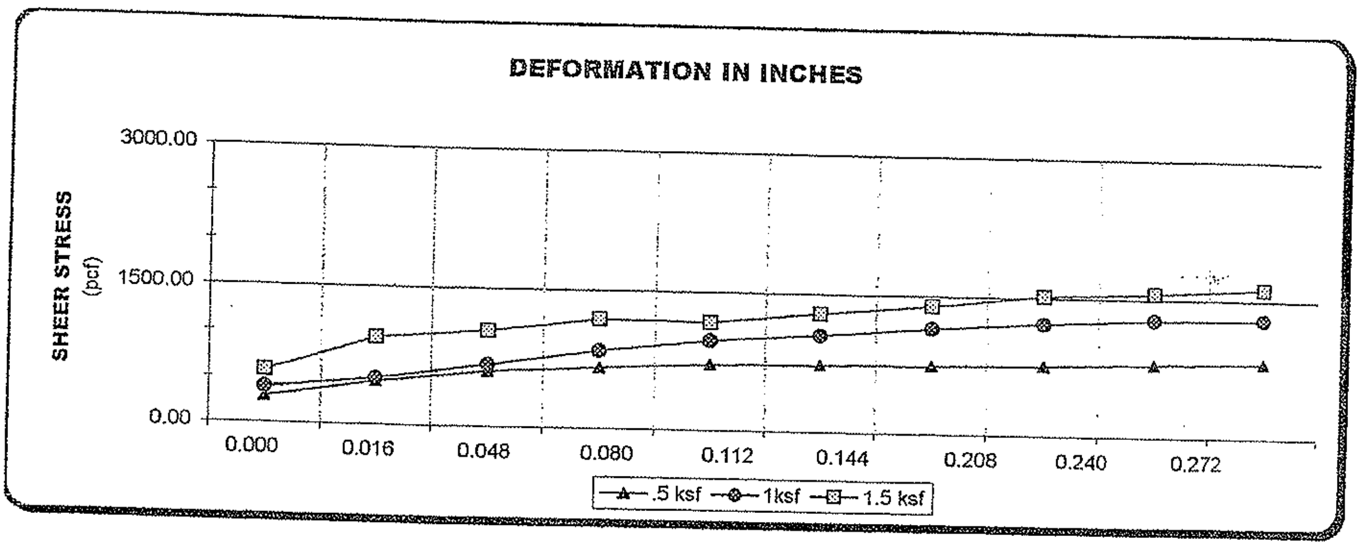


PLATE: S-1
J.O.: GT-2812
DATE: 11/10/05



DATE	11/10/05
PROJECT #	GT-2812
BORING/TRENCH	T-1
SAMPLE	2
DEPTH	4'
SOIL DESCRIPTION	ClayeySiltySand

WI %	7.5%
WF %	21.0%
WS pcf	113
COHESION STRENGTH psf	437.7
FRICTION ANGLE DEGREE phi	38.9

ULTIMATE SHEAR STRENGTH	X
UNDISTURBED	X
SATURATED	X
RUN	

NORMAL SHEAR STRENGTH	
DISTURBED	
DRY	
RERUN	X
REMOLD TO 90%	

AV GEO TECHNICS, INC.

DIRECT SHEAR

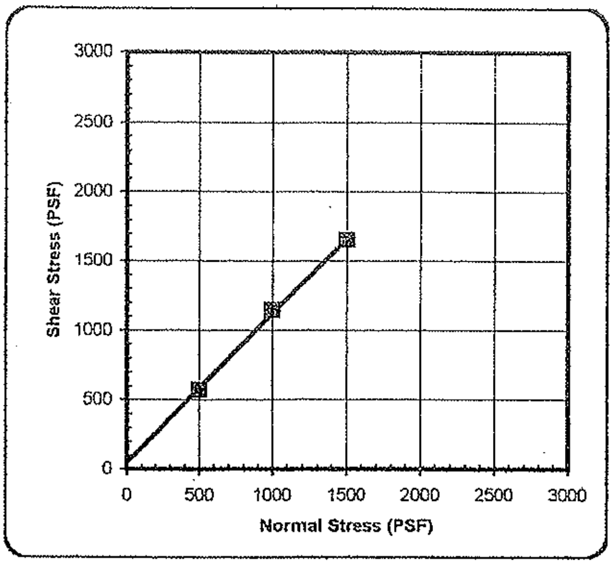
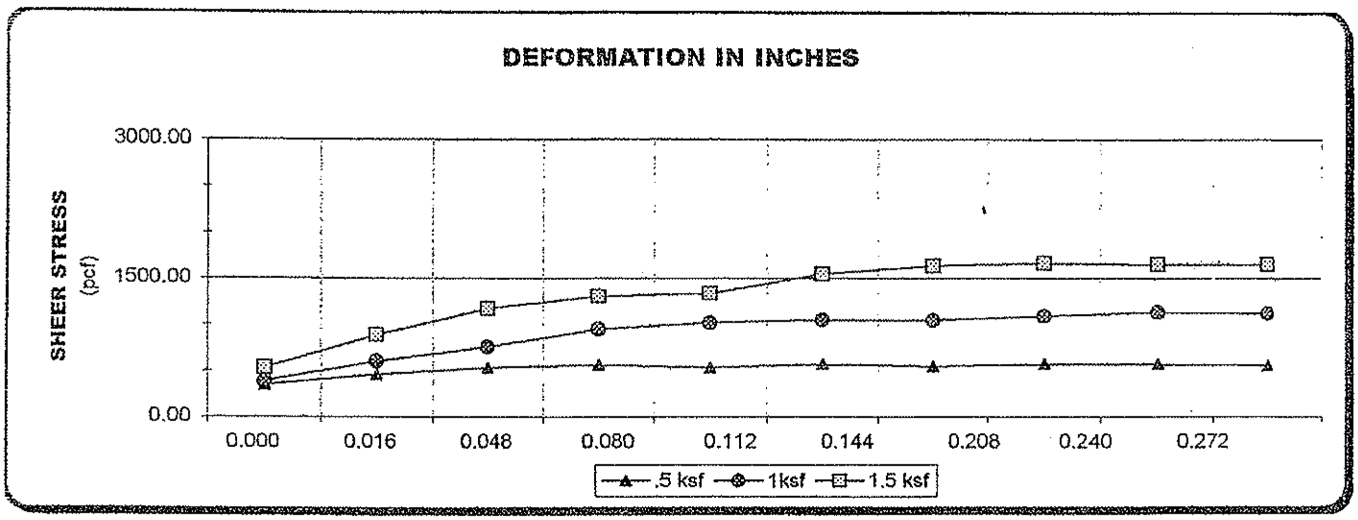


PLATE: S-2
J.O.: GT-2812
DATE: 11/10/05



DATE	11/10/05	WI %	2.4%
PROJECT #	GT-2812	WF %	13.9%
BORING/TRENCH	T-3	WS pcf	115.8
SAMPLE	3	COHESION STRENGTH psf	43.3
DEPTH	6.0'	FRICTION ANGLE DEGREE phi	47.2
SOIL DESCRIPTION	SiltySand		

ULTIMATE SHEAR STRENGTH	X	NORMAL SHEAR STRENGTH	
UNDISTURBED	X	DISTURBED	
SATURATED	X	DRY	
RUN		RERUN	X
		REMOLD TO 90%	

AV GEO TECHNICS, INC.

DIRECT SHEAR

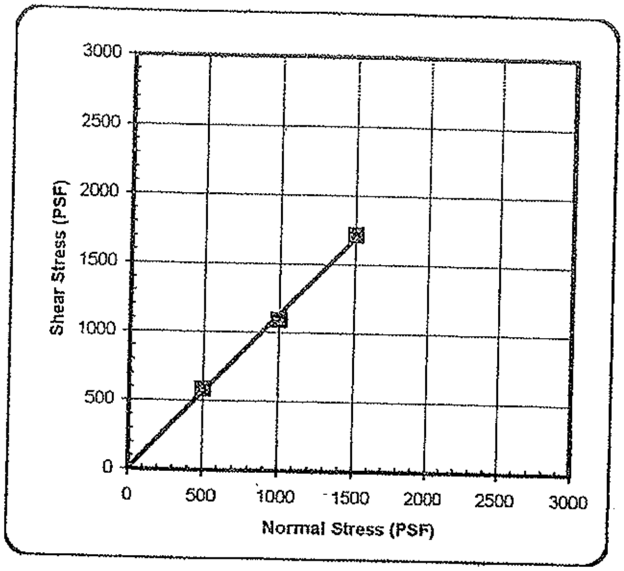
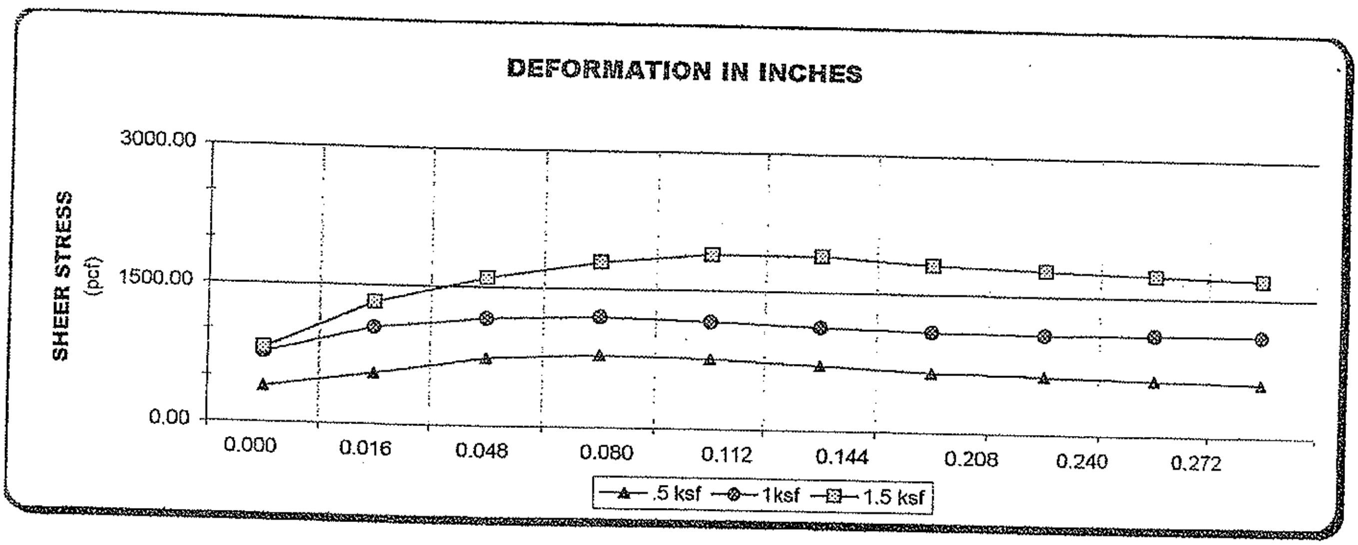


PLATE: S-3
J.O.: GT-2812
DATE: 11/23/05



DATE	11/23/05
PROJECT #	GT-2812
BORING/TRENCH	T-1 & T-5
SAMPLE	A & B
DEPTH	4.0' to 6.0'
SOIL DESCRIPTION	GravellyClayeySiltySand

WI %	9.3%
WF %	15.6%
WS pcf	120.1
COHESION STRENGTH psf	0
FRICTION ANGLE DEGREE phi	48.5

ULTIMATE SHEAR STRENGTH	X
UNDISTURBED	
SATURATED	X
RUN	X

NORMAL SHEAR STRENGTH	
DISTURBED	X
DRY	
RERUN	
REMOLD TO 90%	X

APPENDIX

FIGURE I

Requirements For Concrete Exposed To Sulfate-Containing Solution

Sulfate Exposure	Water Soluble Sulfate (SO_4) Percent By Weight	Water Soluble Sulfate (SO_4) ppm	Cement Type	Maximum Water Cement Ratio	Minimum Compressive Strength Of Concrete (psi)
Negligible	0.00 – 0.10	0 – 999	II		
Moderate	0.10 – 0.20	1,000 – 1,999	II, IP, IS	0.50	4,000
Severe	0.20 – 2.00	2,000 – 20,000	V	0.45	4,500
Very Severe	Over 2.0	Over 20,000	V Plus Pozzolan*	0.40	4,500

Note: A lower water/cement ratio or higher strength may be required for water-tightness for protection against corrosion of embedded items or freezing and thawing.

* *Pozzolan has been determined by test or service record to improve sulfate resistance when used in concrete containing Type V cement.*

FIGURE II

Effect Of Commonly Used Chemicals On Concrete (Durability)

Rate Of Attack At Ambient Temperature	Inorganic Acids	Organic Acids	Alkaline Solutions	Salt Solutions	Misc.
Rapid	Hydrochloric, Hydrofluoric, Nitric, Sulfuric	Acetic, Formic, Lactic		Aluminum Chloride	
Moderate	Phosphoric	Tanic	Sodium Hydroxide > 20%	Ammonium Nitrate, Ammonium Sulfate, Sodium Sulfate, Magnesium Sulfate	Bromine (gas), Sulfate Liquor
Slow	Carbonic		Sodium Hydroxide 10 – 20%	Ammonium Chloride, Magnesium, Sodium Cyanide	Chlorine (gas), Seawater, Soft Water
Negligible		Oxalic, Tartaric	Sodium Hydroxide < 10% Sodium Hydrochloride Ammonium Hydroxide	Calcium Chloride, Sodium Chloride, Zinc Nitrate, Sodium Chromate	Ammonia (liquid)

Note: Avoid siliceous aggregates because they are attacked by strong solutions of sodium hydroxide.

GENERAL EARTHWORK AND GRADING SPECIFICATIONS

General

These specifications and the Grading details attached to the Grading Plans, if required, represent **AZ Geo Technics, Inc.s'** minimum requirements for Grading and other associated operations on construction projects. These specifications and recommendations of the regulatory agencies should be considered a portion of the project specifications.

Clients' contractor (prior to Site Grading) should arrange to meet at the Site along with Client, the design engineer and/or architect, the soils engineer (Consultant), and representatives of the governing authorities. *All parties should be given at least forty-eight (48) hours notice.*

It is Clients' contractor's responsibility to prepare the ground surface to receive the fills, spread, mix, and compact the fill in accordance with the job specifications. Clients' contractor should also have suitable and sufficient equipment in operation to handle the amount of fill being placed.

PREPARATION OF AREA TO BE FILLED

Clearing And Grubbing

All structures marked for removal; timber, logs, trees, brush, and other rubbish shall be removed, piled, and burned or otherwise disposed of off-Site. This is to leave the areas that have been disturbed with a neat appearance and free from unsightly debris.

A thorough search shall be made of the Site for all existing structures to be removed and for possible underground storage tanks and/or septic tanks as well as cesspools. Concrete irrigation lines shall be crushed in place and all metal underground lines shall be removed from the Site.

All trees to be removed from the Site shall be pulled in such a manner so as to remove as much of the root system as possible. Any existing brush, topsoil, loose fill, and porous soils shall be excavated to competent native materials.

Prior to placement of any fill soils, the exposed surface shall be scarified, cleansed of debris, and re-compacted to ninety percent (90%) of the laboratory standard under the direction of the soils engineer (Consultant). This is to be done in accordance with the following guidelines for placing, spreading, and compacting fill materials.

Processing

The existing ground, which is determined to be satisfactory for support of fill, shall be scarified to a minimum depth of six (6) inches. Existing ground, which is not satisfactory, shall be over excavated. Scarification shall continue until the soils are broken down and free of large clay lumps and until the working surface is reasonably uniformed and free of uneven features which would inhibit uniform compaction.

Moisture Conditioning

Over-excavated and processed soils shall be watered, dried-back, and blended or mixed as required to attain uniform moisture content. For field-testing purposes, "near optimum" moisture should be considered to mean "optimum moisture to three percent (3%) above optimum moisture".

Prior to placement of additional compacted fill following a Grading delay, the exposed surface of previously compacted fill should be reprocessed. This should be accomplished by scarification, watering conditioning, and then re-compacted to a minimum of ninety percent (90%) of the laboratory maximum dry density.

No Additional fill should be placed following a period of flooding, rainfall, or over watering until damage assessments have been made and remedial Grading performed.

Benching

Where fills are to be placed on the ground with slopes steeper than five to one (5:1) the ground shall be stepped or benched. The lowest bench shall be a minimum of fifteen (15) feet wide and two (2) feet deep. This should expose firm material; it also should be approved by the soils engineer (Consultant). Other benches shall be excavated into firm material to a minimum width of four (4) feet. If Grading plans are required, typical benching and keying details are included in the Grading details on the Grading plans.

Approval

All areas to receive fill, including processed areas, removal areas, and toe-of-fill benches shall be approved by the soils engineer (Consultant) prior to fill placement.

All Grading operations should be inspected by a soils engineer (Consultant). The presence of the soils engineer (Consultant) will be for the purpose of providing observation and field-testing. This will not include any supervision of the actual work by Clients' contractor, Clients' contractor's employees and/or agents.

It is understood that the soils engineer (Consultant) will not be responsible for job or site safety on this project, which will be the sole responsibility of Client.

It should be stressed that operations undertaken at the Site without the presence of the soils engineer (Consultant) may result in exclusion of certain areas from the final compaction report.

Fill Placement

All fill material should be placed in layers a maximum of six (6) to eight (8) inches thick, moisture conditioned (as necessary), and compacted to a minimum relative compaction of ninety percent (90%) of their maximum dry density as determined by Test Method ASTM D – 1557 - 78.

FILL MATERIAL

General

Material to be placed as fill shall be free of organic matter and other deleterious substances. This shall be approved by the soils engineer (Consultant). Soils of poor gradation and expansion at strength characteristics shall be placed in areas designated by the soils engineer (Consultant) or shall be mixed with other soils to serve as satisfactory fill material.

Import materials shall meet the following minimum requirements:

A. Plasticity index not to exceed twelve (12).

B. R-Value not less than twenty-five (25).

C. Not more than thirty percent (30%) passing the #200 sieve.

Oversized Material

Rocks eight (8) inches and smaller may be utilized within the compacted fill provided that they are placed in such a manner that nesting of the rock is avoided. Fill should be placed and thoroughly compacted to the minimum requirement over and around all rock.

During the course of grading operations rocks or similar irreducible materials greater than twelve (12) inches may be generated. These rocks should not be placed within the compacted fill unless placed as recommended by the soils engineer (Consultant).

Rocks that are greater than twelve (12) inches but less than three (3) feet that are generated during Grading, may be placed within an approved compacted fill provided that it is in accordance with the recommendations in the Grading details on the Grading plans, if any. Rocks greater than three (3) feet should be broken down or disposed of off-Site. Rocks up to three (3) feet should be placed ten (10) feet below the finished grade and should not be closer than fifteen (15) feet from any slope face. Where practical oversized material should not be placed below areas where structures or deep utilities are proposed.

Oversized material should be placed in windrows on a clean over-excavated/unyielding compacted fill or firm natural ground. Select native or imported granular soils (SE = 30 or better) should be placed or thoroughly flooded over as well as around all windrowed rock (such that no voids remain). Windrows of oversized material should be staggered so that successive strata of oversized material are not in the same vertical plane.

COMPACTION

After each layer has been placed, mixed, and spread evenly is shall be thoroughly compacted to no less than ninety percent (90%) of the maximum density in accordance with ASTM D - 1557. Compaction shall be by sheepsfoot rollers, multiple-wheel pneumatic tire rollers, or other types of rollers. Rollers shall be of such design that they will be able to compact the fill to the specified density. Rolling shall be accomplished while the fill material is at the specified moisture content. Rolling of each layer shall be continuous over its entire area. The roller shall make sufficient trips to ensure that the desired density has been attained.

Fill slopes shall be compacted by means of sheepsfoot rollers or other suitable equipment. Compacting operations shall be continued until the slopes are stable, but not too dense for planting; and that there is no appreciable amount of loose soil on the slopes. Compacting of the slopes may be done progressively in increments of two (2) to four (4) feet in fill height or after the fill is brought to its total height.

Field density tests of each compacted layer of fill shall be made by the soils engineer (Consultant). Density tests may be made at intervals not exceeding two (2) feet of fill height provided that at least every one thousand (1,000) cubic yards of fill are tested. Where sheepsfoot rollers are used, the soils may be disturbed to a depth of several inches. Density test shall be taken in the compacted material below the disturbed surface.

When these tests indicate that the density of a layer or portion is below the required density, that layer or portion shall be reworked until the required density has been attained.

The fill operations shall be continued in six (6) inch compacted layers (as specified above) until the fill has been brought to the finished slopes and grades as shown on the approved Grading plans, if applicable.

SITE PROTECTION

Precautions should be taken to protect the Site from flooding, ponding, or inundation by improper surface drainage. Temporary provisions should be made during the rainy season to direct surface drainage away from the Site. Plastic sheeting should be kept on hand to prevent unprotected slopes from becoming saturated.

Where necessary, Clients' contractor should install check dams, de-silting basins, sandbags, and other devices to control erosion.

Following periods of rainfall, Clients' contractor should arrange a walk-through with the soils engineer (Consultant) to visually assess rain related damage. At the request of the soils engineer (Consultant), Clients' contractor shall make all excavations as necessary to evaluate the extent of rain related damage. Rain related damage might include erosion, silting, saturation, swelling, structural distress, or any other adverse condition observed by the soils engineer (Consultant). Soils adversely affected should be over-excavated and replaced with compacted fill as directed by the soils engineer (Consultant).

SLOPES

Compacted fill or backrolled slopes should be limited to a slope ratio of no steeper than two to one (2:1). All compacted fill slopes shall be overbuilt and cut back to grade, exposing the firm compacted fill liner core.

The actual amount of overbuilding shall be increased until the desired compacted slope surface condition is achieved. Care should be taken by Clients' contractor to provide thorough mechanical compaction to the outer edges of the overbuilt slope surface.

If excavations for cut slopes expose loose, cohesionless, significantly fractured or otherwise unsuitable material; over-excavation, and replacement with a compacted stabilization fill should be done. Stabilization fill construction should conform to the requirements of the Grading details outlined on the Grading plans, if applicable. For cut slopes made in the direction of the prevailing drainage, a non-erodible diversion swale (brow ditch) should be provided at the top-of-cut.

SLOPE MAINTENANCE

In order to enhance surficial slope stability, slope planting should consist of de-rooted vegetation requiring little water. Plants native to Southern California and plants that are relative to native plants are generally desirable. Plants native to other semi-arid and arid areas may also be appropriate. A qualified Landscape Architect should be contracted for specific recommendations.

DRAINAGE

Canyon sub-drain systems should be installed in accordance with the Grading details on the Grading plans, if applicable. Typical sub-drains for compacted fill buttresses, slope stabilizations, or side hill masses should also be installed in accordance with grading details on the Grading plans, if applicable.

All roof, pad, and slope drainage should be directed away from slope area structures to approved disposal areas via gutters, down spouts, or swales. For pad areas created above cut natural slopes, a positive drainage should be established away from the top-of-slopes. This may be accomplished by using a berm and/or appropriate pad gradient. A recommended overall gradient away from the top-of-slope should be two percent (2%) or greater. For drainage immediately away from structures, a minimum five percent (5%) gradient should be maintained.

Pad drainage may be reduced to one percent (1%) for projects where no slopes exist, either natural or manmade.

TRENCH BACKFILLS

Utility trench backfill can be best placed by mechanical compaction. Unless otherwise specified, compaction shall be a minimum of ninety percent (90%) of the laboratory maximum density. As an alternative, where specifically approved by the soils engineer (Consultant) clean sand (sand equivalent thirty (30)) may be thoroughly jetted in place. Jetting should only be considered to apply to trenches no greater than two (2) feet in width and four (4) feet in depth. Following jetting operations, trench backfill should be thoroughly compacted by mechanical means.

GENERAL BASIC RECOMMENDATIONS FOR SLABS-ON-GRADE

1. Concrete used for residential concrete slabs must achieve a minimum compression strength as recommended by (Table 19A – 3 1997 UBC) or as requested by local regulatory agencies.
2. The concrete should have a minimum cement content of five and two tenths (5.2) sacks per cubic yard.
3. The maximum water content should be seven (7.0) gallons per sack per cubic yard in order to maintain an acceptable water to cement ratio.
4. Maximum slump at which the concrete should be placed should not exceed more than six (6) inches.
5. Maximum size of aggregate for concrete should be between three-fourths (¾) to one (1) inch.
6. Please note that every gallon of water added to the concrete above the design mix will result in the loss of a one (1) inch slump and two hundred (200) per square inch in compression strength. (ACI Manual and Practices of Concrete).
7. Delivery time including unloading of concrete shall not exceed ninety (90) minutes. (ACI Manual and Practices of Concrete and UBC Section 19).
8. Slabs must be cured using Hunt's curing compound, or any approved equivalent curing method. (ACI 318, Chapter 26).
9. Reinforcement should be placed within three (3) inches from the bottom or according to the specifications outlined in Section 1907, 1997 UBC.
10. Control joints should be placed typically on ten (10) foot centers for four (4) inch nominal slabs in order to reduce excessive cracking. Formula for joint spacing = 2.5 ft. x (slab thickness in inches).
11. Concrete shall not be placed at temperatures exceeding the recommended limits (a low of fifty (50) degrees F in winter, and a high of one hundred (100) degrees F in summer) (ACI 306).
12. The sub-grade should be relatively moist prior to placing concrete slabs-on-grade, (ACI 318).
13. Daily information must be kept on file concerning concrete tickets, time of pour, temperature, and other factors effecting concrete placement and finishing.

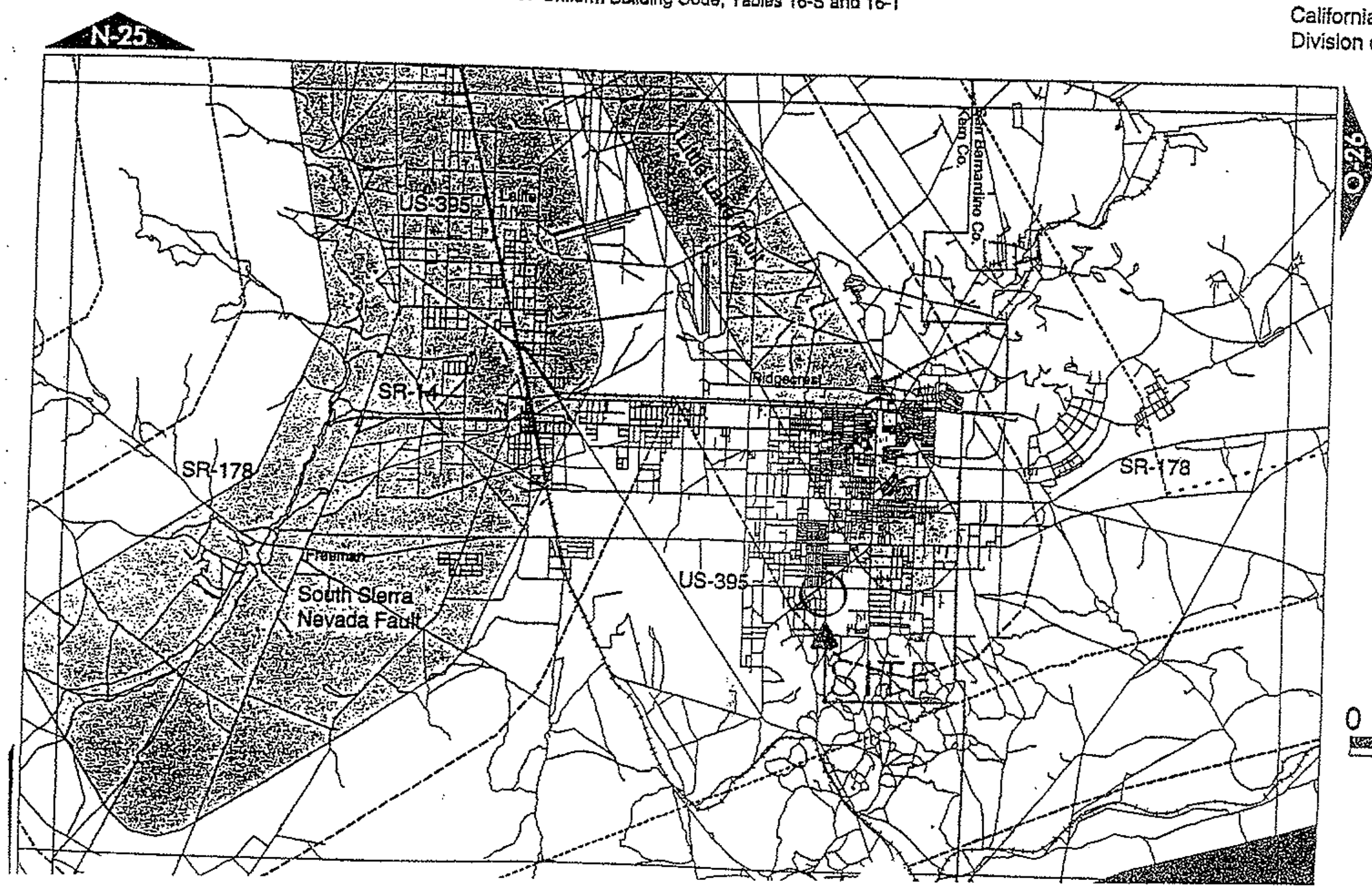
N-26

Active Fault Near-Source Zones

This map is intended to be used in conjunction with the 1997 Uniform Building Code, Tables 16-S and 16-T

N-26

California Department of Conservation
Division of Mines and Geology



LEGEND

See expanded legend and index map

Shaded zones are within 2 km of known seismic sources.

A fault

B fault

Contours of closest horizontal distance to known seismic sources.

5 km

10 km

15 km

0 5 10

Kilometers

1/4" is approximately equal to 1 km